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VOL. XXXIII No. 1

AUTOMOBILE JOURNAL

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Feb. 10, 1912

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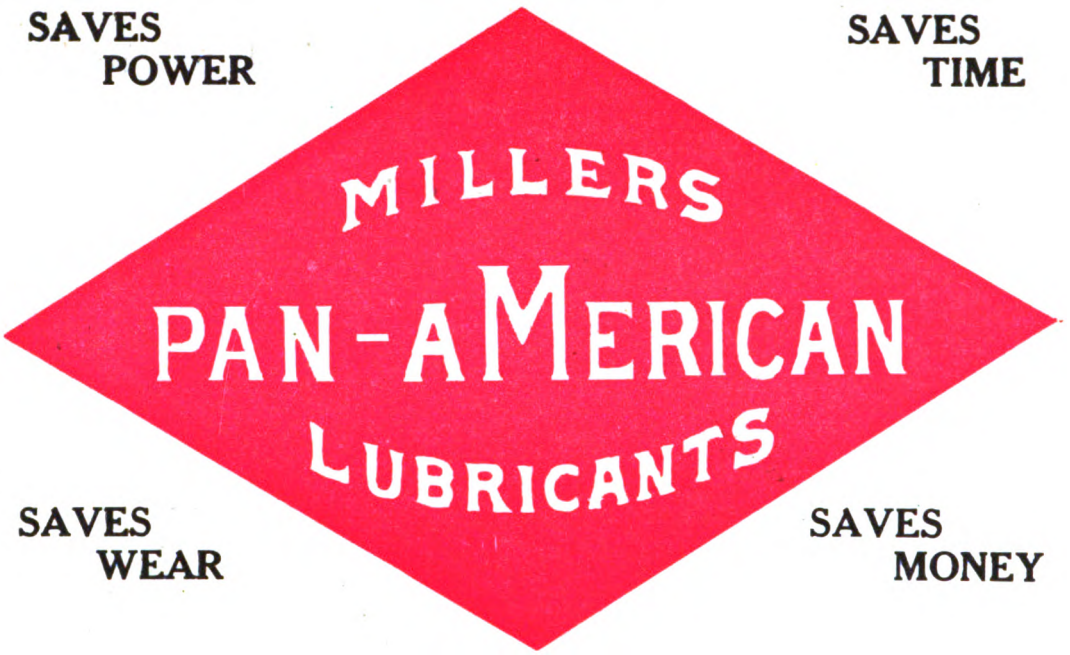
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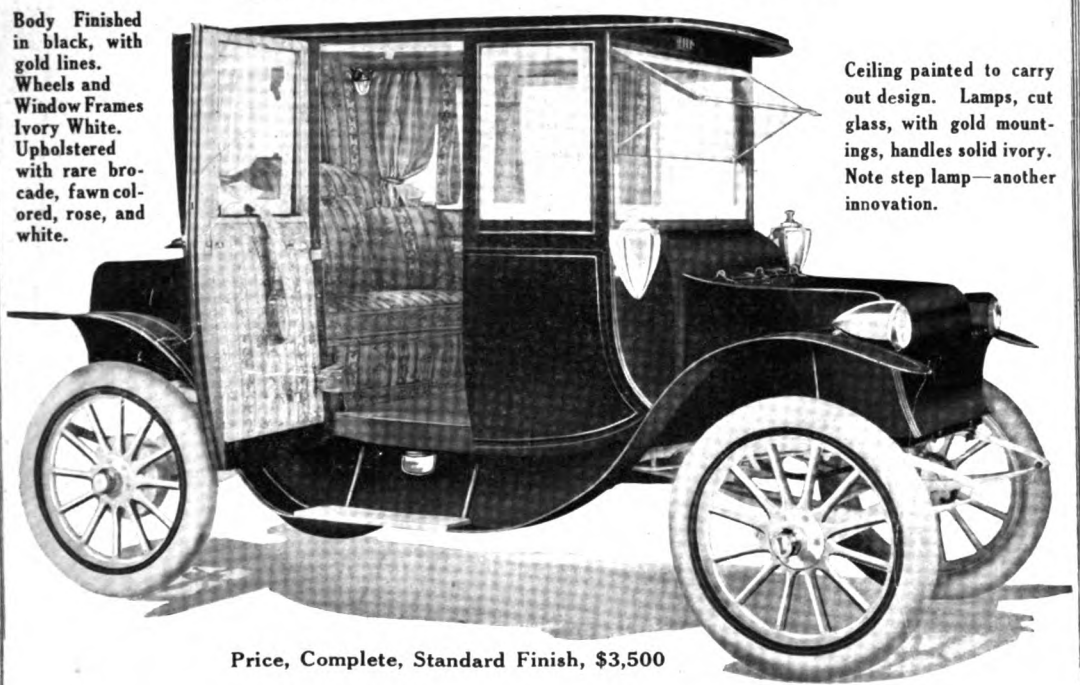
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No-Rim-Cut Tires

(10% Oversize)

At the Madison Garden Show

86 cars were shown equipped with Goodyear pneumatic tires. Goodyears led their nearest competitor, on pneumatic tires, by 138% and the two nearest competitors combined by 30%. At the Grand Central Palace Show Goodyears led their nearest competitors by more than 100%. More cars were equipped with Goodyears at this show than with any three other competing makes.

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127 leading motor car makers have contracted this year for Goodyear Tires.

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Last year we sold 409,000 automobile tires. That's more than the previous 12 years put together.

Goodyear No-Rim-Cut Tires now far outsell every other tire in existence.

Present capacity, 3,800 tires daily.

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Tens of thousands of users have proved for themselves that No-Rim-Cut tires cut their tire bills in two.

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That's what men want—less tire expense. The figures show they found it in No-Rim-Cut tires.

23% Plus 25%

Figure it yourself.

Statistics show that 23 per cent of all ruined clincher tires are rim-cut.

No-Rim-Cut tires end that ruin entirely. Rim-cutting is simply impossible.

The 10 per cent oversize, under average conditions, adds 25 per cent to the tire mileage.

It means 10 per cent more air—10 per cent greater carrying capacity. It saves the blowouts due to overloading.

You get both these savings—23 per cent plus 25 per cent—in Goodyear No-Rim-Cut tires.

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Men used to pay—and gladly—one-fifth extra for No-Rim-Cut tires.

Now they cost no more than other standard tires. The enormous demand has cut the cost of production.

Please remember that.

Tires that can't rim-cut cost the same as tires that do. Tires 10 per cent oversize cost the same as tires that aren't.

The Coming Tire

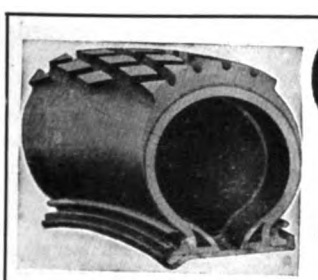
In two years the demand for No-Rim-Cut tires has increased by 500 per cent.

Our present output is three times that of a year ago.

This patented tire—the final result of 13 years spent in tire making—now stands in first place. And the demand is growing faster than ever.

Please mark those facts.

Clincher tires must go. The coming tire, with all men who test it, is the Goodyear No-Rim-Cut tire.



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No-Rim-Cut Tires

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Double-Thick Non-Skid Treads

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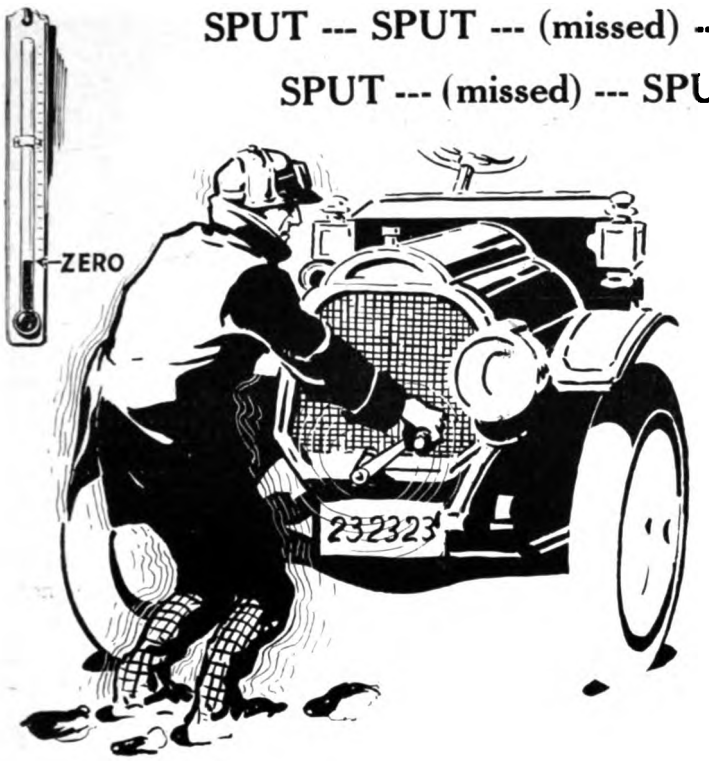
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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 1 FEBRUARY 10, 1912 Price $1.00 the Year

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ASTOR, LENOX AND TILDEN FOUNDATIONS
1912

NEW MODELS REVEALED AT CHICAGO.

ELABORATE as has been the setting for the Coliseum show in Chicago for the past few years, the 12th annual display of the National Association of Automobile Manufacturers, which continued for two weeks, Jan. 27-Feb. 10, was staged amid grandeurs far in excess of previous attempts. Accompanying photographs may convey some idea of the rich, Oriental splendor of the Coliseum interior, but it is impossible to reproduce the wealth of color which greeted the visitor.

To the mind of the easterner, an automobile show is for the purpose of displaying the models of the coming season, that those who may be interested in studying the respective merits of various cars may have full opportunity to do so under conditions which will make comparisons an easy matter. As a result, there has been a tendency on the part of the managers of the so-called national exhibitions in New York to eliminate more and more the ornate decorations, making them so simple as not to detract in any manner from the cars on display.

Evidently the people of the Middle West prefer something entirely different. What has been said should not be regarded in the nature of criticism. The fact remains that it is impossible to attempt to describe the Chicago show without first devoting some space to the decorations. The visitor's attention was drawn to them first of all, and while the exhibition of cars was most complete and particularly attractive, the decorative scheme was such as to force their consideration into the background.



Interior of Coliseum at Chicago, During Pleasure Car Show, Indicating Beauty of Decorative Scheme.

A mosaic palace, is the description offered by the manager, S. A. Miles. The roof was a massive painted arch, the centre of which was a succession of circular panels, carrying red flowers. Each row of tiling, as the arch bent toward the side walls,

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was of a different hue and design, until they joined a simulation of potted plants. And from this immense circular dome hung three rows of lanterns of square design and great size, which shed a rose hued light over the entire interior.

A wide main aisle divided the show spaces in half, these in turn being sub-divided, by superstructures suggesting immense clock towers and surmounted by small, squared spaces, with four projecting platforms on which potted plants were installed. Abutting these towers, and extending in either direction, was a lower structure terminating in small turrets, also carrying potted plants. Behind these plants were hidden green lights, which added their hue to the



One Corner of the Coliseum, Presenting Mosaic Ceiling and Clock Tower Effects.

red of the hanging lanterns and still further accentuated the mosaic effect.

The balcony, where the accessories were shown, was equipped with a white wood rail, below which, and extending the full length of both sides of the building, were panels depicting a forest scene, into which the semblance of mosaic design also was carried. Covering the walls at either end of the main hall was a huge drop curtain, on which the forest scene was even more strikingly portrayed.

And amid these fanciful clock towers, turrets and other superstructures the choicest designs of nearly 100 pleasure car manufacturers were arranged during the first week of the show. The same setting was utilized for the second week, or commercial vehicle section, at which 82 different makers were represented. One hundred and eighty-four accessory firms and 19 concerns showing motorcycles, also found space.

However, not all these exhibits could find room in the Coliseum proper. Some were located in the Annex, where the same general decorative effect was sought, but on a much smaller scale. Still others displayed in the First Regiment Armory, and here the decorations were even more simple.

The ceiling was hidden by a large painting representing a glass roof on which numerous autumn leaves had fallen, and through which glimpses of a painted azure sky could be seen. The railing of the gallery was draped with green and white bunting. The floor work was borrowed from the Coliseum decorations of 1911. The huge Louis XV vases and large, tinted seashells, holding palms and potted plants, set off the various exhibition spaces.

Fully realizing that this meagre description is utterly inadequate for the subject, the reader is referred to the accompanying illustrations for a more intimate consideration of this feature. After all, the cars are the principal attraction at an automobile show, and in this respect the display at Chicago set a new record.

Last year, there were 94 different makes of machines represented in this city. This year there were 98, having reference specifically to the pleasure vehicle section. The two New York displays presented 97, of which 60 were seen at Madison Square Garden and 37 at Grand Central Palace. The total number of machines and chassis shown at Chicago was 344, as compared with 248 at Madison Square Garden and 163 at Grand Central Palace. Of these, 37 were electrics, as compared with 23 for both displays in New York City.

Delving further into statistics, the number of touring cars at the three shows was as follows: Chicago, 169; Garden, 112; Palace, 73. Roadsters were represented by 52, 40 and 39, respectively, and enclosed types by 32, 37 and 16. There were 249 water-cooled engines and but four in which air was utilized for this purpose. In the matter of cylinders there were three of one-cylinder, one of two, 183 of four, five of four-cylinder, two cycle; five of four-cylinder sleeve valve, 55 of six, and one of six-cylinder sleeve valve.

For the most part, the Chicago exhibit may be classed as a repetition of the two New York shows combined in one. This is not wholly true, because, while there was but one more make on display, there were 12 producers of gasoline cars and four of electrics which were not represented in the East, and a few of those who made display in New York brought out a new model. Still, the main statement is unchanged. Nothing radically different was disclosed. The same refinement of details was to be observed as at the two shows which preceded it, and the exhibition still further accentuated the claim that the 1912 season is to see no wide variation from accepted standards.

The additional evidence produced by the 12 new makes shown here for the first time this year indicates even more clearly that in the matter of equipment the offerings for the present season are to be most com-

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plete. As was true of the New York shows, demountable rims were more generally fitted than ever before, and the tendency seemed to favor slightly longer wheelbases and larger tires. Electric lighting, self-starting devices, central control levers, detachable and usable fore doors, and rich body designs were quite as prominent as at the eastern displays.

In fact, it may be stated that many of the exhibits were exactly the same as those made by the same concerns at New York. In some instances the cars were arranged a trifle differently, and as has been said a few added a new model. Among the latter was the booth of the American Motors Company, Indianapolis, Ind. Officially, this is termed the American Scout, and it is the same in all essential details as the remainder of this well known underslung line, except in size and horsepower, the latter of which is 22. The body is enclosed.

Inasmuch as The Automobile Journal went into detail concerning the changes in the various lines exhibited at New York it will not be necessary here to devote space to describing the displays of those concerns. The issues of Jan. 10 and 25 contain full information on this score. Those models which were



Pleasure Cars Disposed Along the Central Aisle, Giving Another Idea of the General Decorative Scheme.

Nordyke & Marmon Company, Indianapolis, Ind., maker of the Marmon line. The new design was termed a Speedway roadster, modelled somewhat after the lines of the Marmon Wasp, in which Ray Harroun won the 500-mile race on the Indianapolis speedway, last Memorial Day. To be sure, it lacks the elongated rear of the Wasp, and is otherwise changed to resemble a gentleman's roadster, with a dark green modified racing body and a large gasoline tank back of the seat. In common with other Marmon cars, it is equipped with a Prest-O-Starter and two point ignition.

Another addition, also a roadster, was seen at the shown at Chicago for the first time will be treated in a similar manner below.

The Austin Automobile Company, Grand Rapids, Mich., displayed two Austin six-cylinder touring cars and a six-cylinder chassis. One of these is entirely new, but first it must be remarked that the Austin line has contained nothing but sixes for the past five years. The new model is claimed to possess the greatest relation of stroke to bore of any car on the American market. The bore is 4.5 inches and the stroke seven. The motor is of the T head type, but has the valve pockets cast diagonally opposed to each other, instead of diametrically opposite as in general prac-

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tise, a decidedly new idea in engine design.

Another feature is the left hand drive with central control levers, particularly as all the other Austin models are controlled from the right. The emergency brake lever has been eliminated and in its place is fitted a pedal with ratchet stop, and the service brake is interconnected with the clutch pedal. The equipment includes electric lighting and a compressed air self-starter, the latter of which is furnished with an attachment for inflating tires as well. Between the two front seats is a compartment for carrying tools, etc., as well as the gasoline tank, and the spare tires are carried in another compartment under the tonneau seats, entrance to which is from the rear by means of two wide doors.

The Bartholomew Company, Peoria, Ill., presented three four-cylinder Glide touring cars. This concern also has a new model, making two chassis instead of one as in former years. The new Glide is of 36 horsepower, while the old one was 45, and it may be added that the older is retained with practically no changes, except such refinement of detail as experience has found desirable. The 36 horsepower car has left hand drive with centre control levers, the motor, change speed mechanism and levers being arranged so as to be removed from the chassis as a whole, or each part separately without interfering with the other units. Electric side and tail lights and an acetylene self-starter are included in the regular equipment.

The Colby Motor Company, Mason City, Ia., showed two four-cylinder Colby touring cars and one four-cylinder chassis. The line is distinguished by a new model, in which the underslung body makes it entirely different from the other members. The motor is of the block type with bore of 4.0625 inches and stroke of 4.5. Lubrication is by means of a cam-driven plunger pump located in the crankcase. The change speed mechanism is mounted on the rear axle, and a torque tube combines the functions of a radius and torsion member. The tube itself extends forward and is attached to a cross frame member by means of a wide yoke around the forward universal joint. Torque and driving strains are sustained by heavy brackets securely riveted to the frame and forming the rear sub-frame hangers. In addition to the heavy torque tube, the axle is braced with two strut rods which extend to the pins on which the yoke turns.

The Crow Motor Car Company, Elkhart, Ind., displayed two four-cylinder Crow-Elkhart touring cars and a roadster. The entire line now comprises five



Presentation of the Individual Exhibits of Pleasure Vehicles Amid Oriental Splendor of Mosaic Design.

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chassis instead of two, and 12 body designs. Few changes are noted, the new chassis maintaining the same general features which marked the product of this concern last year. One of these is the placing of the control levers in the centre of the floor boards, although the driver is still located at the right.

James Cunningham, Son & Co., Rochester, N. Y., presented a four-cylinder Cunningham touring car and limousine. This concern still adheres to the practise of producing but one chassis, in which it has not been found necessary to make a single radical change from past models. The distinctive features include a unit power plant of accessible design and rigid construction, long stroke motor, valves in the head, offset cylinders, etc. Equipment includes demountable rims and two extra rims, as well as the usual full list of accessories.

The Davis Carriage Company, Richmond, Ind., was represented by a four-cylinder Davis touring car and a roadster. This is another car in which the control levers are placed in the centre, although the driver is located on the right. The new motor is cast en bloc, instead of in pairs, and the stroke has been increased from 4.25 to 5.5 inches, the bore remaining at 4.25 inches. A full floating rear axle has taken the place of the semi-floating member used last year. The equipment includes a Prest-O-Starter.

Haberer & Co., Cincinnati, O., had on view a six-cylinder Cino touring car, six-cylinder chassis and four-cylinder racer. The six is a new model, although not particularly different from the older four, which is retained without material change. Perhaps the distinctive features of the new model may be termed the large cone clutch with spring inserts, three-speed selective gearset, full floating rear axle, and worm and double nut type of steering gear. The motor is of the T head type with bore of four inches and stroke of five. All Cino models are equipped with self-starters this year.

The Kissel Motor Car Company, Hartford, Wis., displayed a six-cylinder KisselKar touring car, a four-cylinder small tonneau, two four-cylinder touring cars and a four-cylinder chassis. One of the fours is a new model, rated at 40 horsepower, although it does not depart greatly from the standards set by the older members of the line. In the new car the cylinders are cast en bloc with a bore of 4.5 inches and stroke of 4.75. Particular attention is

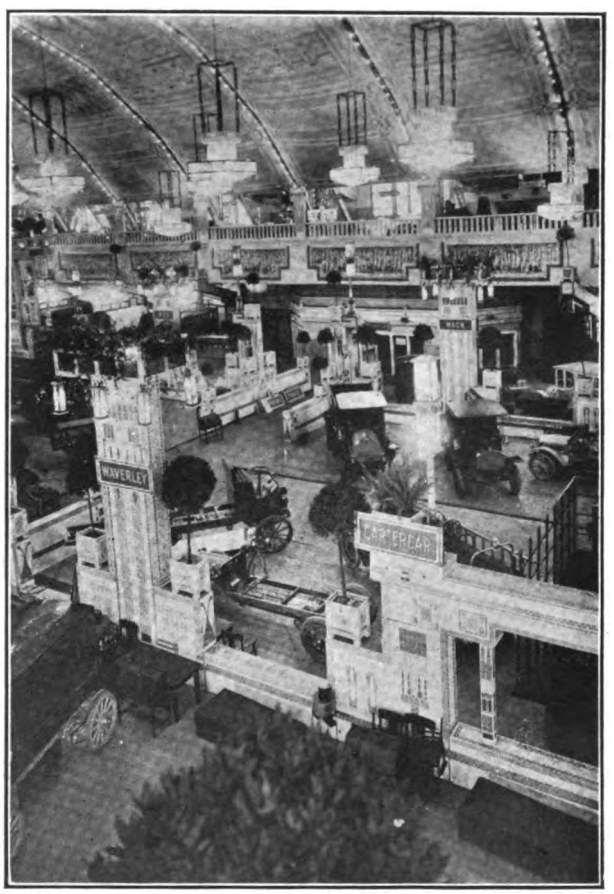


Central Aisle of the Coliseum During Second Week of the Display When Commercial Cars Were Featured.

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called to the light construction, although it is notable that none of the requisite strength has been sacrificed, and it is claimed that the machine is more than ordinarily economical to operate. Equipment includes demountable rims, and one extra rim, on all except the smallest model.

The Lexington Motor Car Company, Connersville, Ind., displayed one six-cylinder roadster and a four-cylinder touring car. Both are new products, and the line also includes another four-cylinder chassis, which is retained without material change. The six is a particularly racy appearing roadster, with an extra long scuttle dash. Both models employ the Rutenber motor, with cylinders cast separately, and



Impression Conveyed by Mosaic Palace Effect, Showing Disposition of Individual Truck Exhibits.

bore and stroke of 4.125 and 5.25 inches, respectively. All Lexington cars are equipped with the Prest-O-Starter.

The Republic Motor Car Company, Hamilton, O., showed a Republic touring car, roadster and chassis, all with four-cylinder motors. The roadster is new, and presents novel features, some of which have been incorporated in the older members of the line. For instance, the windshield is built into the body of the car, the scuttle dash being carried up to meet it, and a distinctive type of ventilator is incorporated in that portion conforming to the usual filler board. The entire body is enclosed, the levers being located in the centre. An auxiliary seat is placed over the running board, and when not in use this folds up and is made to insert into a special compartment under the regular seat, like a drawer. The gasoline tank is in the rear compartment, and an additional feature is the location of the Prest-O-Lite tank and tool box out of sight between the fuel tank and body proper. Still another detail is the hanging of the rear springs below the axle instead of above.

The Staver Carriage Company, Chicago, displayed one large Staver touring car, one smaller touring model and a chassis, all with four-cylinder motors. Practically the only change in the line is the discontinuance of the 30 horsepower model, and the substitution of new motors in the others. The two remaining chassis are identical with the exception of the size of the engines, these being 35 and 40 horsepower, respectively. The former has a bore of 4.375 inches and the latter 4.5, with the stroke five inches in both cases. The lubricating system is held to be distinctive, in that two separate shallow pans are suspended below the crankshaft. Into these each pair of connecting rod big end bearings dip. In the sides of the pans are a number of small holes through which the oil seeps. The initial splash of the connecting rods throws out practically all of the oil, which seeps back slowly, yet sufficiently fast to keep the bearings well lubricated. It is claimed that this method eliminates all danger of smoking.

The Streator Motor Car Company, Streator, Ill., showed two four-cylinder Halladay touring cars and a four-cylinder chassis. The 40 horsepower model is continued practically without change, but the 30 horsepower chassis has been redesigned throughout. Both motors are of the Rutenber make, the new one being of the true long stroke type, with bore of 3.25 inches and stroke of 5.25. The change gear mechanism is suspended from three points in the middle of the chassis, and by reason of this change the rear axle has been redesigned, although it is still of the semi-floating type. The rear springs also have been altered slightly. Equipment on all Halladay models includes a self-starting device.

In the electric pleasure car division, four makers who were not represented at New York made display at Chicago. One of these, the Borland-Grannis Company, Chicago, made its first appearance at any show, with two Borland electric broughams. Standard construction has been followed in every respect. One model is chain driven, and this is the older, while the other is shaft driven. Motors and controllers are of the General Electric manufacture. One of the features is the use of suitable connections, by means of which the power is shut off the moment the emergency brake is applied, and this cannot be turned on again until the brake has been released and the controller returned to neutral position.

The Broc Electric Vehicle Company, Cleveland, O., showed three Broc coupes. A particular feature is the firm's own combined controller and brake lever adopted last year. No radical changes in design are noted.

The Rauch & Lang Carriage Company, Cleveland, O., displayed two Rauch & Lang coupes, a limousine and a chassis. Two chassis are produced, one with chain drive and the other with shaft. Practically no change has been made, with the exception of the addition of chain cases on the chain driven model.

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The Woods Motor Vehicle Company, Chicago, presented two Woods coupes, a five-passenger limousine and a chassis. A number of minor changes are noted chief among which may be mentioned the practise of enclosing all wiring to eliminate the possibility of short circuiting. There are no radical departures from the original Woods design, however.

Concerning the accessory exhibits, it may be stated that the list was much smaller than at the Madison Sqare Garden show in New York. In the latter 329 separate concerns were represented, whereas but 184 were counted at Chicago. There were a number who did not make display in the East, as follows:

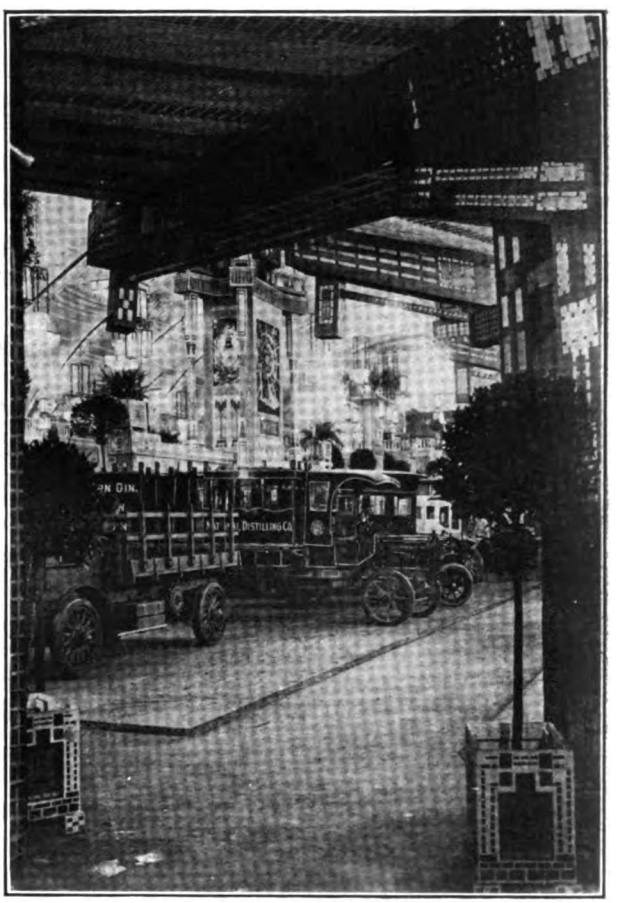
Avery Portable Lighting Company, Milwaukee, Wis., Electrobola lamps; Barco Brass & Joint Company, Chicago, exhaust horns, cut-out valves, accelerators and locking pedals; S. Breakstone, Chicago, Hopewell tire cases; Continental Motor Manufacturing Company, Muskegon, Mich., Continental motors; Cotta Transmission Company, Rockford, Ill., transmissions; E. Edelmann & Co., Chicago, tire and oil gauges, hydrometers and twin screw drivers; Falls Machine Company, Sheboygan, Mich., Falls motors; C. T. Ham Manufacturing Company, Rochester, N. Y., lamps; Hayes Wheel Company, Jackson, Mich., wood wheels; Kinsey Manufacturing Company, Toledo, O., frames, radiators, fans, tanks and windshields; W. H. Leland & Co., Worcester, Mass., machinery; Longdin-Brugger Company, Fond-du-Lac, Wis., automobile tops; Martel Blowout Protector Company, Chicago, emergency tire sleeves; Mayo Manufacturing Company, Chicago, automatic tire pumps and tire gauges; Model Gas Engine Works, Peru, Ind., motors, transmissions and clutches; Norton Grinding Company, Worcester, Mass., abrasive materials; United States Ball Bearing Company, Oak Park, Ill., ball bearings; Waukesha Motor Company, Waukesha, Wis., motors; Western Motor Company, Marion, Ind., Rutenber motors; Wisconsin Motor Manufacturing Company, Milwaukee, Wis., motors.

Of the so-called accessory exhibits, perhaps none occasioned more comment than the new rotary valve motor brought out by the Model Gas Engine Works, Peru, Ind. It was expected that possibly some new engines would make their appearance at Chicago, since it was remembered that the Knight sleeve valve type was first brought to the attention of the public at a show in that city.

The new rotary valve motor is decidedly different from any other, principally in the fact that the valves themselves are located inside the combustion chamber. They are of phosphor bronze, operating on cast iron seats, and are carried on spindles below the gear wheels which operate them. These wheels form a train which is actuated by a smaller gear meshing with one of the large gear wheels and mounted on a vertical shaft between the pairs of cylinders. The vertical shaft is worm driven from the crankshaft.

The Western Motor Company, Marion, Ind., also presented its two new Rutenber motors, one the four-cylinder en bloc design and the other a six. The latter does not differ materially from the older Rutenber designs, with the exception of the number of cylinders. The block motor is a decided departure, however, since the older models have their cylinders cast individually. It is of the long stroke type, the bore being 3.75 inches and the stroke 5.5. The method of driving the magneto and water pump is unique and simple. A single shaft, worm driven from one of the gears in the timing gear train and located transversely to the engine casting at front, operates both.

As was true of the commercial vehicle section of the 1911 show, the second week in Chicago this year was of decided importance to the industry. In this connection, it may be stated that the management has organized a most effectual method of calling the attention of business men, farmers and others to the advantages of the modern industrial transport. Long before the Coliseum exhibition of last year, a campaign of correspondence was begun, in which personal letters to thousands of those who should be



An Alcove Setting in Which the Oriental Design of the Decoration Scheme Is Still Further Accentuated.

interested in motor trucks and municipal wagons played a prominent part. This campaign was not allowed to end with the close of last year's display. In fact, its effectiveness was increased throughout the entire season, until at the opening of the second section, Feb. 5, the entire Middle West had received a personal invitation to be present and inspect the offerings for 1912.

It is small wonder that the number of exhibitors was far in excess of those who made display in New York City, counting both shows. The total was 82 makers, against 57 for 1911. There were 37 different concerns represented at this year's Grand Cen-

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tral Palace show and 33 at Madison Square Garden, a total of 70 for the two. Thirty-one manufacturers exhibiting at Chicago did not make display in the East. Some of these are entirely new to the industry.

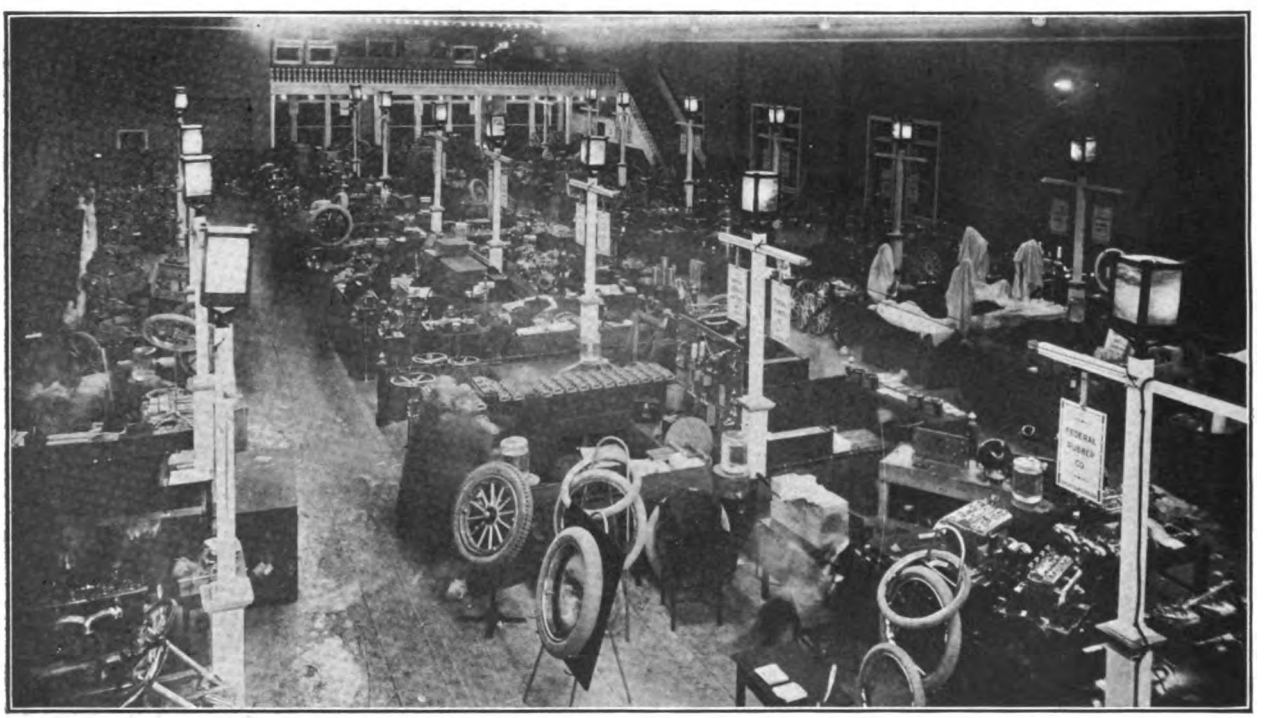
As was to be expected, in connection with so many new designs, several innovations were to be noted. The list of worm and worm wheel drives was increased from three to six. Last year the Pierce-Arrow was the only American truck thus equipped. This was shown this year at the Garden in New York, while the Newark, a new product, also displayed a machine thus driven, and the Roe, another new vehicle, offered it as an option. Both of these were seen at the Grand Central Palace. The new makes at Chicago were: A. O. Smith, Blair, and Dain. The Stegeman, an older concern, presents a spiral drive on its smallest model, which may be regarded as a tendency toward the worm.

Other new features will be brought out in a somewhat more detailed description of the exhibits which were not seen in New York. As was true of the pleasure vehicles, The Automobile Journal outlined briefly the changes in design presented by the trucks shown at Madison Square Garden and Grand Central Palace in the issue of Jan. 25, while an even more comprehensive review of these exhibits was presented in our contemporary, Motor Truck, for February. The Chicago show will be considered in full in the March number of Motor Truck, but the following details some of the more important features of the new trucks shown at Chicago:

The Adams Bros. Company, Findlay, O., presented the Adams, which is a one-ton model, with left hand location of driver, the levers being in the centre. The motor is in front under a Renault type hood, with radiator behind, following foreign practise. Complete accessibility is afforded by lifting the hood from the front, exposing the entire power plant for adjustment or removal as desired.

The Avery Company, Peoria, Ill., displayed the Avery in two and three-ton vehicles, although other sizes are manufactured. The motor is in front under a hood, and the driver and levers at the right. These machines are fitted either with solid tires, or with cast steel rims and wood plug tires. Provision is made for utilizing the truck as a tractor, as well.

The Bessemer Motor Truck Company, Grove City, Penn., showed its one-ton Bessemer. This also has the motor in front, with left hand position for the drivers and central control levers. The motor is of the block construction, with bore of 3.75 inches and stroke of 5.25, rated at 25 horsepower. The radiator is hung on a spring suspension. Other features claimed for it are the use of nickel steel spindles and gears, and large brakes.



A Glimpse of the Accessory Department, Indicating Method of Displaying Parts and Supplies to Decided Advantage.

The Blair Manufacturing Company, Newark, O., showed the 1.5, 2.5 and 3.5-ton Blair, this being one of the makes which presents a worm drive this year. The motor is in the cab, beside the driver, who is located at the right with right hand levers. The worm has four threads and is of the Hindley type. A 28-degree angle is used and there are four separate and distinct bearings. Of these two on either side are thrust, while the others are annular. The worm is made demountable from the rear by the removal of two holding and two housing bolts.

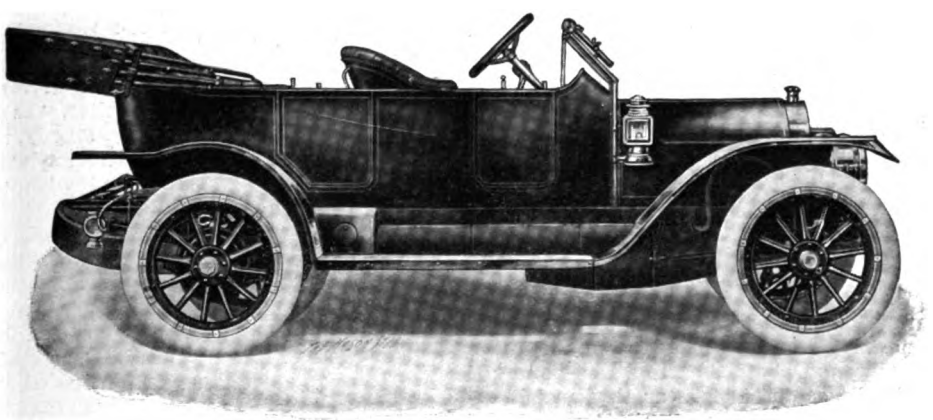
The Chicago Pneumatic Tool Company, Chicago, presented the Little Giant in the 1500-pound size. The motor is a two-cylinder, horizontal opposed unit, lo-

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cated under the chassis, while the driver and levers are at the right. Practically no changes are noted, except such as make for refinement.

The Clark Delivery Car Company, Chicago, displayed the one-ton Clark model, with motor under the floor, and driver and levers at the right. Accessibility of the power plant is afforded by removal of the floor boards. It is of the block construction, with bore of 3.75 inches and stroke of five, rated at 25-30 horsepower. The radiator is carried on a three point spring suspension.

Joseph Dain, Ottumwa, Ia., presented the new Dain truck of two tons capacity, fitted with worm drive, as previously stated. An additional feature is the use of the friction transmission. This latter is utilized only for low speed and reverse, the direct drive being through a cone clutch, without using the transmission in any way for high speed. The worm is of the Hindley triple-threaded type, mounted on the full floating rear axle.

The Diamond T Motor Car Company, Chicago, displayed the three and five-ton Diamond T trucks, with motor in front under a hood, and driver and levers at the right. While this is a new design, it follows standard practise for the most part. The motor has a bore of five inches and stroke of 5.5. The clutch is a multiple disc, steel plates running in oil. Transmission is of the three speed selective type. Drive is by chains. The two models are identical, except for lighter springs and tires.

The Dorris Motor Car Company, St. Louis, Mo., showed its 1500-pound Dorris wagon for the first time. This is a well known pleasure car maker, which has entered the commercial vehicle field, and the motor is the same which has done good service in Dorris cars for the past seven years. It is located in front under a hood with driver and levers at the right.

The Harder Auto Truck Company, Chicago, had on view its combination chemical and hose fire apparatus and small meat wagon, both bearing the name of Harder. This is the same concern as that which exhibited at last year's Chicago show under the name of Harder's Fireproof Storage & Van Company. A distinctive feature is the mounting of the engine on a sub-frame, and hinging the radiator so that the entire power plant may be removed at the front.

The Harwood-Bailey Manufacturing Company, Marion, Ind., displayed a 3000-pound wagon under the name of Indiana. Although a new product, it does not depart greatly from accepted standard construction. The driver is located at the right with right hand levers.

The International Harvester Company of America, Chicago, presented its well known line, in which there has not been material change. The motor is a two-cylinder, opposed, air-cooled unit, located amidships, with driver and levers at the right.

The Thomas B. Jeffery Company, Kenosha, Wis., maker of Rambler pleasure cars, calls its truck the Jeffery, which was displayed in the 3000-pound size. The motor is located under the floor, with driver at the left and central control levers. Standard construction is maintained throughout.

The Kissel Motor Car Company, Hartford, Wis., presented its two and three-ton KisselKar models. In these the motor is in front under a hood, with driver and levers at the right. It is claimed for these machines that they have considerable excess ability, which is not gained at the sacrifice of economical fuel consumption, and that the special form of KisselKar differential lock prevents stalling when one traction wheel is in a hole or in mud. The construction is standard throughout, and the success which has attended the design in the past has not made it necessary to incorporate radical changes.

The L. A. W. Motor Truck Company, Findlay, O., displayed a new line of trucks, known as the L. A. W., this being very complete. The 1.5-ton model is furnished either with right or left hand drive, although the one and two-ton vehicles are with left hand position of the driver only.

The Henry Lee Power Company, Chicago, presented the Old Reliable, which has been on the market for a number of years, and has not been changed materially, except as experience has dictated that certain refinements are necessary.

The Mercury Manufacturing Company, Chicago, displayed its 1000-pound Mercury wagon, with motor under the floor, and driver and a single control lever at the right. In one of these vehicles the driver was completely enclosed, a feature which will appeal in certain lines of business. The construction is along standard lines.

The Mogul Motor Truck Company, Chicago, had on view its two, four and six-ton Mogul trucks. The motor is under the seat, with driver and levers at the right. As the name implies, the construction of these machines is decidedly sturdy, and it may be added that the six-ton vehicle is designed especially for lumber work, being fitted with rollers for easy loading and unloading.

The Monitor Automobile Works, Janesville, Wis., presented its 1500-pound and one-ton Monitor models. In these the motor is under the chassis with driver and levers at the right. No radical changes in design or construction have been found necessary, the success of this make in all sorts of service for the past few years having demonstrated its value.

The National Motor Truck Company, Bay City, Mich., has changed the name of its product from National to Natco. This was shown for the first time and in the one-ton size, although it is understood that vehicles of higher rating will be manufactured. The motor is located under the floor, with driver at the left and levers in the centre. A distinctive lubrication system is among the special features.

The Premier Motor Manufacturing Company, Indianapolis, Ind., one of the well known pleasure car makers, which has not hitherto brought out a commercial vehicle, showed its new Premier delivery wagon. It does not differ materially from the standard set by the Premier pleasure cars, the same motor being employed. A heavier frame; the use of strut rods, and semi-elliptic springs all around, are its distinguishing features.

The Philadelphia Truck Company, Philadelphia, Penn., displayed its 1500-pound Philadelphia utility wagon. Although a new model, it has the general appearance of the conventional design. Its chief feature is the electric self-starting system, the combined motor-generator taking the place of the usual flywheel.

The Sandusky Auto Parts & Motor Truck Co., Sandusky, O., presented its new 1.5-ton Sandusky, which is fitted either with solid rubber or pneumatic tires as desired. The motor is located under the floor, with

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Motor Trucks

AUSPICES

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driver and levers at the left. A particular feature is the mounting of the unit power plant on a sub-frame, to which the radiator is attached. The whole assembly may be withdrawn from the front of the vehicle.

The Schmidt Bros. Company, Chicago, showed its one-ton Schmidt. This has an air-cooled motor located under the chassis, amidships, with driver at the right. A distinctive feature is the placing of the high speed lever on the steering column, while low and reverse are operated by pedal.

The Service Motor Car Company, Wabash, Ind., brought out a new 1500-pound Service truck. This employs a friction transmission, and another feature is the fitting of a pulley back of the frame in the centre, by means of which it is possible to supply power as a stationary engine.

The A. O. Smith Company, Milwaukee, Wis., had on display its five-ton A. O. Smith truck. As already stated, this is worm driven. The motor is located in front under a hood, and the driver and levers are at the right. The worm is of the Lanchester design and is so mounted that it may be removed by taking out the rear flange bolt, this permitting the displacement of the entire housing. A double thrust bearing and two annular bearings on the worm shaft are employed. The wheels are of cast steel. The motor and radiator are mounted on a sub-frame, making for complete accessibility.

The Staver Carriage Company, Chicago, exhibited a Staver ambulance, which does not differ materially from the pleasure vehicles, made by this concern, except in size and strength of parts.

The Stegeman Motor Car Company, Milwaukee, Wis., presented its line of Stegeman trucks, with capacities ranging from one to six tons. The motor is in front under a hood, and the driver is at the left with centre control levers. With the exception of the one-ton vehicle the models follow standard construction. The small machine is fitted with a spiral gear drive with full floating rear axle.

The Stephenson Motor Car Company, Milwaukee, Wis., which it is understood has now been acquired by the J. I. Case Threshing Machine Company, Racine, Wis., displayed the Stephenson truck, which is to be known in the future as the Utility. The line comprises vehicles of from one to three tons capacity. Its chief distinction lies in the fact that it is friction driven.

The Sternberg Manufacturing Company, Milwaukee, Wis., showed the four-ton Sternberg truck, although other vehicles in the line are rated at two, three and six tons capacity. These have been on the market for some time, and follow standard design for the most part. Only such changes are noted as make for refinement.

The Whitesides Commercial Car Company, New Castle, Ind., displayed the 1500-pound Whitesides wagon. The motor is located in front under a hood, with driver and levers at the right. Perhaps the chief characteristic is the construction of the frame, which is white oak, covered with .1875-inch armor plate.

The H. E. Wilcox Motor Car Company, Minneapolis, Minn., presented the three-ton Wilcox truck. The motor is under the floor and located 7.5 inches to the left of the centre of the chassis. Driver and levers are at the right. Accessibility is afforded by placing the power plant on a sub-frame close to the radiator.

Only one new electric commercial vehicle was shown, this being the M. & P. made by the M. & P. Electric Vehicle Company, Detroit.

ORGANIZE HIGHWAY SAFETY LEAGUE.

The Highway League, an organization, the announced purpose of which is to make travel on public streets and highways safer, has been formed in Boston, and both men and women are eligible to membership. It proposes to employ counsel to act for the public and to collect evidence which will insure prosecution in proper cases. In a statement issued by the league its aim is set forth as follows:

"It is patent to every one that the increasing use of motor cars on the public streets is attended with constant danger, not only to other travellers, but to the occupants of the automobiles, and that this danger is not controlled by the existing laws as they are now enforced. The needless emission of bad smelling smoke and ear piercing noise, at all hours of the night and day, with the splashing of mud and water over passengers on the sidewalks, are just grounds for complaint, and it is clear that these abuses should be stopped, or at least mitigated."

HOOSIER MOTOR CLUB ACTIVE.

At a meeting of the Hoosier Motor Club, Indianapolis, Ind., plans were made for the coming season and these included routing the roads of the state for touring, posting of sign boards, and reliability runs. The club is working in conjunction with the trade to pool interests in properly marking the ways. The plan includes the use of the names of local firms upon the sign boards of the club, each company to be allowed approximately three signs to a road.

COST OF COLLECTING LICENSE FEES.

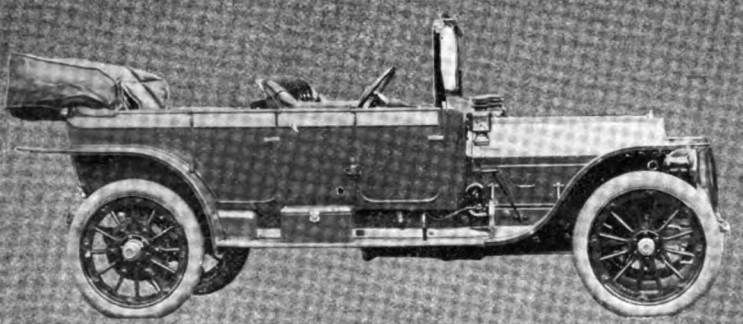
According to the annual report of the secretary of state of New York it cost $224,961 to collect $918,197 in the automobile department. This is about 24 per cent., as compared with seven and 10 in Connecticut and New Jersey, respectively. The expense will be reduced materially next season.

DECLARE EXPORT FIGURES TOO LOW.

Detroit automobile manufacturers declare that the Department of Commerce and Labor at Washington errs in the statement regarding the export of American cars in 1911. The government placed the figures at $20,000,000 and it is claimed that Detroit alone exported more than that amount. Ten of the factories exported during the year 21,715 machines, which brought $20,400,000. This amount does not include other makers who shipped both pleasure and commercial vehicles, or companies doing an export trade handled by their New York City offices. It is stated that in 1911 the Studebaker Corporation sent abroad cars valued at $6,000,000 and that 15,000 Ford automobiles were exported valued at $9,000,000. Factories that a year ago were shipping only one or two cars are now actively engaged in the export business. It is the opinion of Detroit managers that a great foreign trade has only begun.

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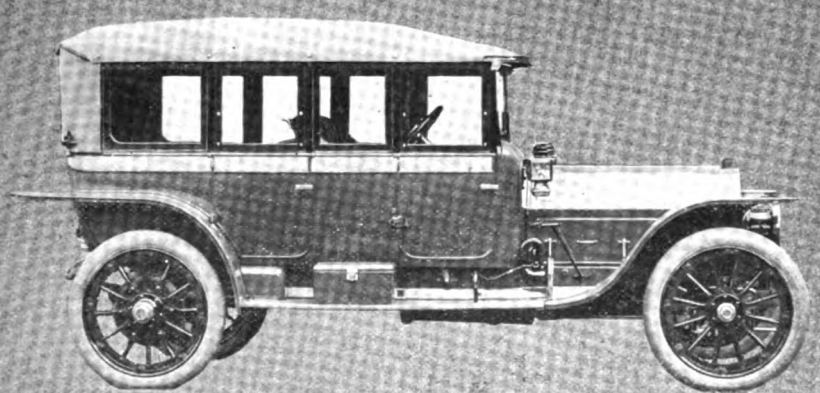
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Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
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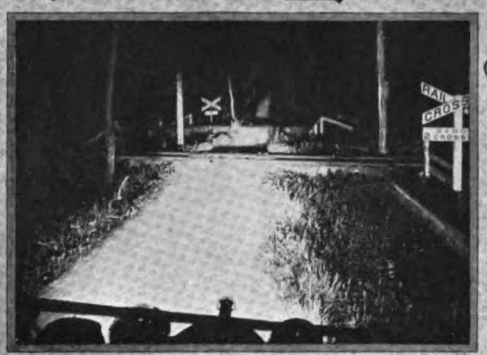
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SPRINGFIELD, MASSACHUSETTS.

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Electric Lighting of Motor Cars



Outlining Various Systems Employed and Methods of Operation.



By C. P. Shattuck



CONSIDERABLE progress has been made during the past year relative to electric lighting for the automobile, and the fact that an increasing number of makers include this as regular equipment is sufficient indication that it has passed the experimental stage. In view of the general acceptance of the magneto for ignition purposes, it is not unreasonable to assume that similar success will attend the efforts of electrical engineers in developing a practical, efficient and inexpensive method of lighting by electricity. That the day is not far distant when this method will be employed even more universally is conceded by those who have followed the evolution of the mechanically propelled road vehicle.

Electricity appeals to the progressive motorist, as the simple operation of turning a switch or pressing a button lights one or as many groups of lamps as may be desired and not only does it lend refinement and taste to the car on which it is employed, but it possesses advantages that are essential to luxury and comfort. The annoyance of dismounting in the rain and mud to light lamps is eliminated, as well as other disagreeable features.

The practical automobilist demands that the lighting of the machine shall be safe, sufficient, convenient and dependable, and that the head lamps furnish a good driving light, one that will illuminate the surface and sides of the road directly in front of the car as well as at distant points. Holes in the road, curves and cross roads make the former point obvious.

The efficient light is free from bright patches in the illumination close to the machine, which dazzle the driver's eyes; shadows, and any side rays which might blind the other users of the highways. Electric lighting, when standard, reliable apparatus and lamps are employed, meets these requirements simply and economically.

Importance of Reflector.

Much of the superiority of the electric headlight, when properly designed, is due to the deep parabolic reflector which gives a powerful, almost parallel beam expanding at an angle of four degrees, and a soft diffused beam expanding quickly at an angle of 90 degrees or more, this quickly diverging beam being quite unreflected and eliminating side dazzle.

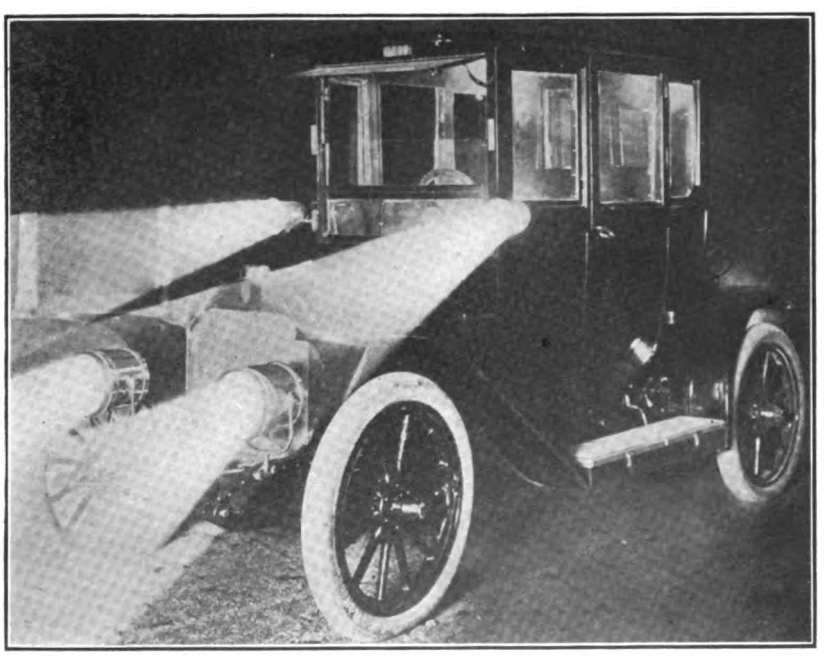


Fig. 1—Motor Car Lighted by the Apico System Which Includes a Dynamo for Charging the Batteries.

Regarding efficiency, it is stated that a properly burnished bare silver plate has a reflecting power of about 97 per cent. If the surface be not allowed to tarnish it is more effective than a lens mirror, through the heavy glass of which the rays of light must pass twice before being projected in a useful beam, and in addition, the lens mirror owing to its lim-

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ited angle can receive upon its surface only a much smaller proportion of the rays than the deep metal reflector.

The simple parabolic reflector was perfected many years ago, but early application with lighting by a gas flame developed the fact that the lens mirror was the better; in fact, it proved to be the only practical member on account of the highly corrosive effects upon the metal by the products of combustion. And it is interesting to note that after practically being discarded by makers of automobile lamps, the parabolic is again in favor. In addition to lighting advantages it is dust and moisture proof, being enclosed tightly.

Lamp Efficiency.

Early experiments with electricity for lighting the motor car were conducted with the carbon filament lamp, and while some of these are still used, the amount of current consumed for the light given does not appear to warrant their employment. With the advent of the tungsten bulb which operates at an efficiency of 1.23 watts a candlepower against 1.97 and more than three for tantalum and carbon, respectively, interest in electric lighting for automobiles was stimulated. Besides materially excelling in candlepower for energy consumed, the tungsten produces a light which in quality is superior to either of the other lamps, and it also is nearly as rugged as the carbon filament.

Despite the improvements in lamps, lighting batteries and current generators, many motorists while admitting the advantages of electrical lighting over other forms, are unfamiliar with electricity, its generation, application and operation. Others who experimented with unsuitable apparatus, many systems of which were installed incorrectly, became prejudiced through these. The use of electric lighting is no longer an experiment and the reliability of the various systems upon the market is such that with proper care satisfactory service is assured. The object sought by each manufacturer is to make his device as nearly fool proof as possible.

It may be said that there are three distinct systems in use; namely, the straight storage battery, the generator and battery, and the alternating current magneto. It is the intention of the writer to take up each of these in logical sequence, and to explain their construction, application and operation in practise, avoiding the use of technical terms, so that in making a selection of a system the purchaser will be familiar with its details.

Straight Storage Battery System.

Considering first the straight storage battery system: To apply and utilize this method successfully does not require any great knowledge of electricity, but the motorist contemplating its installation should acquaint himself with its details if efficient service and economy of operation be desired. A practical understanding of the battery and its care is essential for successful lighting, as well as the method of wiring the automobile to economize in current, for cost of operation is an important factor in the maintenance of the motor car.

Many owners who are conversant with the high-tension ignition system hesitate to attempt the installation of electric lighting, but as far as the straight battery system is concerned, it is a simple matter if standard equipment be employed. The question of expense will be a factor, but the tungsten lamp is not expensive nor the devices for transforming the oil and gas lamps into electrical units. Respecting the battery, there are many excellent makes upon the market at reasonable prices, and in making the investment it must be borne in mind that the lighting storage battery is adaptable for ignition purposes as well.

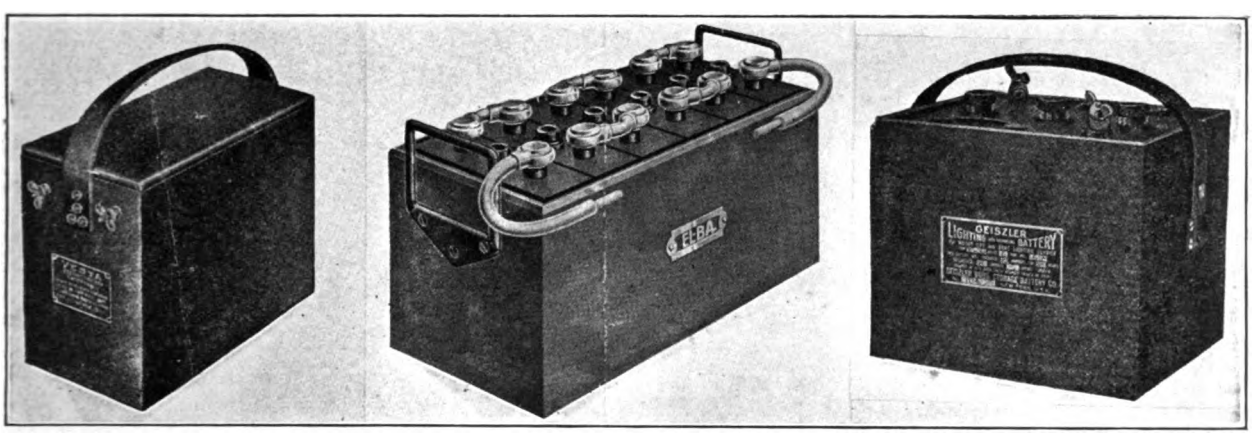


Fig. 2—Conventional Types of Lighting Batteries: A, Vesta; B, Elba; C, Geissler—The Ampere-Hour Capacities Range from 60 to 160.

To the average automobilist the electrical terms employed are mystifying. Volts and amperes convey some meaning, but watts, watt-hours, candlepower, ohms, etc., are bewildering, especially if one be trying to determine how many hours of service his battery will give him with a certain number of lamps. It is even more discouraging to be told by an expert that with the size of lamps decided upon but a few hours lighting will be available and that the battery will have to be charged frequently,

Planning the Lamp Equipment.

Before selecting the battery it is advisable to consider the number of lamps to be burned, their capacity and the conditions under which they are to be operated. Those who do considerable night driving involving the use of the headlights should figure

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Fig. 3—Edison 80 Ampere-Hour Battery, in Which the Acid Is Replaced with a Solution of Caustic Potash.

accordingly, making provision for a reserve battery if necessary, an arrangement which will permit of constant and efficient service.

On the other hand, city driving with the head lamps extinguished lengthens considerably the time of discharge, because these members take a large proportion of the energy supplied to the system as will be explained later. The time of discharge will depend largely upon the service. It is obvious that the operator who employs electricity for short runs, utilizing the gas lamps for long trips, will obtain more hours of lighting. The dual system will appeal to the suburban motorist who desires the use of head lamps lighted by electricity when reaching the unlighted sections in the run homeward from the city.

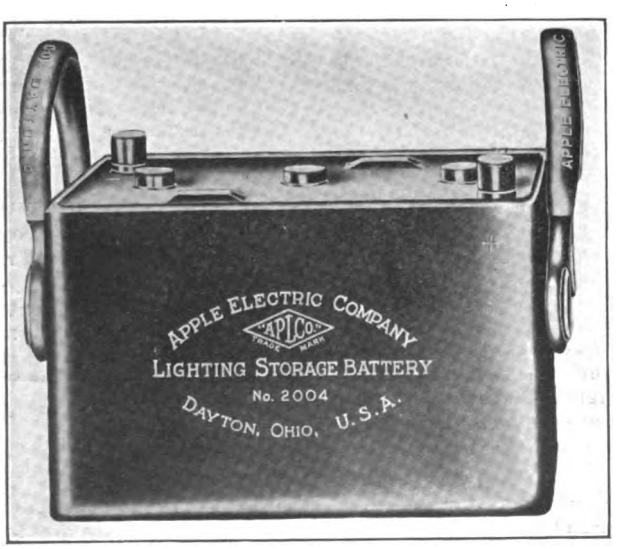


Fig. 4—Apico Battery, Suitable for Straight Storage System or with Dynamo.

As lamps are commonly rated in terms of their mean horizontal candlepower, and their energy consumption in terms of watts a mean horizontal candlepower, it is essential that these factors be taken into consideration in planning the lighting equipment. The new lamp ratings (May, 1910,) of the National Electric Lamp Association designate all lamps by wattage, instead of candlepower as formerly.

Tungsten Lamps Economical.

Ordinary carbon lamps take from three to four watts a candlepower. Thus a 16 candlepower lamp using 3.5 watts a candlepower or 56 watts at 110 volts takes a current of $56 \div 110 = .51$ ampere. For a given efficiency or watts a candlepower the current and power increase directly as the candlepower. As the tantalum operates at an efficiency of less watts a candlepower, and the tungsten even more so, it is obvious that the latter is more economical in current consumption.

Electricity or electrical energy may be generated in several ways but by whatever means it is produced there are many properties which are common to all. The current supplied by a storage battery will flow continuously until it is practically exhausted, while that from dry cells can only be used intermittently; that is, it must have slight periods of rest, no matter how short they may be, to obtain good results.

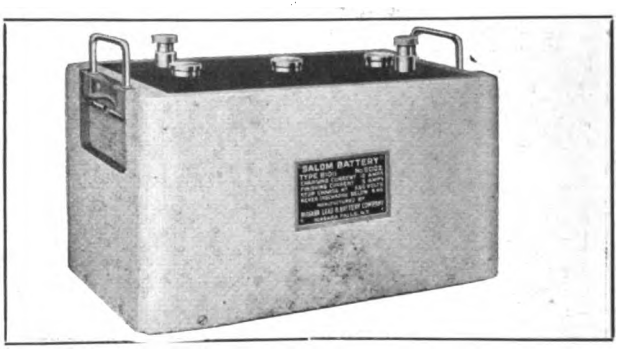


Fig. 5—The Salom Battery, Especially Constructed for Lighting of Motor Cars.

Electrical force is any cause of change of motion of matter and is expressed usually by volts, pounds or other units. Resistance is a counter force or whatever opposes the action of another force. Work is force exercised in traversing or crossing a space against resistance of counter force. Force multiplied by space or distance represents the work in foot-pounds. Energy is the capacity for doing work, and is measured by the work done. The cause of a manifestation of energy is force. If this be electromotive energy or electric energy in current form it is called electromotive force, the practical unit of which is the volt. When electromotive force does work in a closed circuit a current is produced, the practical unit of which is called the ampere.

A current of electricity, when flowing in a closed circuit, passes through some substances more easily than others, and the relative ease of the passage is known as conductivity. In practical calculations its reciprocal, which is called resistance, is generally used. This practical unit is known as the ohm. A current of one ampere is maintained by one volt through a resistance of one ohm.

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The term ampere-hour is employed to denote the capacity for current of a storage battery in a closed circuit. A storage battery that will keep a two-ampere lamp burning for eight hours is said to have a 16 ampere-hour capacity. In a similar manner an 80 ampere-hour battery would operate the same lamp 40 hours. The voltage does not enter into the calculation of its ampere capacity.

Regarding the term watt-hour, it may be stated that a current of one ampere flowing in a closed circuit, with an electromotive force of one volt, is equal to one volt-ampere or one watt. The voltage of the circuit, multiplied by the rate of current flowing in amperes, gives the rate of work, or the energy expended in watt-hours. An electromotive force of one volt, with a current strength of one ampere, is capable of developing an amount of work or energy called a watt. Therefore one volt multiplied by one ampere is equal to one watt.

It will not be necessary to utilize all of these units in computing battery and lamp capacity and to simplify matters the ampere and watt may be employed. The voltage practically may be eliminated insofar as the straight storage battery system is concerned, as the majority of the lighting members are rated at six volts. Regarding the ohm or resistance, this will be dealt with later.

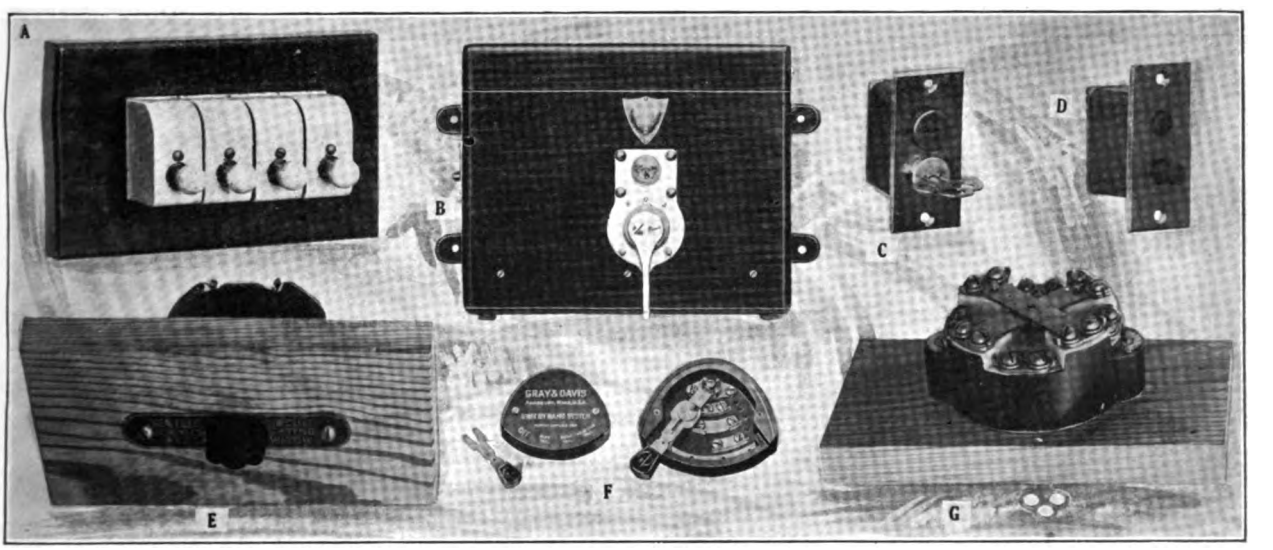


Fig. 6—Lighting Switches Which Permit of Controlling Differing Groups of Lamps: A, C, D, E, G, General Electric; B, Remy Ignition and Lighting; F, Gray & Davis.

Lamp Ratings.

Although lamps are rated by wattage instead of candlepower, the latter term is still employed, many lamp makers incorporating it in their catalogues. This arrangement makes it an easy matter to determine the amount of service a certain battery will give with different sized lamps. In an accompanying table is presented a number of lamps suitable for automobile lighting, and the candlepower, amperage and wattage, as well as the size of the lamps, are given.

It will be noted, however, that the lamp catalogues will give the mean horizontal candlepower in fractions, and the total watts will vary from the given figures slightly. For instance, a "Mazda" six-volt lamp is listed as having a mean horizontal candlepower of 6.1, and the total watts are given as 7.5. These differences, however, are small. The "Mazda" lamp, it may be stated, is a form of tungsten.

Assuming that the lamp equipment for the car consists of two 10 candlepower headlights, two four candlepower side lights, and one two candlepower tail lamp, the entire equipment aggregating approximately 31 watts, a 120-ampere six-volt battery would give 23 hours continuous illumination. A different group of lamps may be more satisfactory and might consist of two 16 candlepower head members, two four candlepower side and one two candlepower tail lamp, a total of 32 candlepower. Taking it for granted that the head lamps operate at an efficiency of 20 watts, the side at five and the tail at two, the total watts will be 52.

To simplify matters, let it be assumed that one ampere is equivalent to six watts, inasmuch as it has been explained that an electromotive force of one volt with a current strength of one ampere is capable of developing an amount of energy called a watt. Having ascertained that the approximate number of watts is 52, this sum divided by six would denote that slightly over eight amperes would be utilized. Consequently, if the battery be of 120 ampere-hour capacity, it will furnish lighting for 15 consecutive hours.

Various groups may be figured on the same basis. For instance: It is desired to utilize two 16 candlepower lamps in the headlights, employing oil for side and tail members, this method to be used in the dual lighting system, and the lamps fitted with either a parabolic reflector or an attachment for equipping the gas burner with an electric socket. Two 16 candlepower tungstens would denote 30 watts or five amperes. With a 60 ampere-hour capacity battery 12 hours lighting would be obtained and 24 for a 120 ampere-hour battery. With a group of five or seven lamps, including the head, side, tail and speedometer lights and current for operating an electric

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signal or trouble lamp, it is evident that the larger battery is advisable, especially if lamps of large candlepower be incorporated in the system.

Concerning Filaments, Etc.

The question of selecting lamps is a matter of choice insofar as their candlepower is concerned. That there is a wide variety in the shape of the filaments will be noted at Fig. 7, which depicts conventional types of standard automobile tungsten lamps and as the drawing shows the bulbs half the actual size with the candlepower of each indicated, the arrangement will assist the motorist in choosing his equipment, as well as estimating the amount of current required to operate each to obtain the rated efficiency.

Attention is called to the lamp shown at J, which is fitted with the new helical coil filament, the distinct merit of which is that it gives a closer focus and more uniform illumination than previous designs. The filaments depicted at I, K and H are of the cluster loop type, for which is claimed great strength and large surface area for light radiation.

In connection with the lamps the sockets or containing devices should be considered and in planning a lighting equipment it should be borne in mind that sockets should be purchased which will fit the type of lamp selected.

Lighting Batteries.

To obtain best results from the lighting battery, careful consideration should be given this important factor of the system. There are several makes upon the market and of these it may be said that they are reliable and efficient if given proper care. The manufacturers have made considerable progress in perfecting the lighting battery, but they do not recommend the use of an ignition member for lighting purposes owing to the low rate of discharge. On the other hand, the lighting battery may be employed for ignition if desired.

The lighting battery is made in divers sizes and shapes and at Figs. 2, 3, 4 and 5 are depicted conventional types. Their capacity varies, as 60, 80, 100 and 120 ampere-hour, respectively. The sizes of the batteries range approximately from 9.5 inches

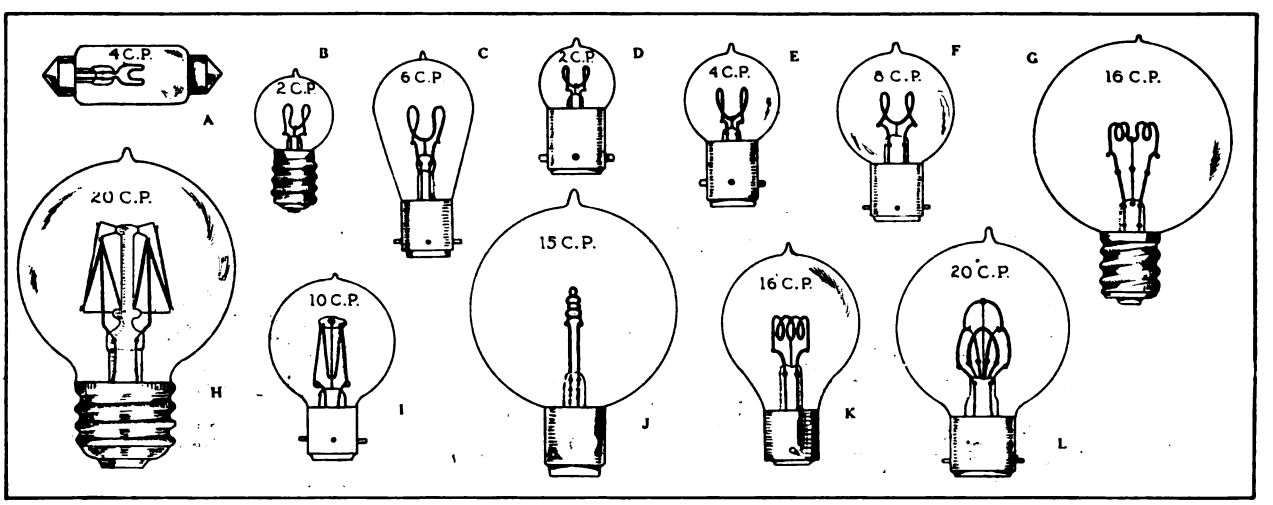


Fig. 7—Outlining Different Types of Tungsten Lamps Suitable for Motor Car Lighting, These Being Half Actual Size; G, H, J, K, L, Headlights; C, E, F, I, Side Lamps; B, D, Tail Bulbs; A, Limousine Tubular; D, E, J, General Electric Lamps.

It will be seen that three distinct types of bases are shown in connection with the lamps. These are known as the Edison candelabra, Ediswan candelabra

	Amperes	Diameter	Watts
2 Candlepower	0.3	0.7500	2.46
4 Candlepower	0.6	1.0000	4.92
6 Candlepower	1.0	1.0000	7.38
10 Candlepower	1.6	1.5000	12.30
12 Candlepower	2.0	2.0625	14.76
16 Candlepower	2.4	2.0625	19.68
20 Candlepower	3.0	2.0625	24.60
25 Candlepower	4.0	2.0625	30.75

and standard Edison. The latter is depicted at H, while J and B are Ediswan and Edison candelabra, respectively. While the last named is used very generally in connection with motor cars, the Ediswan is more often recommended. This type, due to the nature of its construction, holds the lamp firmly at all times, preventing it from working loose and thereby eliminating a broken bulb or a damaged reflector.

long, 7.25 wide and 8.5 high for the 60 ampere-hour members to 15 inches long and 9.5 high for the 120.

They may be fitted to the running board if desired, but the general tendency is to keep the latter free from accessories. To meet these conditions boxes are manufactured which can be underslung beneath the rear footboard or supported on auxiliary cross members made of strap iron and attached to the side members of the chassis. These containers are equipped with a wood lining which has been treated chemically to make it acid proof and the construction of the box provides an air space between the battery and sides of the holder for ventilation as well as keeping the former dry. Accumulation of water or spilled electrolyte in the bottom of the box is prevented by grooves in the bottom board, extending downward from the corners to an outlet at the centre of the board. Rubber bushings are utilized in the apertures through which the wires pass to the terminals.

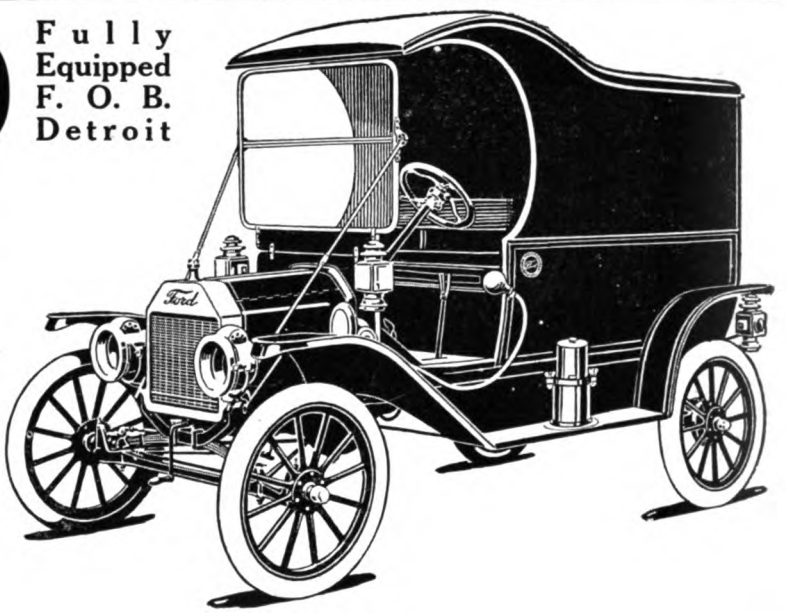
The subject of batteries may be dismissed with a few suggestions as to their care and maintenance:

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This price includes full equipment—Automatic Brass Wind Shield, Speedometer, Ford Magneto built into the motor, two six-inch Gas Lamps and Generator, three Oil Lamps, Horn and Tools. No Ford Cars sold unequipped.

Capacity of this Universal Delivery Car is 750 pounds of merchandise.

This Delivery Car was most thoroughly "tried out" in actual delivery service for two years before we offered it to the business world. (By the Wanamaker Stores in New York and Philadelphia, by the Bell Telephone Company all over the country, and by others.)

We made sure of the dependability of this car in delivery service. We made sure of the economy of this car in actual use. We recommend it in all respects.

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Simple in operation—low in purchase price—cheap in maintenance—Vanadium steel construction (the same strong chassis that has made Ford Model T Touring car so deservedly popular)—it will give years of service.

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To concerns who purchase Ford Cars in quantity lots for Commercial Purposes we will give the benefit of a rate reduction or discount, we have fixed a sliding scale of prices which will be submitted on request. Catalog and detailed descriptive literature will be mailed gratis. Branch Houses and Large Distributors in all Principal Cities—Dealers Everywhere.

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They should be kept clean and dry, especially the terminals. The electrolyte should always cover the plates and as the operation of the battery evaporates the water, the loss should be replenished with rain or distilled water, not acid. Test frequently with voltmeter to ascertain condition and when fully discharged, which is approximately at about 5.4 volts, recharge at once.

Types of Switches.

Decided improvement has been made in the matter of switches, it being possible to control a number of lamps or groups with one switch by simply throwing a lever, turning or pressing a button. This arrangement simplifies operation, does not detract from the appearance of the dash, and as each group of lamps is wired and connected to a separate control, in the event of trouble the faulty member is located quickly.

At Fig. 6 are illustrated several forms applicable for motor car lighting. That at E is a three-circuit snap switch of the flush type having a sturdy porcelain base on the back of which is mounted the terminal plates and battery bus bar with binding screw for each conductor as depicted at G, which is a rear view. This switch may be wired to give the following combinations: Side and tail light, head and tail, all lamps on, and all off. Extra terminal connections are provided so that if desired the electric horn and speedometer light may be wired to it. The switch handle is removable by turning it backward, thus preventing persons interfering or tampering with the lights when the car is left unattended. The bus bar feature eliminates all joints, splices, etc., and makes it a very simple matter to install.

At F is presented a lever switch, having a detachable lever which when removed prevents tampering with the system. This device affords the same number of combinations as the one previously described; is compact and durable, and installed easily. A flush tumbler four-gang switch is outlined at A, and both on and off positions are controlled by one and the same lever, thus reducing the number of levers and simplifying the control of the lights. This is utilized for five-light equipments, one switch being used for the tail light, another for the two side members, and one each for the head lamps. The bus bar feature is provided on two, three and four-gang switches.

The push button switch shown at D is designed for use where the space is very limited. The button is of metal, insuring durability, and the plate on which the terminals and contacts are mounted is fastened to the frame with two long screws, preventing it from jarring loose. The bus bar feature also is incorporated. A similar member with a lock and key is depicted at C. That at B is utilized for a combination ignition and lighting system and is equipped with a lever in front for control of the ignition and lighting mechanism while the lamp control, which is not shown, is located on the left side and is of the push button type.

Reference has been made to the ohm, the unit of resistance, and this is applicable to the wiring methods. It is not the intention of the writer to indulge in a technical discussion of wiring, but simply to emphasize the advantages of employing the proper size wire, as upon the well designed wiring depends the success or failure of the system. The light circuits should be separate from that of the ignition as annealed copper has considerable less resistance than iron.

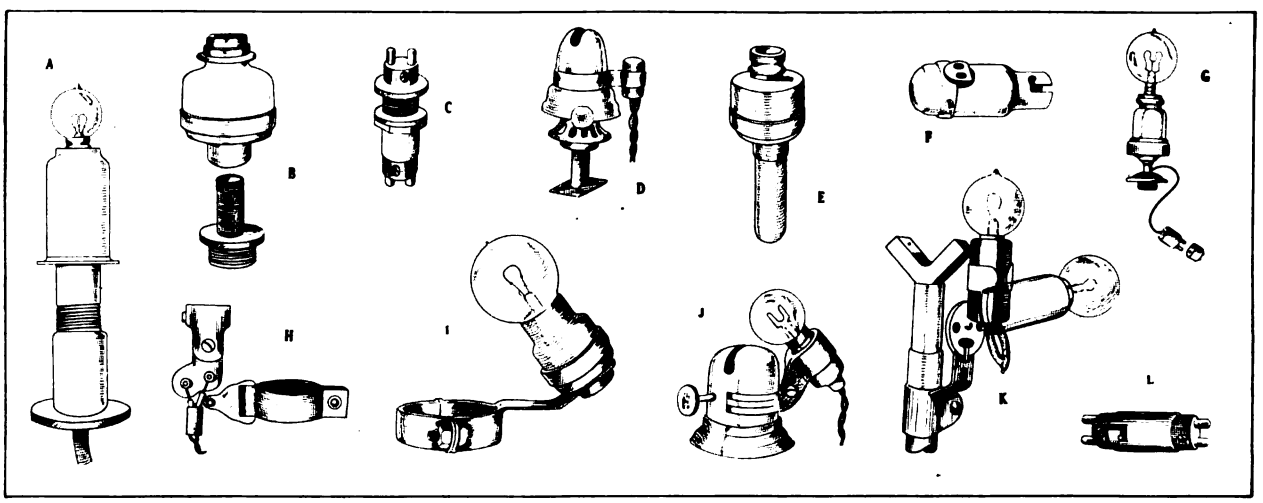


Fig. 8—Devices for Converting Oil Lamps into Electrical Units: A, Apleo Adapter; B and D, Morse Converters; C and L, Standard Connectors; E, Vesta Fitting; F, Ediswan Socket; G, Elba Burner Device; H, Adapter Socket; I, General Electric Socket; J, Manhattan Oil Adapter; K, Gil-Bo Adapter.

Nos. 10, 12 and 14 are recommended for various parts of the circuit and it is important that the wires be protected from abrasion due to wear. Otherwise, if they should be grounded to the frame of the car they might interfere with the ignition circuit which usually is grounded to the frame. The use of wire armored cable is becoming more general, although circular loom and metal tubing are employed still.

Lamp Converting Devices.

Regarding the lamp equipment it may be stated that there are a number of practical devices manufactured for converting oil and gas members into electrical units and these are not expensive. There is a wide variety in design, including complete outfits for installation to single members for attach-

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Greatest Power Wagon Show IN **Greatest Power Wagon Market** **Greatest Service Wagon Magazine Published**

Boston, Mass., THE MOTOR TRUCK

MARCH 13-20. MARCH 5.

BIG SPECIAL EDITION

TO ISSUE MARCH 5,

Will reach thousands of users and prospective purchasers at the opening of the season. Publicity will attract attention. It is as imperative as your product is for your business, for the business of your agents and representatives.

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Practically every visitor is a prospect. The opportunity is DURING THE SHOW.

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The commercial conditions make this the greatest Service Wagon market, as it is the greatest Pleasure Car market, of the world.

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ment, and the prices range from 35 cents to several dollars, meeting every desire of the motorist.

Considering first the oil members: These may be fitted with permanent or removable appliances, the type depending largely upon the design of the lamp. Where the side lamp is of the square type it is an easy matter to install a fixed electric light in such manner that it will not interfere with the operation of the oil burner. This arrangement is preferable, as a dual system is obtained. The same results are to be had with attachments which may be moved in or out of position at the will of the operator. A third method consists of attachments fitted in place of the burners. Where the permanent members are employed they usually are located in the corner, an arrangement making for good reflection as well as safeguarding the bulb from the heat and smoke of the kerosene light. The stationary type is fitted by cutting a hole, inserting the socket and screwing up the adjusting member.

Detachable connectors are employed to connect the wire leading from the switch to the lamp member and are manufactured in different types, but the principles upon which they operate are similar. They are preferable to the plain wiring method as they permit of removing the lamps easily for cleaning, etc.

At Fig. 7 is presented a number of devices for converting oil and gas lamps into electrical units, also sockets, connectors, etc., and both the stationary and removable types are outlined. The former are shown at A and E, and the latter at D, I and J. The third form is outlined at B and G, these members being fitted to the oil container. At H and K are illustrated burner attachments which permit of swinging the electric light in or out of position as desired. Where trouble lamps are incorporated in the lighting system a connector such as shown at C is utilized. At B is depicted a flangeless connector which may be employed to advantage.

Reference has been made to the Ediswan candelabra socket and at F is shown one of these members. When employed in connection with a detachable side light this is inserted through the bottom of the lamp and held in position by a locking nut. The electrical connection is then made by inserting a plug in the receptacle.

Headlight Reflectors.

Although some may limit the lighting equipment to headlights, fitting these with burner attachments, it must be borne in mind that electric lamps utilized in connection with the lens mirror will not give as efficient light as the parabolic metal reflector. It may be stated, however, that with the latter method about 75 per cent. of the total light reaches the reflector and is converted into usefulness, while that with the lens mirror is considerably less. This subject will be considered later.

There are several forms of metal reflectors which may be utilized in conjunction with the gas head lamps and at Fig. 9 are presented different devices, that at A being a bayonet base socket bracket having a six-inch reflector. It is attached easily to the gas pipe in place of the burner, and is held in position by means of brass nuts. The lamps may be focussed by screwing the reflector backward or forward on the socket. The reflector is readily accessible by opening the door of the lamp proper, is nickel plated, highly burnished, and in the form of a true parabola.

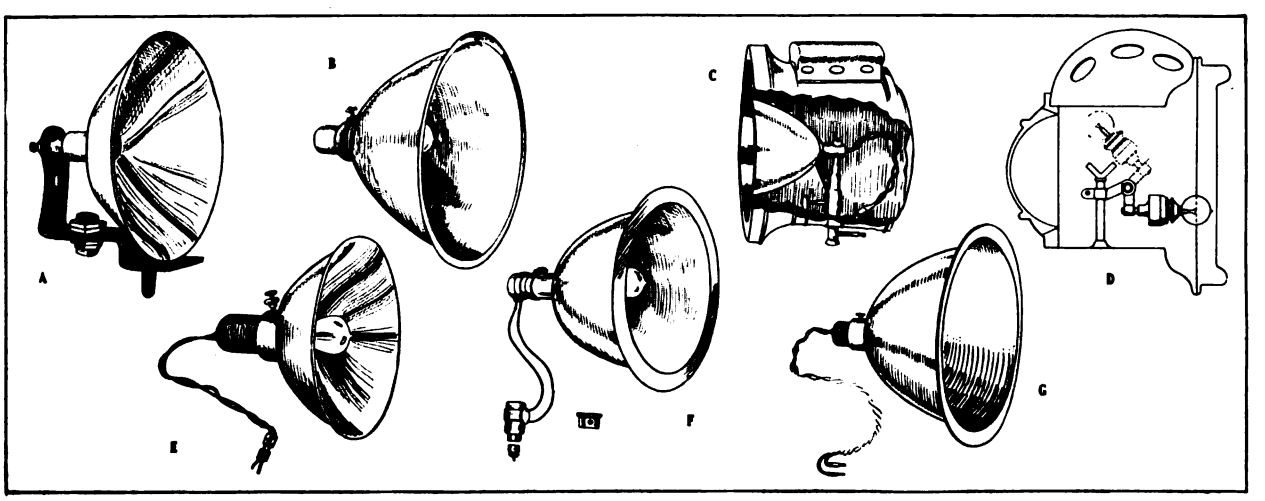


Fig. 9—Parabolic Reflectors Utilized for Gas Burner Lamps: A, General Electric Bayonet Base Adjustable Socket; B, Apleo; C, Narragansett Demountable; D, Gray & Davis Burner Device; E, Vesta Adjustable Reflector; F, Elba; G, Silvey.

Another type is depicted at E, and this is inserted inside the regular lamp, means being provided for adjustment. Another device for remodelling the headlight is illustrated at F, this being designed for similar application and fitted for an attaching plug. A convertible type is depicted at D, this being employed with the lens mirror lamp, and it will be noted that the bulb may be swung out of position when the use of acetylene is desired. A demountable device which is attached to the gas burner by a form of set screw is shown at C. Here the parabolic reflector is slightly smaller than the usual type, but it is said to be efficient.

(To Be Continued.)

Ed. Note—The next installment will deal with the various methods of wiring the car, outlining the proper installation of different straight storage battery systems and explaining the adjustment of the lamps to obtain the best results from the lights.

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BIG BOSTON SHOW

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The Automobile Journal

February 25 March 10

This will be the biggest and most important exhibit of Motor Cars, Accessories, Supplies, Parts and Fittings of the year—and will mark the opening of the active motoring season in the East.

8,000,000 People to draw from—all within easy riding distance of the display—5,000 interests, representing all branches of the industry—in the heart of the Greatest Motor Vehicle and Accessory Market in the World.

The Show Numbers of the AUTOMOBILE JOURNAL will be the most comprehensive of any yet published by a motoring magazine—either from the viewpoint of present value alone or as a book of reference to be retained for future use.

Whether you will exhibit or not, these issues will afford an opportunity for publicity seldom accorded—Reach the owners and prospective purchasers through the Journal—No duplication of circulation—One expenditure.

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MOTORING NEWS OF NATIONAL IMPORT.

Sixth Annual Canadian Display in Montreal, Quebec---Important Exhibitions in St. Louis, Pittsburg, Rochester, Bangor, Brockton and Other Cities--- Boston Show Space Exhausted---Plans for Remainder of the Month.

Although the sixth annual display of the Automobile Company of Montreal was formally opened in the Drill Shed, Montreal, Quebec, at 8 in the evening of Feb. 3, and the doors had been opened since 1 in the afternoon, many exhibits were not yet in place. Some of these were shipped by American makers direct from shows in the States, and were not in place until Monday morning. However, it was demonstrated from the first that the building was wholly inadequate to accommodate all the cars the local dealers desired to present to the people of eastern Canada.

The decorative scheme was quite in keeping with the standard set by previous displays under the direction of E. M. Wilcox, and consisted largely of a liberal use of bunting of various colors. In the centre of the main hall a huge King Edward crown was suspended from the ceiling, and this was a literal mass of electric lights. A total of 3000 incandescent bulbs were employed in strings from the several corners of the building, and 20 arc lights and 100 tungsten lamps aided in illuminating the interior.

It was largely an American exhibit, only four French cars being shown. Many of the makes were represented in Montreal for the first time. It was quite noticeable that the tone of the Canadian papers had changed much in the past year. In 1911 their columns were filled with data concerning French cars and much credit was given to French manufacturers for the development of the gasoline propelled vehicle. This year the publishers apparently had declared that this position was an error and that henceforth American machines are to be featured.

The addition of electric lighting systems and self-starting devices proved to be a decided revelation to the Canadians. Some of the French cars were thus equipped, but the Canadian manufacturers appeared to have overlooked these features, although inquirers were informed that they would be added in the near future.

Manager Wilcox was compelled to disallow six applications for space in the commercial vehicle section, and there is every evidence that 1912 is to see a decidedly increased business in motor trucks in the Dominion. Several sales were recorded during the show and many excellent prospects secured.

Among those who displayed pleasure cars were: Robert & Robert, Jackson; Ford Motor Company of Canada, Ford; Russell Motor Car Company, Russell; McLaughlin Motor Car Company, McLaughlin, Fiat, Rauch & Lang electrics; Harold Cook, Detroit electric; Comet Motor Car Company, Chalmers, Packard; Brockville-Atlas Auto Company, Brockville-Atlas; Automobile Francaise, Berliet; Motor Import Company, Hupmobile, Hudson, Franklin, Pierce-Arrow; Pope-Hartford Company, Pope-Hartford; Baker Electric Company, Baker electric; Hamilton Machinery Company, Inter-State; J. A. Michaud, Vinot; Rousseau Bros., Cadillac; Levesque's Agency, Abbott-Detroit; Reo Motor Company of Canada, Reo; Montreal Locomotive Works, Alco; E-M-F Company, E-M-F, Flanders; Legare Gadbois, Marmon, Cole, Warren, Mitchell, Imperial; Gareau Motor Company, Amplex, Everitt, KisselKar; Ramsay Motor Company, Schacht; W. E. Baker, King; J. I. Case Company, Case; J. M. Landry, Speedwell; Regal Corporation, Regal; Clarke-Carter Automobile Company, Cutting; Royal Automobile Company, Renault, K-R-I-T, Stevens-Duryea.

The following displayed commercial vehicles: Brantford Carriage Company, Brantford; Motor Import Company, Pierce-Arrow; A. Jennings & Co., Gramm; Pope-Hartford Company, Pope-Hartford; Baker Electric Company, Baker electric; Reo Motor Company, Reo; Montreal Locomotive Works, Alco; Legare Gadbois, Kelly; Gareau Motor Company, KisselKar.

Accessories were shown as follows: Auto Tire Company, Goodrich tires; Bosch Magneto Company, Bosch magnetos; S. F. Bowser & Co., Bowser gasoline tanks; Canadian Consolidated Rubber Company, Canadian tires; Mussens, Ltd., Clayton air compressors; Dunlop Tire & Rubber Goods Company, Dunlop tires; Goodyear Tire & Rubber Goods Company, Goodyear tires; Imperial Oil Company, Polarine oils and greases; Independent Tire Company of Canada, Independent tires; Gaulois Tire Agency of Canada, Gaulois tires; R. J. Levy, welding process; John Milen & Son, accessories; Russell Motor Car Company, accessories; Diamond Rubber Company, Diamond tires, Wayne Oil Tank & Pump Company, Wayne storage systems; McColl Bros., oils and greases.

ST. LOUIS SEES 1912 MODELS A SECOND TIME.

For the second time this season the dealers in St. Louis held an automobile show in that city beginning Feb. 5. The first exhibition was given in the open air in Forest Park last fall, and was a much larger representation of the local agencies than the second, which was held in the Coliseum. The building was handsomely decorated, carrying out the open air effect so far as possible. The various spaces were marked off by trellis work and numerous electric lights were employed to illuminate the display.

Among those represented at this second show were: White Motor Car Company, White pleasure and commercial vehicles; Weber Drayage & Warehouse Company, E-M-F, Flanders, Studebaker electric trucks; M. W. Bond Automobile Company, Warren; Lewis Sales Company, Midland; Wiemeyer Motor Company, Apperson; Anderson Electric Car Company, Detroit electric; Heinrich Automobile Com-

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pany, Michigan; C. P. Kimball & Co., Kimball electric; Charles F. Swartz, Velie pleasure and commercial cars; Cochrane Motor Sales Company, Cochrane trucks; Chase Motor Truck Company, Chase trucks; Columbus Buggy Company, Columbus electrics; Franklin Motor Car Company, Franklin; Mack Motor Truck Company, Mack trucks; Kingman-St. Louis Implement Company, Rambler; KisselKar Agency, KisselKar pleasure and commercial lines; Haynes Automobile Company, Haynes; American Welding & Auto Repair Company, welding systems; Coats & McDonald, Aero unicycle; Hurck Motor & Cycle Company, motorcycles; Auto Parts Sales Company, accessories.

LYNN DEALERS HOLD THEIR FIRST EXHIBITION.

The small towns of Massachusetts are entering the automobile show circuit with considerable vigor this year, the agents evidently preferring to demonstrate to their clientele the merits of the various models before they have had opportunity to study the larger display at Boston. Fifty cars were shown by the dealers in Lynn at the Oxford Garage, Feb. 6-10. The interior of the building was handsomely decorated and the various models were so arranged as to bring about the best effect. The event was under the management of the following committee: L. D. Robbins, Frank E. Vallier, L. H. Barrett, S. P. Tierney and W. W. Whitney.

Among those who made display were the following: W. W. Whitney & Co., Overland; F. E. Vallier, Velie; L. D. Robbins Company, Cadillac, Winton; E. T. Reynolds, Pope-Hartford; M. Plumstead & Son, Maxwell; Warren H. Beede, Ford; S. P. Tierney, Metz, Buick; C. E. Whitney, Chalmers, Packard, Federal trucks. E. L. Brown and Fred C. Mitchell also exhibited pleasure car models. The event was a decided success from every viewpoint.



Interior of the Drill Shed at Montreal, Quebec, During the Sixth Annual Display of the Automobile Club of Montreal, Giving an Idea of the Decoration Scheme and the Illuminated King Edward Crown.

SECOND ANNUAL AUTOMOBILE SHOW IN BANGOR.

The second annual automobile show under the management of F. M. Prescott was held in the big new garage of the Bangor Motor Company, Bangor, Me., Feb. 5-10. The railroad companies leading into the city assisted materially in reducing rates, and the people throughout the entire eastern section of Maine made it a point to visit Bangor and inspect the 1912 models. The decorations were unusually attractive, and the various exhibits were set off to the best advantage. Another feature was the special illumination of the street leading to the garage, making the event of local importance in every way.

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Among those who made display were the following: C. P. Treat, Jackson; Harmon Automobile Company, Thomas, Hudson; J. H. Rice, Lozier, Stearns; Clarence B. Swan, E-M-F, Flanders; Bangor Motor Company, Pierce-Arrow, Cadillac, Sampson truck; Arthur A. Robinson, Buick; Asa M. Robinson, Metz; Eastern Sales Company, Haynes; T. D. Talbot, Oakland; A. W. Mutty, Stoddard-Dayton; C. M. Conant Company, Maxwell; George F. Reynolds, Knox, Cole; L. P. Sweet, Oldsmobile, Winton, Nyburg, Elmore, Reo; S. L. Crosby Company, International Harvester truck; Standard Oil Company, Polarine oils and greases; James Bailey Company, accessories; Pyrene Sales Company, fire extinguishers.

BROCKTON DEALERS TRANSFORM PALACE RINK.

The first time in the history of Brockton, Mass., an automobile show was opened in the Palace Rink, at 1 in the afternoon of Feb. 8, continuing until Feb. 10. The event was under the auspices of the Brockton Automobile Association and the direct management of William H. and James F. Powers. Thirteen different makes of cars were shown.

The decorations were borrowed from the recent show in Providence, R. I., the general effect being that of an open air palm garden. The entrance was hung with red, white and blue bunting, but once the visitor entered the main hall he found a massive painted sky overhead, and the exhibition spaces divided with white trellis work, over which smilax was entwined. Potted plants and palms also were used freely in carrying out the garden scheme.

Among those who made display were the following: Harry Windle, Oakland; Brockton Automobile Exchange, E-M-F, Flanders; Arthur L. Turner, Chalmers; Charles Lawton, R. C. H.; Stephen H. Kelley, Maxwell, Hudson; Frank E. & Herbert Cushing, Cadillac; Gay Automobile Company, Buick; Young & White, Overland; Edgar D. Hartwell, Jackson; Jared W. Pratt, Metz; F. W. Swift, Bergdoll; Brockton Sporting Goods Company, Indian and Excelsior motorcycles; American Motor Company, M-M motorcycles; Nathan E. Packard, supplies; Brockton Vulcanizing Company, tires; Eagle Oil Company, Eagleine oils; Charles Lawton, carburetors and tire pumps; Flagg & Willis, vacuum cleaners.

DEXTER, ME., HAS ITS FIRST MOTOR CAR DISPLAY.

The first automobile show to be held in Maine, outside of the cities, was conducted by E. D. Blaisdell in the new Blaisdell garage in Dexter, Jan. 30-Feb. 1. The interior of the building was entirely transformed by the liberal use of bunting, and a special effect was obtained with an entirely new system of electric lighting. Coming as it did shortly before the opening of the show at Bangor, many of the cars shipped into the state for display in that city were first presented in Dexter.

Among the cars shown were: Reo, Maxwell, Cadillac, Ford, Buick, Pierce-Arrow and Metz. Included in the concerns represented were: Bangor Motor Company, Arthur A. Robinson, Darling Automobile Company, Little, Coffin Company, Maxwell-Briscoe Motor Company, Buick Motor Company, F. M. Howard, Central Maine Power Company, C. H. Wyman, and Ajax-Grieb Rubber Company.

ATLANTA SHOW FIRST IN SOUTHERN CIRCUIT.

The residents of the South are to have abundant opportunity to study the 1912 models, several shows having been planned in that section. The first of these opens in the Auditorium Armory, Atlanta, Ga., the afternoon of Feb. 10, and will continue for one week. The event is under the auspices of the Atlanta Automobile & Accessory Association, a new organization formed a short time since for the purpose of holding this show.

It will be remembered that the first show held in the South was under the management of the National Association of Automobile Manufacturers in November, 1909. It was expected that it would prove of sufficient importance to warrant the holding of an annual event of this character in that section. The experiment was not considered a success, however, and until this year southern motorists have been content to secure their information of the current models from the shows in other parts of the country. When the matter of holding another exhibition was broached early in the present season, it met with a ready response on the part of the local dealers.

The committee in charge of arrangements adopted a plan much in the nature of that used by the national association in advertising the propositfion, with the result that it is anticipated that all sections of the South will be represented among the visitors during the week.

Among those who will display cars are the following: Buick Motor Company, Buick; Velie Motor Vehicle Company, Velie; Overland Southern Motor Company, Overland; E-M-F Atlanta Company, E-M-F, Flanders; United Motor Atlanta Company, Columbia, Maxwell; White Company, White; Georgia Motor Car Company, National, Everitt, Brush; Locomobile Company of America, Locomobile; Ford Motor Company, Ford; Mitchell Motor Company, Mitchell; Fulton Auto Supply Company, Peerless, Marmon, American, Hudson; States Atlanta Company, Stoddard-Dayton, Courier; J. I. Case Company, Case; Steinhauer & Wight, Cadillac, Detroit electric; Northcutt Company, Chalmers; John M. Smith, Pierce-Arrow, Apperson; Johnson-Curtis Company, Stevens-Duryea, Baker electric; International Harvester Company, International truck; R. C. H. Corporation, R. C. H., Hupp-Yeats electric; Firestone-Columbus Southern Company, Firestone-Columbus, Columbus electric; Autocar Sales Company, Autocar truck; Herman J. Haas; L. S. Crane, Pope-Hartford; Cole Motor Car Company of Georgia, Cole, K-R-I-T; F. B. Stearns Company, Stearns.

The following accessory dealers also will be represented: Chas. E. Miller, Wayne Oil Tank & Pump Company, Elyea-Austell Company, J. K. Gewinner, Alexander Seawald Company, Atlanta Top & Trimming Company, Standard Oil Company, Gulf Refining Company, Reed Oil Company, Hardy Accessory Company.

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The Car That Marks My Limit

By R. E. Olds, Designer.

I have no quarrel with men who ask more for their cars—none with men who ask less. I have only to say that, after 25 years—after creating 24 models and building tens of thousands of cars—*here's the best I know.* I call it My Farewell Car.

Reo the Fifth is no great innovation.

Its only sensation is the price at which we sell it.

It simply shows the best that men have discovered in every detail of motor car engineering.

And it shows the best I have learned after 25 years of continuous striving.

There are no petty economies. Every detail shows the final touch.

The center control is a new and exclusive feature. The foot pedal brakes—the absence of side levers—the left side drive, all show the coming vogue.

I regard the car as close to finality.

Price, $1,055

The initial price on Reo the Fifth has been fixed at $1,055.

The price may be advanced, and must be advanced if anything adds to present cost of construction.

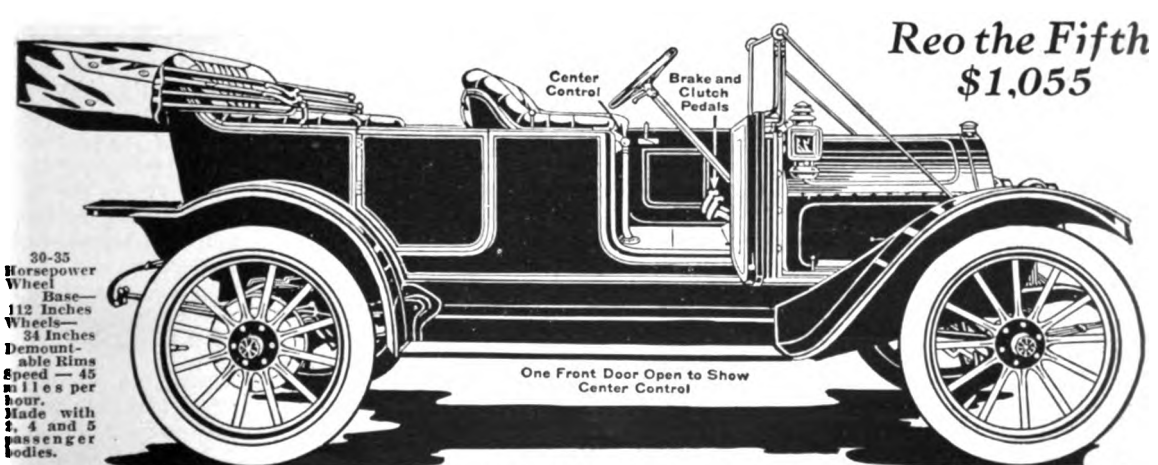
But the price of today offers far more for the money than has ever before been attempted.

This car—my finest creation—will prove, I believe, the most interesting car of the year. Ask for our book about it.

R. M. OWEN & CO. General Sales Agents for

REO MOTOR CAR CO., Lansing, Mich.

Canadian Factory, St. Catharines, Ontario.



Top and windshield not included in price. We equip this car with mohair top, side curtains and slip-cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $25.00 extra

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ARIZONA'S FIRST MOTOR CAR SHOW AT PHOENIX.

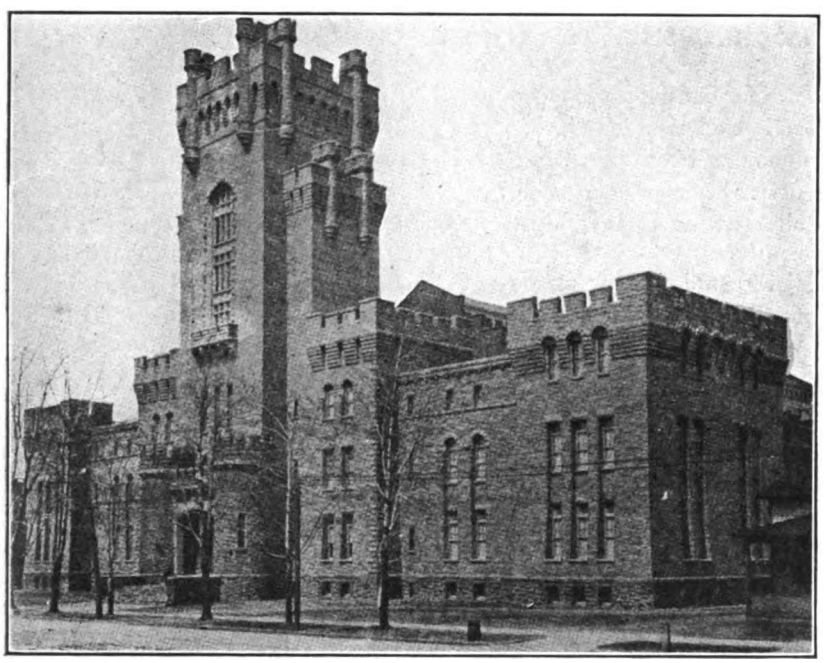
The people of Phoenix, Ariz., as well as the residents of the entire state, had their first opportunity to inspect an automobile show last month, the event being held under the joint auspices of George F. Gardiner, Leon S. Jacobs and Mark Dunbar. As a result, the press of Arizona is unanimous in the opinion that Phoenix not only is a coming city but has arrived.

The show was staged with every attention to detail that would mark the presentation of 1912 models in the business centres of the East. Nothing was lacking, not even the electric lights, the floral decorations or the music. So much of a success was the week's display that it is announced that the automobile exhibition will be an annual event in Phoenix in the future.

Among those who made display were the following: J. M. Smith, American, Regal; Transcontinental Motor Company, Hupmobile, Cutting; Ferguson & Raub Company, Buick, Apperson; W. D. Tremaine, Hudson, Cadillac, Mitchell; George Hageman, Franklin; Arizona Motor Car Company, E-M-F, Flanders, Brush.

ROCHESTER DEALERS FILL NEW STATE ARMORY.

The big new 74th Regiment armory in Rochester, N. Y., was filled to overflowing at the fourth annual display of the Rochester Automobile Dealers' Association during the week of Jan. 22-27. This was the first show held in that city in two years and every dealer in the vicinity took advantage of the opportunity to call attention to the offerings for the 1912 season. The event was under the direct management of Col. C. A. Simmons, but every officer and member of the association took an active interest in the successful outcome.



New 74th Regiment Armory at Rochester, N. Y., Scene of the Recent Rochester Automobile Show.

Electric lights played a prominent part in the decorative scheme, and the chief features were an electric fountain at the main entrance and a splendid sunburst in the rear of the hall. Lattice work, surmounted by decorative flower pots entwined with smilax, separated the exhibition spaces, and made a decidedly attractive setting for the various cars and accessories on display. Among those represented were the following:

Robert-Thomson, Pierce-Arrow; C. L. Whiting, Buick; F. R. Luescher, Rambler; Shafer Motor Car Company, Cole; Overland Rochester Company, Overland; Cutting Auto Sales Company, Cutting; Peck & Arnold, E-M-F, Flanders; A. M. Zimbrich, Haynes; Babcock Electric Carriage Company, Babcock electric; Mabbett-Bettys Motor Car Company, Cadillac; Davidson & Sucker, Moon; A. V. Hart, Everitt, K-R-I-T; Franklin Automobile Company, Franklin; E. W. Fisher, Stearns; McKenney & Gilpin, Paige-Detroit, De Tamble, Clark, Westcott; Knipper-Kipp Company, Stutz; Kline Motor Car Company, Kline-Kar; Selden Motor Vehicle Company, Selden; Turk & Brown, Premier; Gillis-Rand Motor Car Company, Stevens-Duryea; James Cunningham, Son & Co., Cunningham; Kate & Pawlk, Alco; Strong-Crittenden Company, Lozier; Arthur McNall, Peerless; Mandrey Motor Car Company, Packard; Gabel-Hill Company, Ohio electric; Genesee Motor Vehicle Company, Maxwell; Ball-Washburne Motor Company, Bergdoll; Elliott-Porschet Auto Company, R. C. H.; Marathon Sales Company, Marathon; C. E. Hartson, Warren; Hollis-Rand Company, Pullman, Imperial.

THIRD ANNUAL DISPLAY FOR HARRISBURG DEALERS.

Had the Harrisburg Automobile Dealers' Association, Harrisburg, Penn., been able to secure a building twice the size of the Arena it still would have been impossible to stage all the makes of cars which the local dealers desired to present to the attention of the public. The third annual show was held Feb. 3-10, under the management of J. Clyde Myton, well known in the industry as the secretary of the Motor Club of Harrisburg. Thousands of electric lights were used to good effect in the decorative scheme and some 50 1912 models were presented by the following agencies:

Harrisburg Auto Company, Abbott-Detroit, Reo, National; East End Automobile Company, Overland,

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Hupmobile, Velie, Oldsmobile; I. W. Dill, Hudson, Inter-State; Andrew Redmond, Maxwell, Columbia; Keystone Motor Car Company, Pullman, Chalmers, E-M-F, Flanders; Crispen Motor Car Company, Cadillac; W. J. Huntert, International Harvester; J. I. Case Threshing Machine Company, Case; E. M. Hottenstein, Buick; Kline Motor Car Corporation, Kline-Kar; West End Motorcycle Company, Indian; Hengy Bros., Harley-Davidson.

Accessories were displayed by the following: Haines Measuring Pump Sales Company, Keystone Lubricating Company, Wayne Oil Tank & Pump Company, Sterling Auto Tire Company, Atlantic Refining Company, West End Electric Company.

SCRANTON HOLDS ITS FIRST AUTOMOBILE SHOW.

The interior of the 13th Regiment armory at Scranton, Penn., was transformed into a Japanese tea garden for the first annual display of the Scranton Automobile Association, under the management of Hugh B. Andrews during the week of Jan. 29-Feb. 3. Inasmuch as this was the first opportunity the people of Scranton and vicinity had ever had to inspect the various models in an organized exhibition, the event was a decided success from every point of view. Numerous sales were recorded during the week, and there is every reason to believe that the motor car show will be an annual feature in that city under the same management in the future.

Among those who made display were the following: Conrad Bros. Company, Ford; Morris R. Zehnder, Stanley steam; Bishop Bros., K-R-I-T; Simpson & Hubbard Automobile Company, Mercer; Stoddard-Dayton Automobile Company, Stoddard-Dayton; P. J. Needham, Maxwell; Eureka Motor Car Company, E-M-F, Flanders, Hudson, Mitchell, Speedwell, Franklin, McFarlan, Regal; Lackawanna Auto Company, Packard, Chalmers; A. M. Baker, Jr., Hupmobile; Scranton, Penn., Automobile Company, National, Cole, R. C. H.; Anthracite Motor Car Company, Oldsmobile, Overland, Chase truck; City Hall Garage, American, Matheson; Economy Automobile Company, Locomobile; Schnell's Garage, Abbott-Detroit, Kline-Kar; Rambler Motor Car Company, Rambler; Republic Motor Car Comompany, Winton; Peter Beyrent, Haynes; Charles P. Scott Company, Stevens-Duryea; Wyoming Auto Company, Ohio gasoline; Deitrich Motor Car Agency, Stearns; Motorcycle Sales Company, Harley-Davidson and Thor motorcycles; John Rawley, Indian motorcycles.

SIXTH DUQUESNE GARDEN DISPLAY IN PITTSBURG.

The Pittsburg Automobile Dealers' Association held its sixth annual display in the Duquesne Garden, in that city, Jan. 27-Feb.10, the first week being devoted to pleasure vehicles and the second to commercial cars. Accessories were shown both weeks. The committee in charge was composed of the following: R. P. McCurdy, chairman; Frank D. Saupp, A. X. Phelan, G. P. Moore and Thomas Dunn.

The interior of the building was entirely transformed into a bower of flowers. The prevailing color scheme was red, white and green. Fifteen thousand red poinsettias were utilized in covering the white lattice work which surrounded the main hall and separated the various exhibits. Electric lights were combined in a variety of designs to give the whole a most pleasing effect.

As is well known, Pittsburg will have two shows this year, the other exhibition being under the auspices of the Pittsburg Automobile Association, and this will be staged in the Exposition building, Feb. 17-24. At this first display there were 35 different makes of pleasure cars, shown by 28 dealers or manufacturers. During the week several representatives of makers visited the city and aided materially in bringing the merits of the respective models to the attention of the local people. So satisfactory was the first week's business, that it was decided to continue the showing of some of the pleasure cars during the second week, particularly as there was an abundance of room after the trucks had been placed in position.

Among those who made display during the first week were: Abbott-Detroit Motor Car Company, Abbott-Detroit; Eddie Bald Motor Car Company, Everitt; Baker Electric Sales Agency, Baker electric; W. W. Bennett Motor Car Company, Pope-Hartford; Buick Motor Company, Buick; East End Auto Company, Waverley electric; Ford Motor Company, Ford; Franklin Automobile Company, Franklin; J. E. Graham Company, Reo, KisselKar; Hiland Automobile Company, Peerless; Keystone Automobile Company, Stoddard-Dayton; McAllister Bros. Motor Car Company, Cadillac; McCord-May Company, Pierce-Arrow; N. C. Morrison Company, Pilot; A. X. Phelan, Lozier; J. M. Quimby Company, Simplex; Pioneer Motor Car Company, American, Hudson; Pittsburg Chalmers Company, Chalmers; Pittsburg Mercer Company, Mercer; Poffinberg Motor Car Company, Marmon, Amplex; Robinson Painter Company, Garford, Overland; F. B. Stearns Company, Stearns; Standard Automobile Company, Packard; United Motor Pittsburg Company, Sampson, Maxwell, Columbia; Vesta Motor Car Company, Stevens-Duryea; White Company, White; Winton Motor Car Company, Winton; R. & L. Electric Sales Company, Rauch & Lang electric; Schacht Motor Car Company, Schacht.

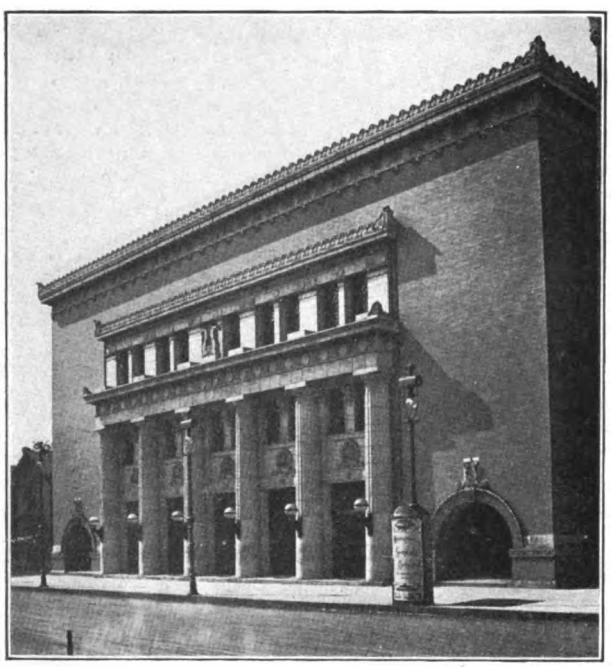
Atlantic Refining Company, oils and greases; Auto Tire Company, tires; Bell Telephone Company, telephone service; Banker Windshield Company, windshields; W. G. Bratton, speedometers; Chamberlain Manufacturing Company, polishes; Eyler & Henry, insurance; E. J. Flentje, shock absorbers; Hipwell Manufacturing Company, horns; Hoover & Hurst, insurance; Iron City Spring Company, springs; Jackson Motor Supply Company, accessories; A. E. Kent Company, insurance; Mutual Windshield Company, windshields; McGraw Tire and Rubber Company, tires; Penn Automobile Supply Company, accessories; Pittsburg Lamp & Repair Company, radiators, lamps, etc.; Pittsburg Auto Equipment Company, accessories; Standard Automobile Company, accessories; Universal Appliance Company, mirrors; Pyrene Sales Company, fire extinguishers; Wayne Oil Tank & Pump Company, gasoline storage systems; Winterton Manufacturing Company, windshields; Joseph Woodwell Company, accessories; Union Auto Specialty Company, windshields.

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SPACE AT TWO BOSTON SHOWS IS ALL GONE.

From the very beginning of automobile show history the annual display in Boston has been the largest of the year, both from the standpoint of number of exhibitors and total attendance. Manufacturers, while denying its representation as a national event, always have regarded the New England exhibition as the best business show of the country. There is every reason, therefore, that makers represented by agents in Boston and vicinity should strive to secure space.

This increasing demand for opportunity to display wares in what has come to be recognized as the greatest market for motor vehicles in the world, had reached a point last year where it was impossible to house all of the displays in one building. Early in the season representatives of commercial vehicles



State Armory, Scene of Minneapolis' Forthcoming Display.

urged that a separate show be devoted to their product, and a decision was reached to follow that plan this year. It was expected that the division would result in better opportunity to accommodate those who waited until the last minute before applying for exhibition space.

Feb. 1, a full month before the opening of the pleasure vehicle section in Mechanics' building, March 2-9, Manager Chester I. Campbell announced that all space had been taken. This applied as well to the commercial car division of March 15-20. Even the adoption of the new plan will not enable Mr. Campbell to provide for those whose applications were received after that date. In fact, it is stated that a long waiting list had been formed at that time.

There seems little doubt that the two shows in Boston this year will be the largest the industry has ever known. There is little lessening of interest on the part of pleasure vehicle owners and buyers in the New England states. The section offers the same splendid market for cars and accessories, as it always has done.

In addition there has been a growing demand for more and more knowledge concerning the business vehicles during the past two years. Boston is the centre of an immense district that can utilize industrial transports to the best advantage, and the results that have been obtained by the pioneers in this line have been such as to encourage others to follow their example. Those who have secured space in the commercial vehicle section are bound to realize this situation next month.

As evidence that not all of the new things have been uncovered at the New York and Chicago shows it is announced that a new Knight motor is to be displayed for the first time at Boston. This is the product of Miss Margaret E. Knight of South Framingham, Mass., and it is said that it possesses many distinctive features of merit.

The Boston exhibits always have been regarded as of sufficient importance to warrant the presentation of new products, despite the fact that it has come much later in the season than the two so-called national displays. The practical knowledge of mechanics possessed by the skilled workmen in the New England factories is such as to grasp readily the details of new inventions or designs, and it is a simple matter to interest others after the article has received the approval of the visitors at the Boston show. It would appear that the 1912 display is to maintain the former reputation of this section in this respect.

PLANS FOR COMING EVENTS IN OTHER CITIES.

The next two weeks will see a number of so-called minor shows in various sections of the country. New England will contribute no less than four. Of these, the first is to be held at Fall River, Mass., Feb. 12-17. Hartford, Conn., will have the largest exhibition in southern New England, Feb. 19-24. The annual event at Portland, Me., will be held in the Auditorium during the same week. The Consolidated Motorcyclists of Keene, N. H., will present its annual show Feb. 21-23.

The Middle West will be represented by the following: Kansas City, Mo., 12-17; Dayton, O., 12-17; Grand Rapids, Mich., 14-17; Minneapolis, Minn., 17-24; Cleveland, O., 17-24; Omaha, Neb., 19-24; Cincinnati, O., 19-24; Davenport, Ia., Feb. 26-March 2.

New York state will have four displays as follows: Binghamton, 20-24; Troy, 21-24; Brooklyn, Feb. 24-March 3, and Elmira, Feb. 26-March 2. Newark, N. J., will have its annual show, Feb. 17-24, and Paterson, N. J., Feb. 26-March 2.

The South will have four, as follows: Atlanta, Ga., 10-17; Memphis, Tenn., 12-17; New Orleans, La., 20-25; Louisville, Ky., 21-24. Baltimore, Md., will be represented, Feb. 20-28, and Pittsburg, Penn., with a second show, Feb. 17-27.

Canada has two more shows scheduled for this month, one at Ottawa, 12-17, and the other at Toronto, 21-28.

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LAMBERT—$1200

The Car With a Thousand Speeds

STUDY the two drawings shown in this ad. On the left is the common form of Power Transmission. On the right is the Lambert Patent Friction Drive. Do you realize that all automobiles are friction driven? Our combination clutch and transmission is as positive as any friction clutch, cone or multiple disc.

The First $1200 5-passenger Touring Car Equipped with Self-Starter, Top, Windshield, 112in. Wheelbase, 35 H. P., Ball Bearing Motor, Gas Tank, Horn, Lamps, Tools, etc.

We have spent twelve years perfecting Lambert cars. Our output has been sold every year to agents and buyers who appreciated the merit of our famous Patent Friction Drive. Our business has increased as fast as we have been able to take care of it. We have proven its efficiency in every form of service, from pleasure cars to five-ton trucks. Replacement of worn parts will not amount to the cost of oil in a sliding Gear Transmission. Perhaps you have been caught in the last few years by some of the many mushroom factories which spring up over night in so many parts of the country with the intention of doing business on agents' deposits. During this time we have been turning out cars on a proposition which has proven a money maker to hundreds of agents. Owing to our increased facilities for 1912, we are in a position to serve a number of new dealers. The Lambert Friction Drive is the ideal transmission for trucks. We have a complete line, and all of them winners in their class. The truck will be a big end of your business next year. Get in line now and secure the agency on a complete line built in our factory and built around the one correct form of Power Transmission—the *Famous Lambert Friction Drive.*

What a Friction Drive Means to You, Mr. Dealer

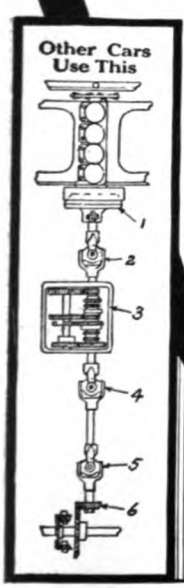
With the advent of the Self-Starter thousands of women will take up the driving of motor cars. You know what it means to teach a woman to shift gears. The Lambert Friction Drive is as easy to handle as an Electric. Seventy-five per cent. of cars are bought with women's consent. You can secure her consent easier by selling a car she can drive. It means increased sales for you.

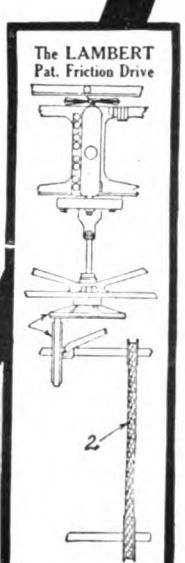
OUR PROPOSITION TO DEALERS

The Lambert contract for 1912 is the most liberal agency agreement ever written. We have made our prices so you can make money. The small dealer gets the same show as the big one. Write today for complete literature and discounts.

Model	66	$1,200
"	66-C	1,500
"	66-B	1,400
"	99-C	1,650
"	99-B	1,700
"	99-A	1,700

All models completely equipped.

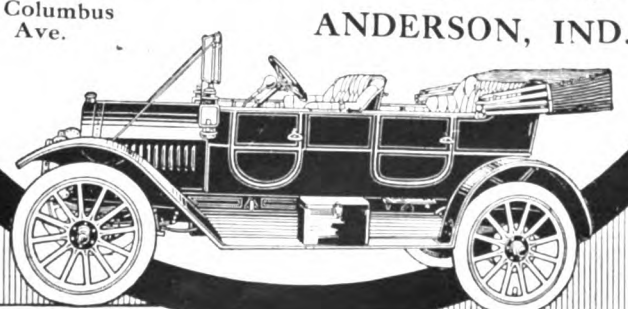




Buckeye Manufacturing Company

159 Columbus Ave.

ANDERSON, IND.



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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

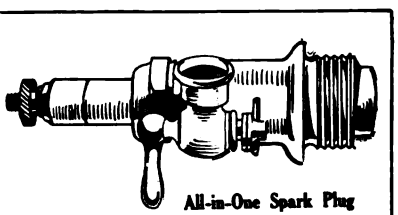
All-In-One Spark Plugs, marketed by the Frontier Specialty Company, Buffalo, N. Y., are manfactured in six different types to meet the requirements of varying motor designs. The construction eliminates the removal of a spark plug for priming purposes as a priming cup is incorporated, a feature which will interest motorists whose engines are not thus fitted.

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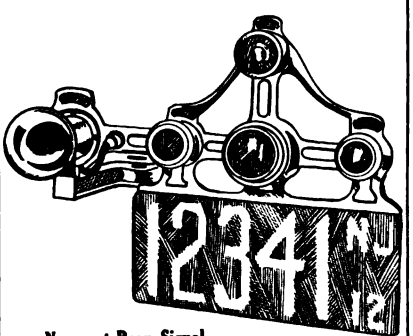
The Neverout Rear Signal Bracket is a combined rear lamp, license bracket and signalling device produced and marketed by the Rose Manufacturing Company, Philadelphia, it being patented in this country and abroad. It is operated by electricity and a push button switch is placed in an accessible position. This is equipped with three buttons for lighting the desired signalling lamps. The latter are four in number. A red disc is [illegible] to the middle of the bracket, this light burning constantly during the night and serving as the usual tail light. This is provided with a slot which allows a white light to be thrown upon the number plate attached immediately below. On either side of the red lamp is a white disc, these being employed for signalling to a vehicle in the rear that the operator of the machine in front is about to turn to the right or left as the case may be. Above the tail light disc is a similar member which shows a green light, this being utilized to warn those in the rear that the automobile is about to be stopped. Attached to the device is an electric horn which is sounded each time the white or green lights are operated, or flashed. The buttons on the switch are so arranged that a mistake cannot be made in signalling as the right hand member operates one white light at the rear, the left button the other, and the centre, the green.

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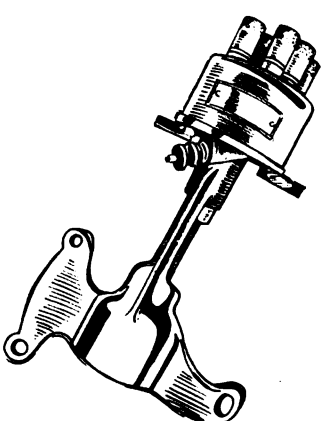
The Atwater Kent Unisparker is a device brought out by the Atwater Kent Manufacturing Works of Philadelphia for model T Ford cars and consists of a bracket and gears operating its well known system of ignition. For it is claimed large mileage with small current consumption, that synchronism is obtained and that once adjusted it does not require any attention. It may be installed easily without the use of special tools or machine work, by anyone who knows how to time a motor. The device is gear driven from the timer shaft, a pinion being attached to the latter after removing the usual commutator. By drilling two small holes in the gear-case cover the bracket is readily attached and this arrangement permits of quick removal of the member for inspection. Although the device is designed particularly for Ford cars special sets of gears and brackets are manufactured for several other makes.



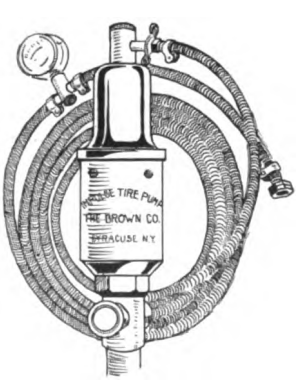
All-in-One Spark Plug



Neverout Rear Signal



Atwater-Kent Unisparker



Brown Impulse Tire Pump

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The Brown Impulse Tire Pump is a device which will appeal to motorists as by it a large tire may be inflated quickly and without exertion upon the part of the operator. It is compact and may be stored in the automobile easily and is said to be free from complications and noise. The instrument is fitted with a special breather valve providing means for drawing in and conveying cool, fresh air to the tire, and in addition, it is equipped with a pressure gauge which automatically indicates the amount of air in the shoe. This arrangement dispenses with the usual device and its operation. To attach the pump, any convenient spark plug is removed and the former screwed in by hand until fairly tight. The motor is then started and run very slowly as the pump will deliver its full efficiency under this condition. The air hose is attached to the tire and the pressure gauge watched until the required amount is indicated. The length of the tubing is sufficient to reach every wheel. When more than one shoe is to be inflated it is not necessary to stop the motor. The pump is manufactured by the Brown Company, Syracuse, N. Y.

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The Doehler Oil Cup is a lubricating device manufactured and marketed by the Doehler Die Casting Company, Court and Ninth streets, Brooklyn, N. Y., and a feature is that it may be attached easily by means of a screw driver.

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The oiler is fitted with a spring retained lid which closes on the outside of the container, this arrangement, it is said, facilitating the flow of the lubricant to the bearing. The cup may be filled easily, the operation involving the use of but one hand, as the nozzle of the oil can is inserted readily.

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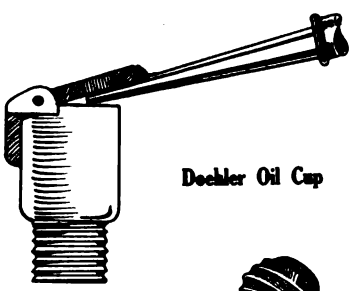
A Hydrometer Syringe that will appeal to motorists who charge their storage batteries as well as those who test the acid of the members, is marketed by E. Edelmann & Co., 49 West Kinzie street, Chicago. The device is a combination acid syringe and hydrometer, the latter being contained in the instrument and its action is said to be very accurate. This arrangement is an improvement over the usual apparatus which consists of a jar and a hydrometer. The syringe is neat and compact and may be carried easily in the motor car.

★

The Peerless Jack of the 1912 design, presents interesting features, inasmuch as the device may be used to remove stubborn tires as well as raise a wheel of the automobile. Believing that there is a demand for a light jack of compact size but strong enough to stand the strain of heavy work, the Oliver Manufacturing Company of 326 South Desplaines street, Chicago, brought out the new model, which is fitted with a large arched base to prevent tipping and provided with means for increasing its leverage and simplifying its lowering arrangement. It is said that it will work well in any position and that it is lowered easily by turning the handle. One of its features is a bracket which when attached to the jack and placed between the spokes of a wheel, will push or pull upon a tire, as desired. The handle is so constructed that it forms a handy tire tool. It weighs four pounds and is about eight inches in height.

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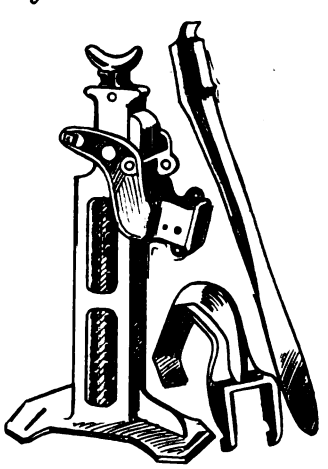
The Briggs & Stratton Lighting Switch has been brought out by the Briggs & Stratton Company, Milwaukee, Wis., to meet the demand for a high grade switch for automobiles fitted with electric lighting. It is a four point switch of the kick type and the moving of the lever provides for lighting



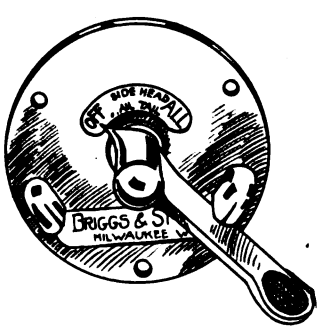
Doehler Oil Cup



Hydrometer Syringe



Peerless Jack



Briggs & Stratton Switch

the side and tail lamps, the headlights, all five, and an off position. Any one of the groups may be utilized singly or in conjunction with others. The device is finished in either brass or nickel, polished or frosted, is compact and very attractive in appearance.

★

The Apco Force Feed Oiler is marketed by the Auto Parts Company, Providence, R. I., and is made especially for this concern by the Detroit Lubricator Company, Detroit, and is designed for model T Ford cars. It is fitted easily to the right hand side of the motor and it is claimed that it may be installed in less than an hour. The oil is fed into the breather pipe by means of a small tube, the latter passing through a small opening in the screen of the breather member. The mechanism of the oiler consists of a double plunger pump which pumps the oil from the reservoir through the sight feed nozzle, from which it drops, and the other plunger takes the lubricant from the sight feed chamber and forces it to the breather. Drive is by a steel belt from a pulley attached to the camshaft, the former replacing the retaining nut of the timer brush. The amount of oil fed is regulated by turning a button in front of the sight feed, this permitting of a fine adjustment.

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The Gordon Radiator Robe, manufactured and marketed by the Vehicle Apron & Hood Company of Columbus, O., is designed for covering the front of a radiator and protecting the contents from freezing. It is constructed of heavy, artificial leather and lined with wool, and attached to the cooler by means of straps. In addition, it is provided with a curtain which may be rolled up when the car is being operated, and lowered and fastened when the machine is standing idle. It is made in three sizes, large, small and medium.

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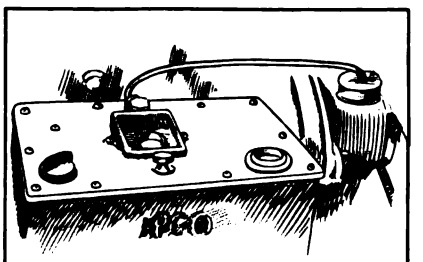
The Kerosene Gas Producer is an attachment invented by William K. Bassford, a mechanical engineer and authority on internal combustion engines, and designed for use in connection with any type of automobile, marine or stationary engine, whereby the less

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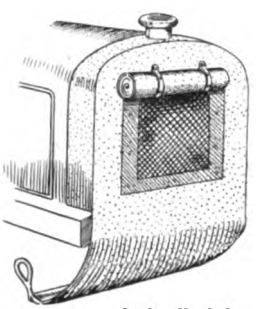
highly refined non-explosive fuels, such as kerosene or denatured alcohol, may be utilized instead of gasoline. The device is cylindrical in shape, about six inches in diameter, its length varying according to the horsepower of the motor, and is attached in the same manner as a muffler. It is produced in the form of an exhaust manifold when it becomes an integral part of the engine, thus permitting the use of gasoline or kerosene. In this type the control is automatic, and it is claimed that it does not require any attention upon the part of the operator. The motor is started in the usual manner, and after running for about three minutes, the kerosene is turned on and gasoline shut off, this being performed automatically by means of a thermostat, which also regulates the temperature of the gas entering the cylinders. But a small quantity of gasoline is required, this being contained in a priming tank holding about one gallon. It is pointed out by the maker that the device utilizes all of the heat units and that the low price of kerosene reduces the operating cost to about one-half of that when gasoline is employed. The gas producer is not only adapted to motor cars, but to large plants. It is manufactured by the Universal Oil Converter Company, Long Island City, N. Y., for which the Kerosene Gas Producer Company of New York City is agent.

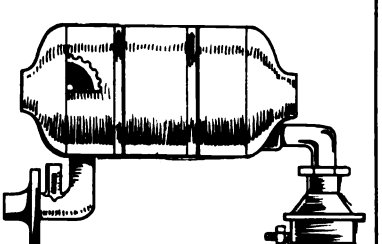
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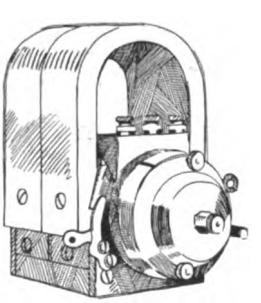
The No-Lag Magneto, manufactured and marketed by the American Circular Loom Company, Aldene, Union County, N. J., is of the low-tension type and two alternating waves of current are generated in the armature at each revolution. One of these waves is interrupted by one pair of contact points of the circuit breaker, and the other by another similar pair of points located directly opposite on the other side. The low-tension current is built up by two transformers, compactly arranged, by which it is claimed that the efficiency is increased greatly, and that the spark occurs in the cylinder at the same instant that the break takes place at the contact points of the circuit breaker. It is also claimed that wear is reduced and that by placing the condensers directly over and very near the circuit breaker, burning and pitting of the platinum points is eliminated. Instead of distributing a high-tension current to each plug and returning through a ground, two spark plugs are placed in a series circuit, producing a spark in two cylinders, timed to take place, in one, at the end of the compression stroke, and in the other, at the end of the exhaust. The spark in the latter cleans the points of the plug and intensifies the spark in the cylinder on compression.

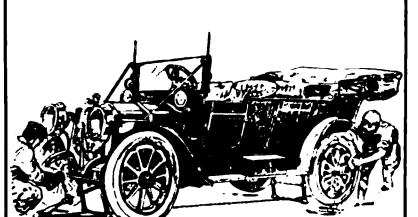


Apco Oiler


Gordon Hood Cover


Kerosene Gas Producer


No-Lag Magneto


Four-Wheel Auto-Jack

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The Four-Wheel Auto-Jack and tire saver is a device for raising the entire car from the floor of the garage or ground and the operation is so simple that it is said a child can lift the heaviest automobile in less than a minute. The jack consists of two rectangular steel frames which lean against the axles of the machine at an angle. The frame bases are connected by a chain which also is attached to a powerful differential jack screw. When the latter is operated the tilted frames are drawn together which movement pushes the car backward and at the same time raises it. The device is operated easily, being laid upon the floor and the machine driven over it and stopping within a foot or so of the correct position. The rear jack is then placed under the rear axle and the front member attached. The differential lever is then turned and the machine is not only blocked securely but raised two or more inches. The chain is adjustable and the device will fit any motor car. To demount, the jack is compressed, this requiring but a few seconds. The advantages of a tool of this type are numerous, among which may be mentioned that it removes the weight of the car from the tires, increasing their service, prevents contact with oil drippings and dampness; permits of drying the shoes after being exposed to the rain and washing; allows a daily examination for cuts; facilitates the application of tire chains, adjusting brakes and mechanism, and washing. The Four-Wheel auto-jack, for which John E. Nattress, 3132 Columbia avenue, Philadelphia, is agent, is guaranteed to lift safely a load of 6000 pounds.

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Dealers, Why Are You in the Automobile Business?

Are you in it for fun? Or do you want to establish a permanent business future. And make money—*now*.

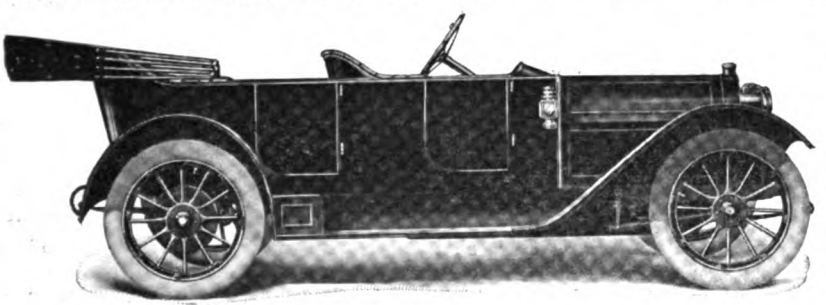
Here is a car, Mr. Dealer, with every powerful selling argument known to Motordom. Into it goes the prestige of the world's greatest vehicle builders. Back of it is a wonderful selling plan—an economy that saves the buyer from $600 to $1,000 a machine.

No Cut in Agent's Profit

But the best feature of all is that we have provided liberally for the agent—the man who sells the car.

We realize that no matter how good our machine, or how attractive our selling proposition, what counts most in making the sale is the personality of the salesman. And that is one reason why we have thought it only just not to deduct anything from the agent's profit on account of the special selling features included in the car.

This policy of ours makes the MICHIGAN agency a valuable asset—an opportunity. And it is a big thing for us, too. Because MICHIGAN agents will always hustle. They make money—big money—for *themselves!*



SPECIAL FEATURES

- 40 Horsepower
- 116-in. Wheel Base
- 34x4-inch Tires
- Demountable Rims
- "Michigan" Self-Starter
- Nickel Trimmings
- Three-Bearing Crankshaft
- Enclosed Valves
- Absolutely Silent Motor

MICHIGAN "40"—$1,500

Contains Every Big Selling Feature

MOTOR

Compare our motor with those of $2,500 cars. Full forty horsepower. A strong three-bearing crank shaft with extra large bearings. Large valves. Cylinders 4 1-4x5 1-4 inch. Except fan, every moving part enclosed. Result: Ample power—long service—freedom from vibration—and silence, absolute silence.

SELF-STARTER

We have tried out nearly every self-starter made. The one self-starter that our engineers found to be entirely practical we have approved for use on MICHIGAN cars. It is simple and easy to operate, nothing complicated. Very light and thoroughly dependable. We gave it thousands of tests under all sorts of conditions, and it proved itself absolutely efficient. Nobody likes to crank a car. What folks will insist upon in six months you get *now* on the "Michigan Forty."

IGNITION

Tests of all kinds were made before we finally decided on the Briggs magneto. Not only did we find the Briggs the most efficient, but we felt that its strong guarantee gave MICHIGAN agents another big selling recommendation possessed by no other cars of equal price.

CLUTCH

The "Michigan Forty" is equipped with a clutch of the multiple disc type, dry plate, thermoid against steel. Can't grab—nor slip. A clutch that transmits a greater percentage of power to the rear axle than any other clutch on the market, bar none.

AXLES

Our three-quarter floating rear axle combines all the advantages of both the full-floating and semi-floating types, with none of the disadvantages of either. Hyatt High Duty roller bearings are used throughout.

WHEELS AND TIRES

We use genuine Shortsville wheels, known everywhere for their strength. 1 1-2 inch spokes—12 to a wheel. 34x4 inch tires and demountable rims—just to make sure that MICHIGAN owners will not be bothered with that bugbear of Motordom, tire trouble.

BRAKES

One square inch of braking surface for every eight pounds. Brake drums 14 inches in diameter, 2 inches wide. They are lined with raybestos, making it impossible to burn them out.

MOUNTINGS

Look at the 1912 models of the most expensive cars. You'll find very few mounted in brass. Takes too much time to keep all the lamps and other metal parts polished and cleaned.

On the other hand, look at the cheap cars. How are they mounted? Brass—always brass.

And that's the answer.

The "Michigan Forty" goes to the dealer with expensive white nickel mountings throughout. Another big selling point.

BODY

Here's where we have made big capital of our vast carriage building experience. Big and massive, yet graceful, and wonderfully suggestive of character and power.

COMFORT

Easy riding qualities secured by 116-inch wheel base, soft springs and luxuriously comfortable cushions. Appointments are perfect—such as you would expect to find only in cars costing $4,000.

GUARANTEE

The broadest and most liberal that it is possible to put on a motor car. A life guarantee backed up by an old line concern. One that has been here for thirty years and that will be here thirty years from today.

MAKE UP YOUR MIND

You've looked into every car proposition on the market. You've studied this contracting matter from every conceivable angle. But if you want to get machines before the selling season is all over, now is the time to *decide*—and you know it.

If our proposition looks best write us. Not because we talk the loudest, but simply because of our proposition. We ask you to investigate. Get the facts. Then ACT.

Michigan Buggy Company, 147 Lay St., Kalamazoo, Mich.

Free Catalog Coupon

MICHIGAN BUGGY CO.

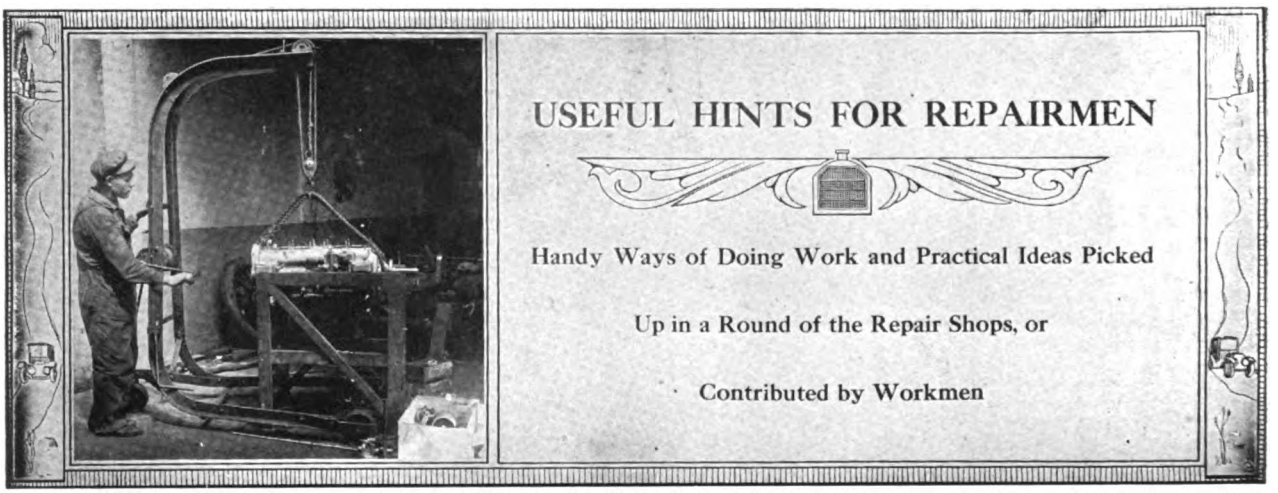
147 Lay Street, Kalamazoo, Mich.

Please send me catalog describing the "Michigan Forty" and other Michigan cars.

Name .....

Address .....

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FRAME BRACING DEVICE.

Broken or sprung frames are not uncommon and many times these members being out of alignment are responsible for other mechanical troubles, among which may be named that of a leaking radiator, when the fracture is near the latter. There are several ways of repairing a frame, the methods varying according to the location of the break.

An instance of an effectual repair was noted by the writer recently. The frame was cracked near the goose necks and the workman fitted plates, riveting these members securely. As a severe strain was

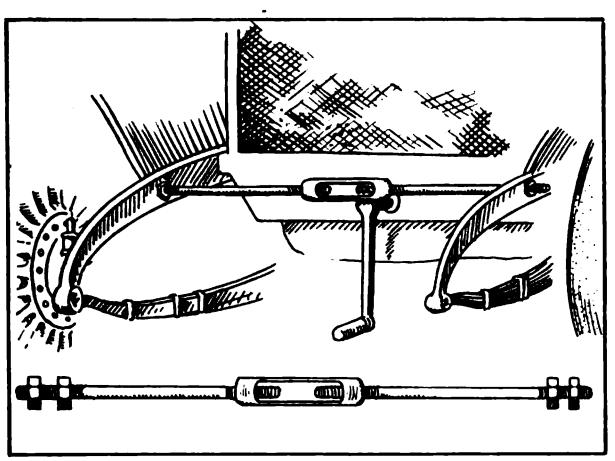


Fig. 1—Method of Bracing Securely Cracked Frame of Motor Car.

imposed upon the part, owing to the service performed by the car, a brace was employed as outlined at Fig. 1.

A .625-inch hole was drilled in each side member, these being directly opposite and on a line with each other. Two pieces of cold rolled steel, .625 inch in diameter, were threaded at each end, and a turnbuckle made as illustrated in the drawing. Each rod was fitted with two nuts, these being for the purpose of locking.

One of the rods was threaded into the turnbuckle and a nut screwed up after which it was inserted in the opening of the frame. The other rod was fitted with a nut and screwed into the turnbuckle. The nuts on either side of the frame were then locked and by means of the turnbuckle the tension adjusted.

CUTTING GEARS.

When cutting gears care must be taken to have the cutter central with the index centres, and to have the cut exactly the depth required. A good method of testing the setting is to cut a groove in a piece on the centres, then shift the piece end for end and try the groove upon the cutter. A good method of holding the gear blanks is on an arbor with a taper shank which fits in the index spindle, the outer end of the arbor being supported by the foot stock centre. Frequently in cutting gears a shank arbor is used with an expanding bushing and a nut at each end of this, one nut forcing the bushing up on the arbor and holding the gear blank, while the other pushes the bushing off the taper and releases the gear when finished.

If the ordinary arbor and dog be used, care must be taken that the dog does not spring the arbor. The depth of the cut can be gauged from the outside of the blank, or if so desired, marked on the side by a gear depth gauge. In cutting gears, when the blank has been placed in position it is raised by the elevating screw until it just touches the cutter. The graduated column on the vertical feed shaft is placed at the zero line and the blank moved horizontally away from the cutter. Then the work is raised the number of thousandths of an inch required for the depth of the tooth.

GALVANIZING CAST IRON.

To galvanize cast iron the casting should be cleansed thoroughly by immersing it for a few hours in a bath of one part muriatic acid and two parts water. After removing the work it should be scrubbed thoroughly with a brush and fine sand, after which it is washed with hot water. When the metal is clean it is dipped in a solution comprising one-half pound of sal ammoniac to a gallon of water. It should be dried quickly and dipped in a zinc bath. If the surface of the metal be oily, the grease may be removed by boiling in caustic soda or lye.

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THE LEHMANN PISTON RING.

The efficiency of the internal combustion engine depends largely upon the piston rings and if these be not gas tight a considerable loss of power results. One of the causes of the escape of gas past the members is that the pressure of the rings against the cylunder walls is unevenly distributed. In addition they are broken easily when being removed or fitted.

A French firm is manufacturing a new form of ring known as the Lehmann double spiral, and it is claimed that the defects of the usual design are eliminated. It is formed of a double spiral having one opening only to each complete circle as will be noted at Fig. 2 A. It is stated that but two of these are necessary to a piston and that the usual retaining pin is not required to prevent the rings from turning and the openings coming opposite each other.

In fitting the ordinary ring it is customary to have its two extremities join when inside the cylinder, and when the bevel type is utilized, to make an allowance for a large range of adjustment. A common fault is the ring's insufficient elasticity and the unequal pressure at various points of its circumference.

It is claimed that the eccentric rings partly overcome this disadvantage, but even with these it is impossible to obtain perfectly round members when the bevel ends meet. A feature of the Lehmann is that owing to its double spiral formation, the elasticity of the two spirals increases or decreases in contrary direction round the ring. Thus all the differences of elasticity experienced opposite each other are equalized, so that the pressure of the ring against the wall of the cylinder is equal on the entire surface.

The principle of the Lehmann permits of its being made absolutely circular in shape, and it remains perfectly round when in position on the piston. Another advantage claimed is that it permits of the reduction in the depth of the ring slot in the piston, and not being eccentric, it does not require so deep a recess. In placing it on the piston the bevel extremities are inserted in the slot, and the ring, if turned around by hand, falls into position readily.

HOOK MAKING KINK.

In fitting cut-outs, signal devices, etc., to the motor car considerable time is consumed by the repairman in making the S hooks or couplings. At Fig. 2 C is shown a method of making one or many at the same time. It consists of gripping in the vise a round bar of metal of the size of the required hook. One end of the wire is caught as depicted, and the balance coiled snugly about the rod. Two complete turns will be necessary for each hook. When enough wire has been wound it is removed and with a pair of pliers, one coil turned back and cut at the end of the second. The result will be a perfectly shaped S hook.

DISC HOLDING DEVICE.

When working on discs it is difficult to hold the members securely in the vise, as owing to their shape the jaws of the latter cannot grip them firmly. Frequently they slip, making it impossible to do accurate work, such as drilling, etc. A simple method of fitting the vise with holders is depicted at Fig. 2 B. It consists of drilling and tapping four holes as indicated in the drawing, to take a like number of bolts, the heads of which are slotted to permit the use of a screw driver in fastening and removing. But two bolts are necessary as these may be shifted to fit large or small discs. When fitted to a small hand vise the arrangement will permit of carrying the work about the shop for the purpose of marking and fitting.

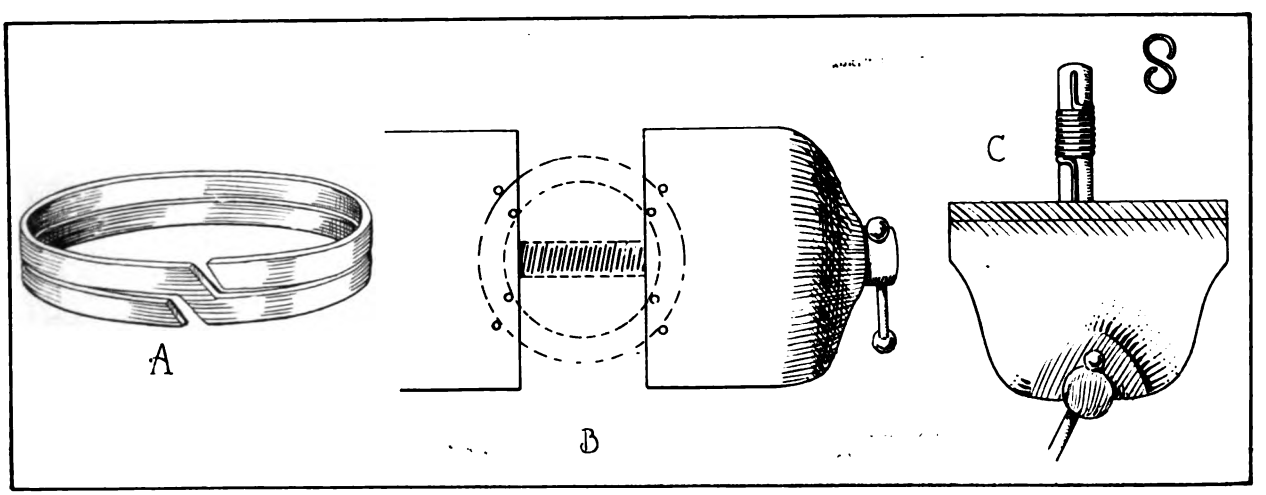


Fig. 2—Some Repair Shop Kinks: A, New Type of Piston Ring; B, Device for Holding Circular Parts in the Vise; C, Simple Method of Making S Hooks.

SURFACE HARDENING CAST IRON.

The surface of cast iron may be hardened by taking equal parts by weight of saltpetre, sal-ammoniac and prussiate of potash. These should be pulverized and mixed thoroughly. Next make a solution by adding four ounces of prussiate of potash and two ounces of sal-ammoniac to a gallon of cold water. Heat the metal to be hardened to a red, roll it in the powder, covering all parts, then dip them in the liquid.

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PARTIAL SOFTENING OF HARDENED PARTS.

Frequently in fitting parts it is necessary to draw the temper of a certain portion to machine or bore as the case may be. For example: In attaching a new bevel gear which has been hardened and ground, if the bore be of incorrect size, it is necessary to place it in the lathe and rebore. Usually this would mean softening and rehardening, but the temper may be withdrawn from the section to be bored by filling the opening with red hot lead which will render the metal soft enough to work.

Sometimes it is necessary to soften the ends of a wristpin that they may be drilled and tapped. By dipping the ends in a vessel containing lead heated to a red, the immersed parts will turn blue while the other portion will not be affected. Where the centre of a pin requires softening, the ends may be wrapped with asbestos cord and the member placed in the heated lead. In using the lead it should be borne in mind that the work must not be allowed to remain immersed too long, and it should be cooled quickly in water before the heat has time by direct conduction to affect the part that has not been in actual contact with the molten metal.

Ends of small, hardened pins may be softened by grinding on an emery wheel, pressing the work tightly against it. The pins, however, should be made a trifle longer to allow for the metal ground off. Where hardened parts are to be riveted, this kink will be found useful.

BLACK FINISH FOR BRASS.

A handsome black finish may be put on brass by the following process: Dissolve in 1000 parts of ammonia water, 45 parts natural malachite. Carefully and thoroughly clean the metal, and if oil lamps are to be finished, remove the oil and wicks. Place the darkening solution in a large vessel and immerse the articles. After allowing the mixture to stand for a short time gradually warm the same, examining the articles from time to time to ascertain if the color be deep enough. Rinse and let dry.

An alternate method is to immerse in the following solution and then heat over a Bunsen burner or a spirit lamp: Add a saturated solution of ammonium carbonate to a saturated copper-sulphate solution, until the precipitate resulting in the beginning has almost entirely dissolved. The immersion and heating are repeated until the brass turns dark; then it is brushed and dipped in negative or dull varnish.

ENLARGING WITHOUT A REAMER.

Sometimes it is necessary to enlarge a hole slightly and a reamer is not available, especially when odd sized members are to be fitted. The work may be accomplished by using a flat or twist drill with its point ground slightly out of centre. If a hole be required for a taper pin, a flat drill should be made with the diameter the same as that of the taper pin at its smallest end. The drill should then be ground out of centre. After about .125-inch depth is drilled, the tool ought to be ground a trifle more towards the centre. In this manner a fairly good taper hole may be made.

SOLDERING FLUXES.

The repairman is called upon to attempt the joining of different metals, and a knowledge of the proper fluxes to be used will prove of value. Resin may be used either with the soldering iron or blowpipe for joining lead, tin, copper, brass, and tinned metals. Tallow with the blowpipe or by the wiping process for lead, tin or tinned metals. Sal ammoniac for copper, iron or brass, and muriatic acid with the iron for dirty zinc. Chloride of zinc may be employed with the iron or blowpipe for clean zinc, copper, brass, tin and tinned metals. Resin and sweet oil is a good flux for lead and tin pipes, while borax is recommended with the blowpipe for iron, steel, copper and brass.

BELT CEMENT.

A good belt cement may be made by mixing five ounces of bisulphide of carbon, and one-half ounce of spirits of turpentine with enough gutta percha to make a paste. In preparing the belt, care should be taken to remove all grease and this may be accomplished by absorption, using blotting paper and a warm flat iron.

REMOVING MICA PLUGS.

Mica is utilized as an insulator in some types of plugs and as this material is very brittle it is destroyed easily. When overhauling these members the use of a box wrench is preferred, for with the ordinary wrench an undue strain is brought upon the insulation, which is liable to be injured.

WEIGHT OF CASTINGS.

When a pattern is made of soft pine, put together without nails, an iron casting made from it will weigh 16 pounds to every pound of the pattern. If the casting be of brass, it will weigh 18 pounds to every one of the pattern.

FILING BRAZED JOINTS.

In filing joints or brazed work to reduce the surplus metal a new file is soon spoiled. If salt be placed upon the work as soon as it is brazed it will soften the metal and borax, and as a consequence the file will last longer.

REO ECHO ANNOUNCEMENT NUMBER.

The 1912 announcement number of Reo Echo, published by R. M. Owen & Co., New York City, distributor for Reo cars, is handsomely illustrated with views of timely interest in which cars of this make figure prominently. A. Lincoln Crayon, the veteran motorist and automobile writer, tells in his clear, realistic and intensely human way a story of his trip from New York to Jacksonville, Fla., in the 1911 Glidden tour. Many other popular authors are represented in the 48-page brochure, which will be mailed free to those who make request of the publisher.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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THE VALUES OF THE KISSELKAR

30 H. P.	$1500
40 H. P.	$1850
50 H. P.	$2350
60 H. P. "Six"	$3000

Fully Equipped.

1½ to 2 Ton, 3, 4, 5 Ton Trucks, Delivery Wagons, etc.

WE are not in the race to produce the cheapest car. Every KisselKar is a dependable value. No model has a pinched wheel base or a cramped tonneau—there is no slighting of material or workmanship in any part. The KisselKar is built to meet a standard not a price.

Every KisselKar model has the generous wheel base, the roomy tonneaus, big tires and wheels essential to comfort, low maintenance and attractiveness.

Among the conspicuous values in the whole history of the industry is the 60 H. P. KisselKar "Six",$3000. Several seasons of marked success have established the ability and dependability of this model—you will find it with other KisselKars in every State in the Union, with tremendous mileage behind it and a striking record for low operating cost.

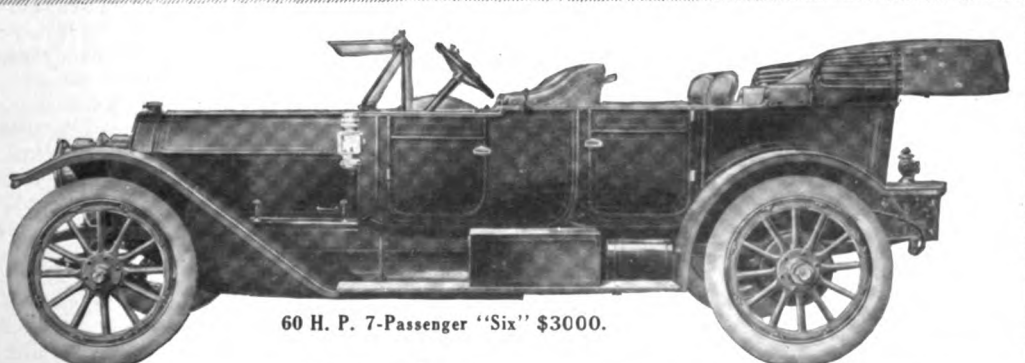
WRITE FOR THE KISSELKAR PORTFOLIO—

One of the Most Informing Automobile Books Ever Published. Write for the KisselKar Portfolio—it will give you an entirely new standard by which to judge Automobile values. Free on request.

TRUCKS AND DELIVERY WAGONS—KisselKar Commercial Vehicles have been demonstrated to be 15% to 20% lower in operating cost than competitors—special features make them dependable on roads that would stall ordinary trucks or wagons.

KISSEL MOTOR CAR COMPANY, 174 KISSEL AVENUE, HARTFORD, WIS.

Branches and agencies everywhere.



60 H. P. 7-Passenger "Six" $3000.

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CORRESPONDENCE WITH THE READER

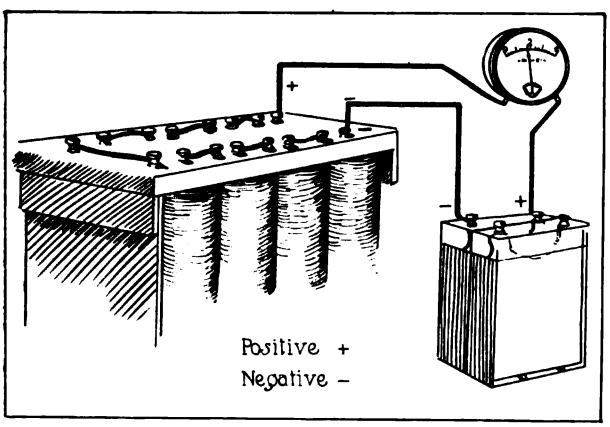
Fuel Consumption.

(1331)—Will you kindly publish in the columns of your valuable Journal the amount of gasoline used for a one horsepower motor an hour, also how you would figure to obtain the result? I have had the question asked me many times, and according to my figuring on different sized cylinders, my figures do not agree

L. N. WALTER.

Montello, Mass., Feb. 5.

The amount of fuel consumed by an internal combustion motor will depend upon a number of conditions, such as bore and stroke, number of cylinders, carburetor, work performed, etc. It is obvious that a cylinder having a five-inch bore and stroke will consume more fuel than one with a bore and stroke of three inches, all other conditions being equal. Different fuel results may be obtained with two similar engines fitted with different carburetors. There are so many conditions entering into the question that the figures obtained would only be satisfactory when two motors were tested in the same service.



Charging Ignition Storage Battery with Primary Cells.

The amount of fuel consumed, however, may be obtained by measurement, a practise common with motorists and others. The fuel container should be emptied, a gallon of gasoline poured in, a stick inserted, and the height of the liquid noted and marked upon the rule. The balance of the fuel may be poured a gallon at a time or in less quantities, the amount depending upon how fine the measure is to be calibrated. After running the motor for a stated period, the tank may be measured, the amount of fuel consumed noted easily and computations made accordingly.

Charging Ignition Batteries.

(1332)—Please publish in your columns when convenient, a description of some efficient arrangement if there be any, to charge storage batteries for ignition purposes by windmill power. I have heard that there are some successful plants of this sort in operation.

W. H. B. JACOBS.

Omaha, Neb., Feb. 1.

While the energy of a windmill might be utilized to operate a dynamo for generating a current to charge storage batteries, the writer has never seen one in practise. The variable speed of the mill would have to be regulated by fitting a governor to the current generator. In charging batteries it is essential that the flow of current be of a stated amperage, this depending upon its construction. This rate should be maintained evenly to obtain satisfactory results. Perhaps some reader has experimented with the system mentioned and will present the results obtained.

Cracked Cylinders.

(1333)—Being one of your subscribers I would like to inquire if you can inform me if the ——— car is being manufactured, and if so where? I have a 1907 model, touring car, the motor of which I think is a ———. One cylinder is cracked. I wish to repair it as I am going to sell the machine.

G. W. JEPSON.

Melrose, Mass., Feb. 3.

The automobile referred to has not been marketed for some time although it is stated that steps are under way for a reorganization of the company. The address of the concern was Charlotte, Wis.

Regarding the motor, you could have it identified by some repair man or person familiar with the make, or write to the company you mention whose address is Muskegon, Mich., explaining the circumstances and giving the model of the car. The damaged cylinder may be repaired by autogenous welding process, this depending upon the nature of the fracture.

Adjustment of Tappets.

(1334)—I have a model ——— car and the adjustment of the intermediate tappets works loose. I have set the lock nut up as tight as possible, but it works loose just the same. The power of the motor is considerably affected as there is too much play between the tappet and valve stem. Is there any way I can remedy the trouble as I do not wish to go to the expense of new members? The car was not new when I purchased it.

WILLIAM FORDHAM.

Bridgeport, Conn., Feb. 4.

The best repair would be to purchase and install new members. The old parts have worn through careless locking by the former owner and it would involve considerable machine work to make them satisfactory. A simple method of obtaining results with the old tappets is to unloosen the check nut and remove the tappet proper. As the locking member is recessed, the tappet should be screwed down snugly as far as it will go and the nut locked securely. Then take a piece of round steel, the same diameter as that of opening in pushrod, and cut off a number of different sized discs. Insert one or more as may be necessary to offset the space lost by screwing down the tappet. An accurate adjustment may be obtained by filing the disc if too thick and it is advisable to make the latter a trifle longer than necessary to permit of fitting. The discs may also be hardened to prevent wear.

Another method is to utilize fibre. Cut a number

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of discs, slightly smaller than the opening, and hammer them as hard as possible, this being done to improve their wearing qualities. The fibre has an additional advantage as it will be quieter than the metal members. The writer effected a repair to a motor of the same make by making solid tappets, and after fitting them hardening the ends. In adjusting the parts it is advisable to time the opening and closing of the valves by the marks on the flywheel, rather than by measuring by a visiting card, etc.

Charging Battery with Cells.

(1335)—I read an article in your magazine describing how to charge storage batteries with electricity of the house or garage. Not having electric lights, can you inform me of a method of charging a battery without using a dynamo or house current? F. A. CARLTON.

Jacksonville, Fla., Feb. 2.

A storage battery, such as is employed for ignition purposes, may be charged with primary batteries as illustrated in the accompanying sketch. When using this system an ammeter should be incorporated in the circuit, and the zincs of the batteries let down into the solution just so far that the required number of amperes is indicated by the instrument. Instead of raising or lowering the zincs a small resistance may be introduced in the circuit, such as lamps, but as these would consume current, the other method is preferable. The number of cells employed will depend upon their type, but this may be determined by experimentation.

Adjusting Brakes.

(1336)—Can you inform me why it is that the brakes on my ——— car do not hold equally? I have taken up the rods evenly on both sides, but the right hand brake does not hold as well as the other. Is there any way to adjust the members so that they will grip the same? The linings appear to be good as I have had the wheels off and examined the former.

W. S. GOODCHILD.

Cleveland, O., Feb, 5.

The reason the brakes do not grip evenly is because of the adjustment of the rods. It is a difficult matter to set the latter so that both members act the same owing to the design which is not being employed in modern motor car construction. If an equalizer, that is, a device for distributing the pressure applied, were utilized, the trouble would be overcome.

An excellent method of adjusting brakes is to jack up both rear wheels clear of the ground. Then release brake pedal and disconnect turnbuckles. Next shorten each rod a little, and move it forward and note if the brake begins to grip when the end of the rod is in a position for attaching to its holding member. Then set the brake pedal a trifle and try each wheel, noting if one grips more than the other. By shortening or lengthening the rod of the member which allows the wheel to move easier or harder than the other, the brakes may be equalized. Next apply more pressure and try both wheels, making further adjustment for pressure if necessary, but in the operation take the same number of turns with each turnbuckle.

Starting Two-Cycle Motor.

(1337)—Being a reader of your magazine I take the liberty of inquiring about a two-cycle engine which is not utilized in connection with automobiles but for sawing wood. I have used the engine for some little time with good success, but lately it is difficult to start and I have to change the mixture, giving it a richer one in starting than formerly. It is not because of cold weather as I have tested this out. It is a two-port motor and was used some time before I got it. I have tried all the things I can think of, but the trouble continues. Can you give me any suggestion as to the cause?

W. Z. CARTER.

Westerly, R. I., Feb. 7.

The description would indicate that the difficulty experienced in starting was due to a leak in the crankcase, either around the bearings or in the crankcase proper. The writer knows of an instance where a tiny blowhole in the casting, which was covered with paint, caused starting troubles after the paint wore away. This was detected by turning the flywheel until the piston was compressing the charge when a slight hissing noise was heard and traced to the hole in question. This was sealed and the motor gave excellent service thereafter. A leak of such a nature will affect the operation of a two-cycle motor, especially in starting.

Coil Gives Trouble.

(1338)—I have a ——— car and have experienced considerable trouble with my coil. I have been advised to install a K-W master vibrator as the repair man claimed it would eliminate my troubles. Will you please give me your opinion as to the merits of the same?

C. T. EVANS.

Hartford, Conn., Feb. 3.

A master vibrator would improve the running of your motor and as the repair man states, prevent a repetition of your troubles. The K-W device is employed on many cars and has proven very satisfactory in practise.

R. C. H. COMPLETES LONG TRIP.

Averaging 205 miles a day for 15 days an R. C. H. car recently completed a trip from San Francisco, Cal., to the site of the Panama-Pacific Exposition. The automobile made by R. C. Hupp, manufacturer, was piloted by R. H. Luther, and a feature of the run was that the speedometer was sealed. Throughout the tour the schedule was adhered to in spite of heavy rains, bad roads and steep grades. The valleys of the Sacramento, San Joaquin, Santa Clara and Sonora in California were traversed and throughout the journey the motor car ran perfectly, the operator experiencing no trouble whatsoever despite the strenuous work performed by the automobile. R. C. Hupp is naturally elated over the showing made by his product.

WARD HEADS INDIANA ASSOCIATION.

Frank E. Smith of Newcastle, general manager of the Maxwell-Briscoe Motor Company's plant, and president of the Indiana Automobile Manufacturers' Association, has appointed J. M. Ward of the Waverley Company to succeed P. P. Willis of the National Motor Vehicle Company as secretary of the association. Mr. Willis resigned previous to the New York shows and President Smith did not name his successor until the term had expired. The new secretary is well known to the automobile industry and is particularly prominent in the electric field.

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KNIGHT MOTOR ATTRACTS MECHANICS.

During the Detroit automobile show at which the Stoddard-Dayton and Columbia automobiles were exhibited, the Knight motor with which these cars are fitted, attracted an unusually large number of mechanics from the different motor car factories of the city. Those in charge of the exhibits were kept exceedingly busy answering the questions of the factory men who displayed a decided interest in the sleeve valve engine, even going so far as to inquire as to the materials used and methods of casting, etc.

CORRECTION OF ERROR.

As the result of improper attention to details in making up the issue of The Automobile Journal for Jan. 25, the article concerning the promotion of Harry W. Griffith of Indianapolis, Ind., to become general manager of the Remy Electric Company, Anderson, Ind., was illustrated with a likeness of P. P. Willis, who recently was appointed advertising manager of the Mais Motor Truck Company of Indianapolis, Unfortunately, Mr. Willis' picture bore Mr. Griffiths' name, and undoubtedly the friends of the two gentlemen had some trouble trying to identify the illustration. Both men are exceedingly well known in the industry, particularly in the Middle West. Mr. Griffith has been secretary-treasurer of the Remy Electric Company for the past year, while Mr. Willis has taken an active part in the organization of the Indiana Automobile Manufacturers' Association, of which he was the first secretary, and assisted materially in the success of the Indiana Four-States tour of last summer. Mr. Griffith's photograph is presented herewith.



Harry W. Griffith, General Manager Remy Electric Company.

WOLGAST BUYS A MERCER.

Adolph Wolgast, lightweight champion pugilist of the world, has purchased a Mercer roadster, made by the Mercer Automobile Company, Trenton, N. J., and with his wife is planning a transcontinental trip from Los Angeles. The car will be equipped with the necessary articles and the Sante Fe trail will be followed, this being over the proposed route of the national boulevard. The start will be made about April 1.

WILL PROTEST BOARD'S DECISION.

It is stated that the Abbott Motor Company, Detroit, intends to file a protest against the severity of the decision of the contest board of the American Automobile Association, which at its last meeting disqualified Abbott-Detroit cars from entering races until next July. This is because one of the rules concerning advertising results in non-stock events is held to have been infringed by the Abbott company in the Savannah events.

In discussing the question, Vice President W. M. Botto said: "We feel that we are disqualified because of the purest technicality. The fact remains that we did enter an entirely stock car in the Vanderbilt race. The report of the A. A. A. does not even pretend to question this. And, in view of the fact that this stock car entered a field with the finest American, French and Italian specially built racing machines of several times its price and horsepower, and made a record of speed, reliability, endurance and consistent performance, we think our enthusiasm in advertising the fact was understandable and perhaps even pardonable. We are particularly concerned in the six months' disbarment because it prevents our entering the Indianapolis races next May, where we hoped to make another good showing. In consideration of the circumstances we feel that a reprimand would have been sufficient punishment for what, after all, was merely an infrngement of a technical point, and that disbarment is an unnecessary hardship."

BRISCOE ADVISES A. A. A. ON RACING.

Believing that high speed motor car racing no longer serves a useful purpose, besides bringing discredit upon motoring and the automobile trade, Benjamin Briscoe, president of the United States Motor Company, New York City, has prepared a letter to the American Automobile Association, advising that it abandon the control of speed contests and devote its time to the promotion and encouragement of touring and reliability events and particularly furthering its work for good roads. Mr. Briscoe suggests that the government of speed contests be turned over to any organization that will care for it, leaving the A. A. A. to continue its work in connection with roads, legislation, foreign and American touring maps, guide books, touring contests, etc.

FIRESTONE TIRES WERE EMPLOYED.

One of the straws which tell which way the wind blows in the matter of motor truck equipment is that of tires fitted to commercial cars at the shows. A careful count of these at the recent New York and Philadelphia exhibitions, showed that Firestone tires, made by the Firestone Tire & Rubber Company, Akron, O., led at both displays, with 47 sets at the former and 25 at the latter. Many of these were equipped in addition with Firestone quick-removable rims, enabling the driver to make changes on the road without difficulty.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

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PERSONAL ENGINE CARE.

With the exception of the one item of lubrication, most of the things learned by the man who cares for his own engine and car are those which he works out by physical experiments, rather than by scientific research. He adjusts the carburetor one way or another and notes the effect, but in the matter of oil he has neither the time, the laboratories nor the exact scientific knowledge which is necessary to reach a definite and satisfactory solution of the rather complex problem of proper automobile lubrication.

He may know that his engine misses fire, and that this is due to a deposit of carbon, but he will not know how to overcome the difficulty. He may guess, and rightly, that the carbon deposit can be traced to the lubricating oil, but he will not know wherein this oil is unsuited to his engine. He may find that his engine heats up, that his bearings bind and cause mysterious and very annoying squeaks and weird noises, and again he may rightly guess that the oil is to blame. Guess work is not only unsatisfactory in results, but is expensive, and if the man who takes care of his own engine can find a lubricating oil that is especially adapted to his motor's specific needs, probably 90 per cent. of his troubles are at an end.

Although the average car owner has neither the time nor the equipment for the proper scientific study of lubricants, there are many manufacturers of oils who are quite willing to offer him brands that are claimed to be exactly what he wants. Then, again, there are producers who have devoted many years to the scientific study of the problem and who place in the market an oil which is especially adapted to the purpose for which it is advertised.

The Havoline Oil Company, New York City, is one of the concerns which has prepared its product scientifically. Controlling, absolutely, its own oil fields, it is thus enabled to secure a uniform quality of crude as a basis of its finished products. In its four refineries, it maintains laboratories in charge of expert chemists who are constantly at work keeping up the standard of Havoline oils. After the laboratory investigation and tests, all oils made by this concern are first thoroughly tested in actual severe service, both in engines on the block and on the road, before being placed in the market and backed by the name of Havoline.

By a scientific system of filtration, which is too expensive to admit of its being followed by some concerns, this company eliminates the carbon to a minimized point, so that the resulting product is as near a non-carbon perfection as it is possible for an oil to be carried in preparation without a loss of its lubricating qualities. It follows that these oils burn up cleanly and thus eliminate carbon deposits and with them the bulk of the owner's troubles.

In an effort to familiarize car owners with the real needs of lubrication, the company has prepared a booklet entitled "The Common Sense of Automobile Lubrication," which it will send to anyone addressing the Havoline Oil Company at its main office, 17 Battery place, New York City.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

BECOMES BRANCH MANAGER.

William Q. Cramp, formerly an officer of the Seneca Rubber Company, Buffalo, N. Y., has been appointed manager of the new branch opened by the Kelly-Springfield Tire Company in that city. Mr. Cramp is well known in the industry through his connection with the Seneca Company and moves into his new position as a result of the absorption of that concern by the Kelly-Springfield Tire Company.

HALLADAY AFFAIRS ADJUSTED.

The Streator Motor Car Company, Streator, Ill., maker of Halladay cars, starts the 1912 season in a better position than ever before to handle its increasing business. It is announced by the concern that the company originally started business with insufficient capital, and because of the large demand for its product, soon found it was impossible to secure ready money.

John C. Barlow and Paul R. Chubbuck, two of the principal stockholders, offered to convey to a trustee a large amount of real estate and other property which was to be used as security for bonds, the proceeds from which were to reimburse the creditors. An attempt was made to bring this about without the assistance of any court, but a few of the creditors objected, and the matter was taken into the bankruptcy court, not for the purpose of declaring the company insolvent, but to take advantage of the bankruptcy law, which provides that the court may compel a minority of creditors to accept a proposition to which a majority has agreed. The objections filed were subsequently withdrawn, and the proposition was confirmed by the court, leaving the company with all of its assets and free from debt.

NEW TYR IS A PRESERVATIVE.

A waterproof liquid composition, which it is claimed not only improves the appearance of the car but will preserve the tires, has been placed in the market by the New Tyr Manufacturing Company, 771 Lexington avenue, New York City. This product is termed New Tyr, and is said to be a German invention, which has been used for years throughout Europe. It penetrates into the fabric of the shoe, fills up any air holes, prevents sand blisters and keeps the rubber from cracking. The preparation is applied with a two-inch flat brush after the rubber has been thoroughly cleaned, and is said to dry in from 15 to 20 minutes.

FAIRMOUNT PARK RACE.

While the park commissioners of Philadelphia are known to be divided in their opinion regarding the annual Fairmount Park road race in that city, it is said there is every probability that permission will be granted as in former years. It is pointed out that the event has done much to advertise the city and that the plan under which the Quaker City Motor Club has conducted the race has resulted in large sums for charity. It is added that during the four years the contest has been held cars have travelled fully 25,000 miles in practise and competition without serious accident to contestants and no injury to spectators.

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THE BURDEN OF RESPONSIBILITY.

Massachusetts, which has set many an example to other commonwealths in the matter of automobile legislation, has a proposition before it to limit the size of motor trucks operating over the highways. It seems hardly probable that the highway commission could have studied the full effect of this bill before giving it indorsement. Motorists, as well as automobile manufacturers, should familiarize themselves with its provisions without delay, in order that the fullest possible publicity may be accorded what seems to be decidedly injurious legislation.

Briefly, the bill provides that no traction engine, trailer, motor or other vehicle in excess of a weight of six tons shall be operated on a highway or bridge, without obtaining a permit from the authorities in charge of such highway or bridge. Also that the owner, driver or operator of such vehicle unless relieved from liability in such permit, shall be responsible for all damages which the highway or bridge may sustain as a result of his action. It further provides that no traction engine or motor truck carrying a weight of more than four tons, including the vehicle, shall be operated at a speed greater than eight miles an hour. A fine of not less than $10 nor more than $500 is provided for violation of this law.

It is understood that the bill is a direct result of the failure of certain bridges in various sections of the commonwealth. At best, it appears to be an attempt on the part of town officials to transfer the responsibility for damages from the town treasury to the individual. Its effect upon modern methods of transportation readily may be conceived.

Massachusetts is too well informed to deny the approach of a new era, and it would seem that the proper solution of the difficulty was to recognize this fact by increasing the strength of roads and bridges which must be used by the modern vehicles. There should be no attempt to evade responsibility or to delay the inevitable.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

THE HIGHWAY SAFETY LEAGUE.

A new organization has made its appearance in Massachusetts, having as its object the elimination of the motor car operator with little regard for the interests of others. This is the Highway Safety League, which aims to become national in character. Time and funds will be devoted to the enforcement of existing laws and the punishment of violators. If the present laws are not sufficient for the purpose, it is proposed to secure others, more stringent.

It may be pointed out that the present statutes seem to be adequate for the purpose sought, but there has been a decided failure on the part of those whose duty it is to enforce them. It takes little effort to hale into court the driver who is travelling just over the maximum speed allowed, but few means appear to have been found for apprehending the real offenders. It is to be hoped that the new organization will devote its time and attention to the more serious side of the situation, and in so doing it will have generous support from the majority of motorists, who have quite as much at stake as other users of the highways.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

THE 1912 AUTOMOBILE.

While it is but natural that the growing importance of the commercial vehicle end of the industry should cause the improvements made therein to stand out more prominently than the changes in the pleasure car field, it will not be denied that the present show season reveals much progress here as well. The radical departures from accepted design are few, as was to be expected. Even the adoption of the so-called valveless engine has not been sufficiently widespread as yet to indicate any pronounced departure from what may be regarded as standard practise.

The most interesting developments of the past twelvemonth have been along the line of equipment. Whether the 1912 automobile be used for business or

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pleasure, the owner will find it fitted with all that makes for comfort and convenience. This applies quite as well to the machine of low price as to those heretofore recognized as of the first rank.

Electric lighting was beginning to come into vogue a year ago. Today it is regarded almost in the light of a necessity. The self-starting model is the rule rather than the exception. Practically all makes are equipped with fore doors, and in many instances this means four real doors, which may be removed at will. Demountable rims, tire carriers and luggage racks are now almost as commonly fitted as the magneto, speedometer and windshield.

There has been no appreciable reduction in price, for the most part, but so many things in the nature of accessories are being fitted as regular equipment this year that the resulting outlay is decidedly less than formerly. That it is only necessary to purchase a supply of fuel and secure a license tag before leaving on the summer tour is more nearly true than ever before. The 1912 model is a splendid investment and presages an excellent year's business.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

LOOKING BOTH WAYS.

Recently the Boston Elevated Railway Company offered prizes for the best poems written by school children, relating to the modern dangers of the public streets. First award went to a young woman who selected as her title, "Look Both Ways." Her advice to young people was to look in both directions before venturing on the highways.

Of course, the competition was arranged with the trolley car in mind, but it might be applied as well with reference to the automobile. There is little doubt that if children would adopt the title of this poem as their motto there would be far less accidents. And it may be added that the advice will be quite as beneficial for adults as well.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

LEGISLATIVE PLANS CHANGING.

The agitation for uniform motoring laws appears to be having its effect during the present legislative season. A number of states are looking over their statutes with a view to carrying out the desires of motorists in this respect. Word comes from New York, for instance, that a new law, patterned after the liberal provisions of the Connecticut statute, is in the process of formation. Rhode Island and a number of other states are turning their attention to the matter of universal lighting, following the example set by Massachusetts.

While it is still too early to predict what the final outcome shall be, there appears to be a disposition on the part of legislators to look upon motoring in a different light than has prevailed in the past. Much of this is due to the work of organized motorists, but it should not be forgotten that this is the season when automobile clubs and associations should be most active.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

CHAUFFEURS' NATIONAL ORGANIZATION.

The prospectus of the Chauffeurs' Federation of America claims two definite objects—obedience to the laws governing the use of the highways, and making the federation button a testimonial of the fitness of the holder to take a position of responsibility. Applicants for membership must pass an examination before a board composed of men who understand the mechanism of the automobile and its practical use on the public ways.

The aims of this organization appear to be decidedly worthy, but it may be added that the blame for misuse of the highways does not fall upon the heads of the chauffeurs in most instances. A careful investigation of the situation will indicate that usually the owner is at the wheel. The majority of chauffeurs, like the majority of motorists, have due regard for the rights of others. The party at fault is the man who cannot control himself and who should be refused a license to drive under any circumstances. There ought to be some way for the licensing board to determine in advance whether or not an applicant is a fit person to entrust with such responsibility.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

WHY THE CHANGE OF NAME?

Announcement is made that the national automobile tour is not to be known any longer as the Glidden tour, and that a new trophy is to be secured, in order that the event shall not bear the name of any one man. There must be some very good reason for this action, since it will not be denied that the generosity of Charles J. Glidden in presenting the trophy bearing his name was responsible for one of the most important contest features in the industry.

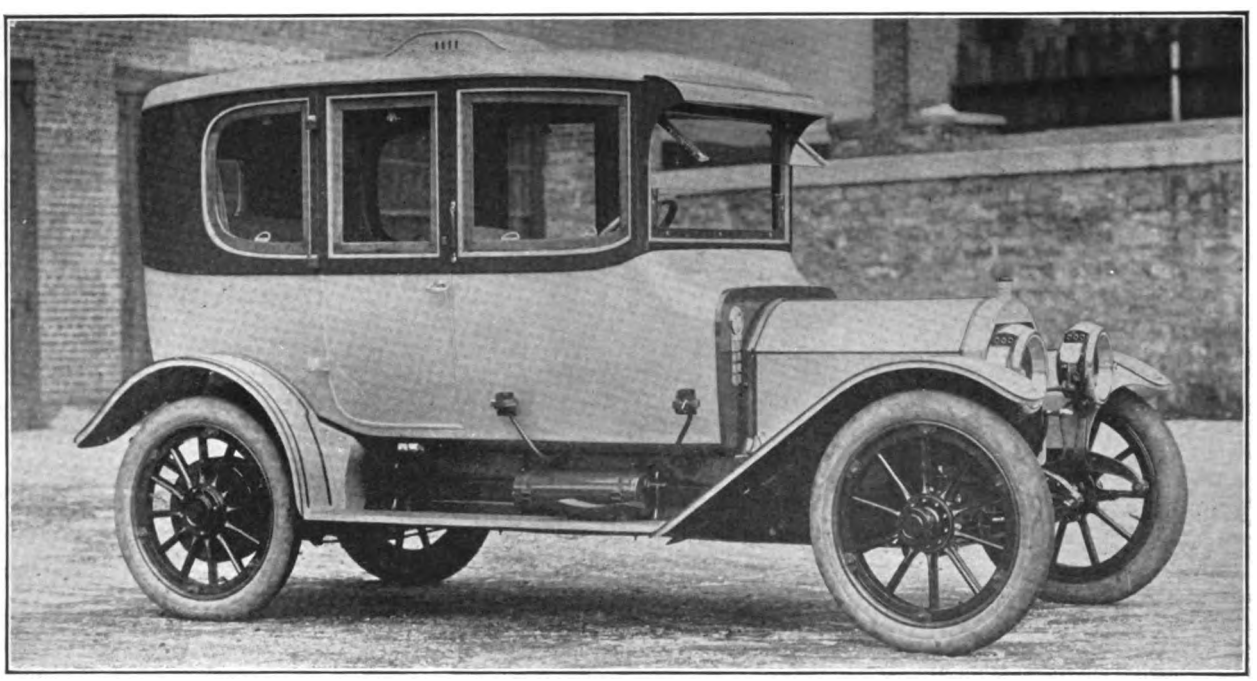
In 1911 there was very little disposition on the part of manufacturers to enter the tour, but when the governing body revived the original plan of making it a contest for individuals there was less difficulty in securing entrants. Still, the national tour of last year was not the same success as previous events. It hardly seems probable that the name had a great deal to do with it, since the Glidden tour had come to be recognized as one of the motoring classics of America. It will be interesting to note whether the change of title effects the result expected.

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MARMON 32-40 HORSEPOWER STOCK CARS.

THE standard Marmon chassis is rated at 32 horsepower, which is marketed with six different types of body. With all of these bodies the equipment differs somewhat, but the mechanical qualities are identical. From these six body models one may select the five-passenger touring car, the four-passenger touring car designated as the "suburban," the two-passenger roadster, the three-passenger roadster, the five-passenger inside driven limousine and the five-passenger landaulet.

The Marmon car has become widely known through recent racing achievements, these including numerous track and road events. Among these was the International Sweepstakes at the Indianapolis speedway, Memorial Day, 1911, in which the two Marmon entries finished first and fifth out of 40 cars to start. The



The Marmon Five-Passenger Inside-Driven Ventilated Top Limousine.

winning machine was driven 500 miles at an average speed of 74.61 miles an hour, and the other Marmon was in third place with two laps to go when its radiator was punctured by a tire lug thrown by another car and fell back with its cooling system practically useless.

While Marmon cars have won races consistently and their successes have been on all of the noted courses and speedways and against the most skillful drivers, one fact pre-eminent is that many events were won without stops. That is, the cars not only endured the hardest work but went through without the stops for tire changes that delayed many other entries. This quality has been pointed out by the maker, the Nordyke & Marmon Company, Indianapolis, Ind., who has claimed that the Marmon car has no equal for easy riding. It has also been offered as abundant evidence of the economy of fuel and lubricant consumption, to say nothing of the proof of substantial and enduring construction.

The Nordyke & Marmon Company has been engaged in manufacturing for more than 60 years and the methods which firmly established this concern have been applied to the production of the Marmon cars. It is maintained that these cars are the result of the highest degree of motor car development and engineering skill. The design is simple in every sense. Every endeavor has been directed toward minimizing weight and insuring against complications. Extreme accessibility is another quality to be pointed out, as well as the protection of every moving part from wear.

The Marmon 32 Horsepower Motor.

The Marmon motor is of four cylinders, cast in pairs. The motor is the T head type with the valves on opposite sides. The bore is 4.5 inches and the stroke five inches. It is rated at 32-40 horsepower. The cylinders are cast from a special quality of gray iron with the water jackets integral, the water jackets being with liberal spaces for effective radiation and circulation of the water. Exhaust is at the left side and the fuel intake at the right side of the motor. The pistons are of the same material as the cylinders and are unusually long. The cylinders are carefully bored and ground to size and the pistons are accurately fitted by grinding. The cylinders are ground under a strong air blast to remove all metallic or stone particles. The pistons are fitted with three rings, two above and one below the wristpins, these being specially designed three-piece rings that permit free movement of the pistons without loss of compression.

The crankcase is a barrel type aluminum casting

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with a lubricant reservoir or base. It is so designed that the crankshaft may be withdrawn through the forward end of the case. It is of the three-bearing form and the main bearings are anchored with heavy through bolts instead of studs. There are three main bearings in which the drop forged one-piece crankshaft, carefully ground and fitted, is mounted. The bearings are generous and are white die-cast brass, making for long life without need of adjustment.

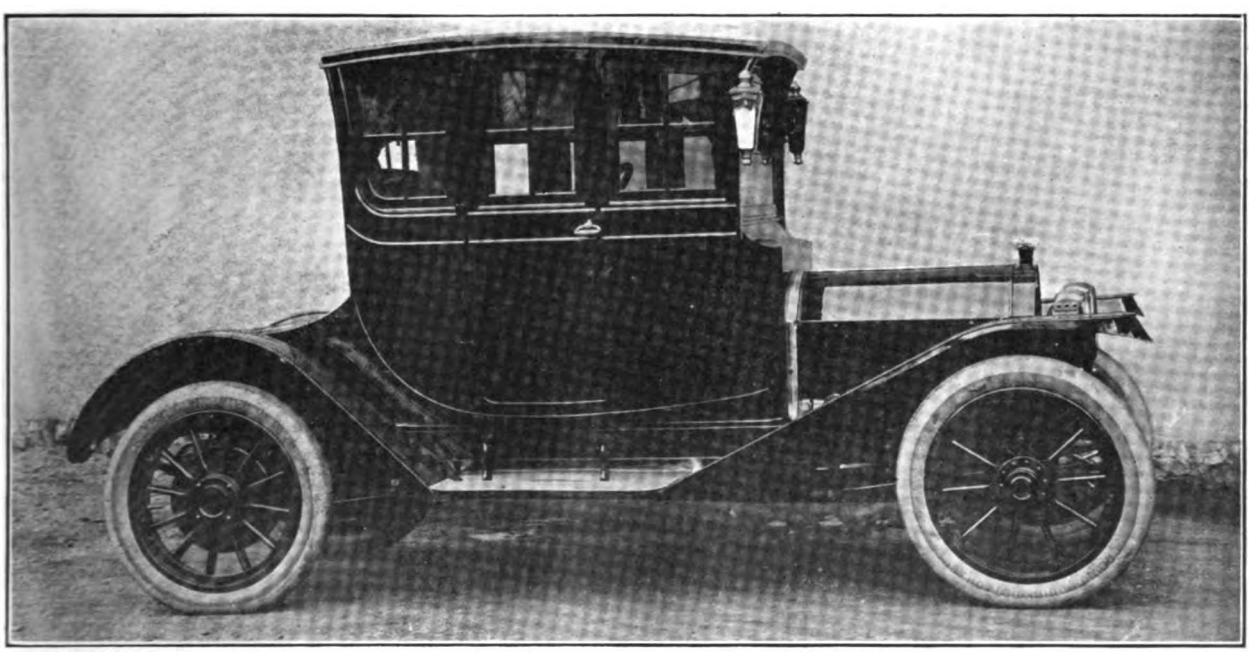
The wristpins and crankpins are large and the drop forged steel connecting rods are unusually long, the length insuring against vibration at high speed and minimizing the side thrust upon the walls of the cylinders. The connecting rod bushings are of die-cast white brass.

Marmon Lubricating System.

One of the special features is the system of motor lubrication, which has been employed in Marmon motors for nine years and has proven under all conditions of service and contest to be amply efficient and dependable. The method is force feed from a reservoir to all the moving parts of the motor. The reservoir has a capacity of six quarts and is bolted beneath the engine case, there being a large opening for the free flow of the lubricant from the engine base to the reservoir. There is a circular filter of fine screen in the centre of the reservoir and in this filter at a point above any possible accumulation of sediment is located the intake of the gear driven oil pump.

From this pump are two leads, one of which is carried to a pressure gauge installed on the dash within constant view of the driver of the car. The other has three branches whch extend to the three main bearings. The crankshaft is drilled through the shaft, webs and crankpins longitudinally, the channels through the webs being smaller. The larger channels are capped at either end and from these the centrifugal force of the crankshaft revolutions tends to carry the oil through the smaller. The shaft is drilled radially with holes that register with the oil grooves in the main bearings. The crankpins are similarly drilled with holes that register with holes in the big end bearings of the connecting rods, and these are fitted with tubes that extend to the bearings for piston wristpins.

As the engine is started the oil is pumped from the reservoir and is forced to the main bearings, through the hollow crankshaft to the crankpins and thence to the wristpins, there being a constant pressure that insures a liberal lubrication of all these parts. There is considerable excess of oil and this is thrown off from the revolving crankshaft, amply lubricating the cylinder and piston walls, the camshaft bearings, the cams, the valve lift rollers and the valve lifts and guides. From the forward main bearing the oil flows into a pocket formed by the timing gearcase and these gears revolve constantly in a bath of lubricant.



The Marmon Three-Passenger Colonial Coupe.

The oil pump is driven from the intake camshaft by spiral gears and while it is in operation every bearing or moving part is flooded, the oil being circulated very rapidly. The excess is drained into the reservoir, filtered and is used over and over again. The amount of oil in the reservoir may be determined at a glance by the pressure gauge. An automatic relief valve insures a uniform pressure of the system and there can be no failure save by the exhaustion of the supply within the reservoir, of which there will be long indication.

The pump is in a housing outside the engine case and may be readily removed should there be need, and the reservoir may be taken off for cleaning as desired. There is a removable plug for draining the reservoir should this be necessary. The pump is absolutely automatic in its action, starting and stopping

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with the motor and insuring that sufficient oil is delivered to all the bearings. The circulation of the oil is such that it is always under control and besides being exceptionally economical of lubricant it requires little attention. It is further claimed that it entirely eliminates the smoke nuisance.

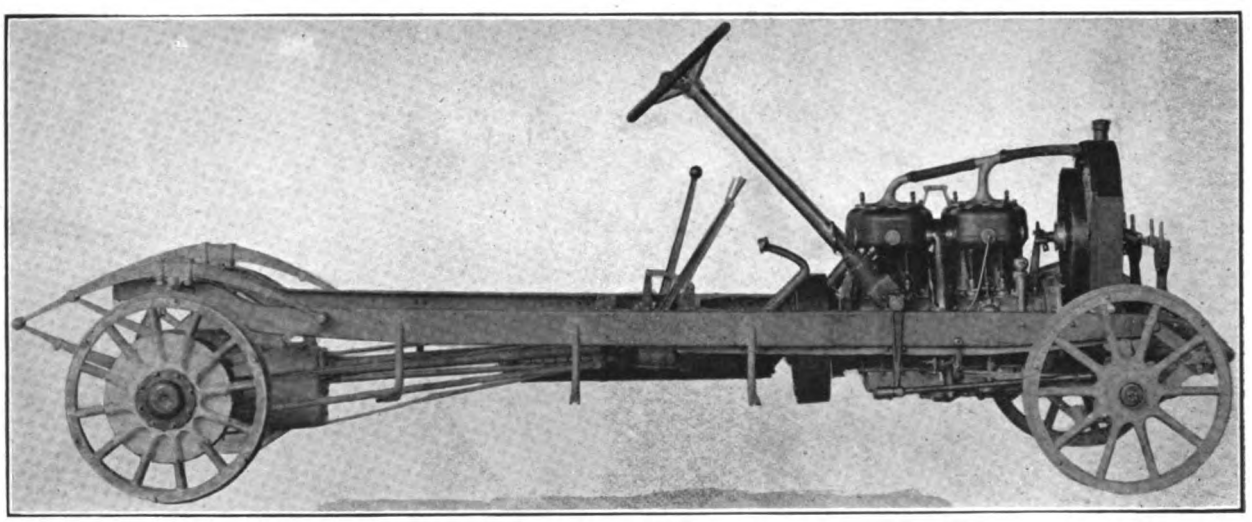
Highly Efficient Valve Action.

The valve action of the motor is such as insures the greatest efficiency. The exhaust valves are at the left and the intake valves at the right side, these being actuated by camshafts with liberal bearings, the shafts and cams being ground accurately to size. The valves and ports are large to facilitate complete charges of fresh fuel and thorough exhaust of the consumed gas. These valves operate in guides of white brass and the lifting pressure on the valve stems is a vertically straight line with the guides, this eliminating all side strain and pressure on the valve stems, insuring accurate and noiseless seating of the valves as well as long life of the mechanism. The valve springs are fitted with a special installation which makes for durability and facilitates quick removal and replacement of valves and springs. The tappet rods are installed in guides of white brass and the rods are fitted with hardened steel rolls with bronze bushings mounted on hardened steel pins to contact with the faces of the cams. The tappets have dust proof caps to protect the bearings between the rods and the guides and screws and lock nuts afford means for accurate adjustment of the valve clearance and to compensate for wear.

Cooling and Carburetion.

The cooling of the motor is by a circulation through the liberal water jackets and a cellular radiator. The circulating medium is a gear driven centrifugal pump of large capacity that is driven by an outside shaft from the exhaust camshaft. The inlet to the pump is large and a free flow of water is insured. The water is delivered to the cylinder units midway between the exhaust valves, at the base of the water jackets. The outlet manifolds are attached to large caps that are retained to the cylinder heads by cap screws. These manifolds are connected by flexible rubber hose. The curves of the manifolds are easy and there are no obstructions to the free flow of water. The radiator is mounted on a trunnion to eliminate any strain upon it. The radiation is further facilitated by a large fanwheel carried on a ball bearing and mounted on a bracket carried on the engine case. This fan is driven by a belt that is carried from a pulley on the extension of the same shaft that drives the water pump and magneto. The efficiency of the radiation is best evidenced by the results of the racing contests in which these machines have taken part. The exhaust header is of large proportions and affords free passage of the burned gases to the muffler, which is an especially effective silencer. The header is ribbed to increase the radiation.

The carburetion of the fuel is by means of an automatic float feed instrument with air valve adjustment, which may be adjusted from the seat. The carburetor is a type that has been carefully tested and developed and is highly efficient. The intake is a straight pipe from the carburetor to the connection with the intake manifold, which is cast integral with the cylinders and, being water jacketed, is surrounded by the circulating, cooling water, which simplifies the construction as well as insures against condensation of the fuel at low temperatures or slow speed.



The Marmon Standard Four-Cylinder 32 Horsepower Stock Chassis.

Three Point Motor Support.

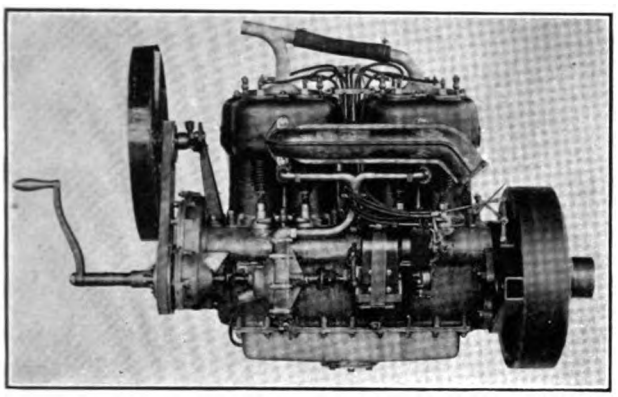
As mounted, the motor has three supports, that forward being on a heavy cross member of the frame, while at the rear it is supported by a pressed steel member that is carried on brackets attached to the chassis frame side members. The engine is slightly inclined toward the rear, which makes for a nearly straight line of the driving members, this minimizing the stresses upon the universal joints and making for the greatest economy of power created. The manner of installation also affords the complete accessibility of the motor and all its parts.

Dual Type of Ignition.

The ignition is of the true dual type in that it consists of a high-tension magneto and energy is supplied to two sets of spark plugs located over both inlet and exhaust valves, two sparks being generated

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in each cylinder simultaneously. This increases the rapidity of firing and the consequent expansion and power of the motor. This certainty of firing is an-



Exhaust Side of Marmon Motor, Showing Water Pump, Magneto and Ignition Leads.

other factor in the admirable results obtained in racing and other forms of contests. In addition the system may be used with the storage battery that is utilized for starting and as a spare, the current being intensified by a coil located on the dash.

The clutch is of the familiar cone type, the female member being the recessed flywheel and the male member being a cone faced with an asbestos fabric facing. This form is not only very effective but is free from troubles. Engaging springs are placed beneath the cone facing to prevent harsh engagement, this insuring smoothness in operation. In the driving system, back of the clutch and where the gearset is usually located is the support for the forward end of the heavy steel housing for the driving shaft, and paralleling this is the tube that carries the rods controlling the gearset. There is a universal joint within the clutch construction to prevent torsion stresses upon the motor, and another within the shaft housing. The shaft housing is suspended forward by a ball and socket joint.

Combination Gearset and Differential.

The transmission itself is constructed in combination with the bevel gear and pinion drive at the rear end of the driving shaft and is of the selective type with three forward speeds and reverse. It is claimed for this construction that it affords better distribution of weight, lower centre of gravity of the car, ease in riding, tire economy, accessibility, avoids all exposed universal couplings, and that the propeller shaft is always run at engine speed, it being held that the power a shaft will transmit is always proportioned to its speed. The gearset is thus combined with the rear axle design, being, with the differential, carried in a large central housing.

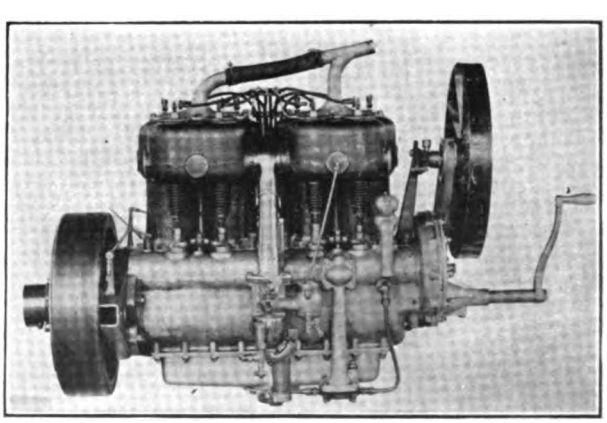
The housing is heavily webbed to insure strength, for the axle is of the full floating type, in which the wheels revolve on bearings at the outer ends of the axle tubing, the wheels being firmly fixed to the driving axle shafts. The axle house is of pressed steel and that encasing the differential is cast aluminum. The rear of the housing is closed with an aluminum plate which, when removed, permits the removal of the gearset or differential after the driving shafts have been partly withdrawn. When mounted the differential is carried on large roller bearings and into the differential assembly are extended the ends of the driving shafts. The outer ends of the shafts are bolted solidly to the hubs of the rear wheels, this making practically a single construction. The wheels run on heavy ball bearings that are centred in the hubs. The stresses of road shocks are borne by the wheels and the springs and not by the gears and shafting by which the car is driven.

The bearing supports for the differential are integral with a heavy steel cage or case, which also carries the bearing for the bevel pinion and the rear gearset bearing. The transmission shafts are mounted in imported ball bearings. The bevel driving pinion has an easily accessible adjustment which may be made use of from the outside without opening the housing so that it is not necessary to open the transmission to compensate for any wear. The large torsion tube strengthens the construction and heavy distance rods maintain the rear axle in its correct relation with the chassis.

Brakes and Control Details.

The brakes are of the internal expanding type and are with shoes of steel, faced with asbestos fabric, operating within pressed steel drums 16 inches in diameter bolted to the rear wheels. The shoes have two-inch face and have a total braking area of 403 square inches. They have improved screw and segment adjustment accessibly located. The brakes are dust proof and operate effectively under all conditions, and are equalized as to pressure. All brakes are in duplicate and the parts interchangeable. The front axle is a forged steel I section and of such design that the load is carried by ball thrust bearings protected by aluminum housings. The wheels are mounted on roller bearings. The yokes and the steering arms are steel forgings, carefully annealed. The draglink and the tiebar are located behind the front axle for protection against road obstructions. The clearance of the axles is 10 inches.

The wheelbase is 120 inches and the tread is 56.5 inches. The chassis frame is of pressed steel channel section, cambered at the rear to permit the use of

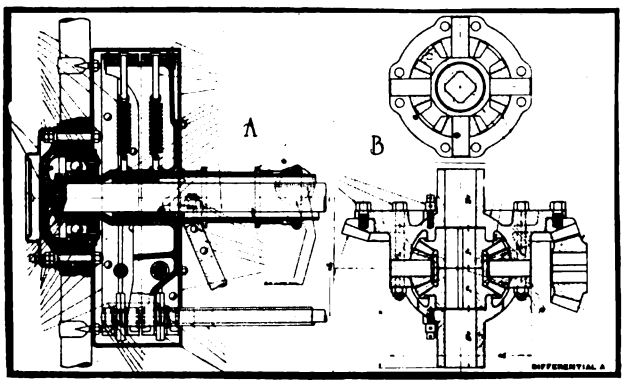


Inlet Side of the Marmon Four-Cylinder Motor, Showing Carburetor and Oil Pump.

full elliptic springs. The rear springs are 40 inches in length and two inches in width and the semi-elliptic forward springs are 35 inches long and two inches

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wide. The spring shackles are provided with grease cups for lubrication. The wheels are of the wood artillery type which are regularly equipped with 35 by



Marmon Rear Axle Construction: A, the Floating Driving Shaft and Brake Installation; B, the Differential Assembly.

4.5-inch tires carried on quick detachable rims.

The control is by gearset and emergency levers at the right side, the former being mounted in the conventional H slot. The clutch and service brake are operated by left and right pedals respectively and the motor also may be accelerated by pedal. The ignition and throttle are controlled by hand levers on a quadrant on the 18-inch steering wheel. This wheel has a solid spider and grip. The steering column is of large size and the gear is of the irreversible type of the screw and nut construction, in which one adjusting nut will compensate all wear. The fuel supply is carried under the driver's seat on the touring types and behind the seat of the roadster. It has a capacity of 18 gallons and the feed to the carburetor is by gravity. There is a float sight gauge to indicate the quantity and the tanks have large hand holes to permit of cleaning.

The fenders are of steel with mud aprons between them and the chassis frame and there is a skirt between the aluminum pyramid-faced running boards and the frame. The motor is protected by an easily removable dust pan. The hood is of sheet metal with a centre panel bolted to the radiator and the dash. The bodies are of the Marmon perfected cast aluminum construction with sheet metal seat backs. All upholstering is of selected black leather, with coiled spring backs and spring edge cushions stuffed with the best of curled hair and with leather welts and binding. All models are finished with blue-black bodies with white striping, the running gear being olive with blue-black striping. The exposed metal work is polished brass. The weight of the cars is approximately 2750 pounds.

BAUER REMAINS WITH OAKLAND.

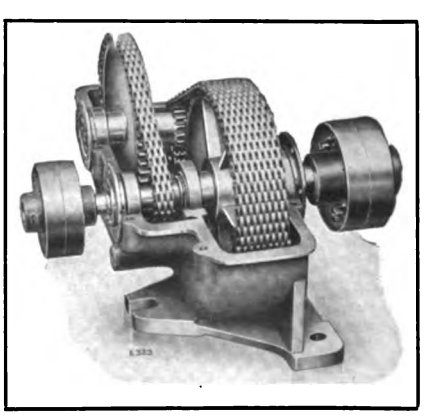
Harold A. Bauer of Buffalo, N. Y., who is well known because of his performances in hill climbing contests, endurance and reliability runs as pilot of Oakland cars, has been re-engaged to handle the contest work of the Oakland Motor Car Company, Pontiac, Mich., during the present year this announcement being made by General Manager George F. Daniels of the company. Bauer began his career when 16 years of age, piloting an Oakland through the Glidden tour, and finishing with a perfect score. Since that time he has engaged in many hill climbing contests with success. The Oakland company will adhere to its established rule of participating in hill climbs, endurance and reliability runs during the coming season.

ENTER LEXINGTON IN BIG RACE.

Announcement is made that the Lexington Motor Car Company of Connersville, Ind., has entered a six-cylinder Lexington car in the 500-mile international sweepstakes race to be held at Indianapolis, May 30. This is said to be the first entry made by the company in a contest of this nature. The car will be piloted by Harry Knight, who made such an excellent showing in the event last year, but who met with an accident when he voluntarily drove his car into the pits to avoid striking a mechanician who had fallen from a car. The machine entered by the Lexington company is equipped with a six-cylinder motor having a 4.125-inch bore and 5.25-inch stroke, giving a piston displacement of 421 cubic inches. It is the third six-cylinder to be entered and the 10th entry received thus far. The new machine is nearly completed and will be sent to the speedway shortly for a try out.

COVENTRY SILENT CHAINS FOR MOTORS.

One of the mechanical features of the foreign motor car shows was the growing tendency of makers to utilize the silent chain for driving camshafts, magnetos and pumps. At the Scottish motor exhibition, recently held in Glasgow, Scotland, many of the best known manufacturers of British machines exhibited models which employed the Coventry noiseless chain drive in the motor. The product of the Coventry Chain Company, Ltd., Coventry, England, for which S. Hoffnung & Co., Ltd., New York City, is United States representative, was shown also in many change speed gearboxes an application that was noticeable at the Olympia show. Another exhibit of proved utility was the speed reduction gearbox, which is shown in an accompanying illustration. This method is said to solve effectually the question of reducing speeds of electric motors to the desired number of revolutions with a minimum loss of power, by either double, triple or quadruple reductions.



Speed Reduction Gearbox for Electric Motors.

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COMING EVENTS.

February.

Feb. 10-17—Show, Atlanta, Ga.
Feb. 12-17—Commercial car show, St. Louis, Mo.
Feb. 12-17—Show, Memphis, Tenn.
Feb. 12-17—Show, Ottawa, Can.
Feb. 12-17—Show, Fall River, Mass.
Feb. 12-17—Show, Kansas City, Mo.
Feb. 12-19—Show, Dayton, O.
Feb. 14-17—Show, Grand Rapids, Mich.
Feb. 17-24—Exposition show, Pittsburg, Penn.
Feb. 17-24—Association show, Minneapolis, Minn.
Feb. 17-24—Show, Newark, N. J.
Feb. 17-24—Show, Cleveland, O.
Feb. 19-24—Show, Omaha, Neb.
Feb. 19-24—Show, Hartford, Conn.
Feb. 19-24—Show, Cincinnati, O.
Feb. 19-24—Show, Portland, Me.
Feb. 20-24—Show, Binghamton, N. Y.
Feb. 20-25—Show, New Orleans, La.
Feb. 20-28—Show, Baltimore, Md.
Feb. 21-23—Show, Keene, N. H.
Feb. 21-24—Show, Louisville, Ky.
Feb. 21-28—Show, Toronto, Can.
Feb. 24-March 2—Show, Brooklyn, N. Y.
Feb. 26-March 2—Show, Paterson, N. J.
Feb. 26-March 2—Show, Elmira, N. Y.
Feb. 28-March 2—Show, Davenport, Ia.

March.

March 2-9 —Show, Norfolk, Va.
March 2-9 —Pleasure car show, Boston, Mass.
March 4-9 —Show, Des Moines, Ia.
March 4-10—Show, Denver, Col.
March 6-9 —Show, Tiffin, O.
March 11-16—Show, Cedar Rapids, Ia.
March 12-16—Show, Syracuse, N. Y.
March 13-20—Commercial car show, Boston, Mass.

SPECIAL BOSCH SERVICE.

Arrangements for special installation service have been made in all branches of the Bosch Magneto Company, New York City, so that motorists in the vicinity of any branch desiring to install the Bosch system may leave their machines and have the change made not only with promptness but at a reasonable figure, with the usual Bosch quality and guarantee.

INSURANCE BUSINESS SUSPENDED.

Supt. Blake of the state insurance department in Missouri has prohibited casualty companies from writing business for automobile owners in that commonwealth, claiming the possession of liability insurance causes carelessness on the part of motor car operators. In this connection, it is interesting to note that the organized motorists of St. Louis had been agitating a revision of classification for liability risks in that city, as it was held there was no good reason why the residents of St. Louis should be compelled to pay a larger premium than those of any other city in the country with the exception of New York and Chicago.

HUPP COMPANY LITIGATION.

Announcement is made from Detroit that Judge Murphy of the Wayne County Court has handed down a decision in the case of the Hupp Motor Car Company against the Hupp Corporation and R. C. and L. G. Hupp, granting the prayer of the plaintiff for a permanent injunction restraining the use of the name "Hupp." Under the terms of the decree, the Hupp Corporation is required, within 15 days, to change its name, eliminating the word "Hupp," and is forbidden to use the name "Hupp" as a part of its corporate name, or in any manner as applied to the manufacture and sale of gasoline automobiles. The Hupp brothers are permanently enjoined from using the name jointly or singly as applied to gasoline cars, and R. C. Hupp is prohibited from making any written or printed statement in advertising or otherwise by which he claims to be the designer of any car or cars produced by the Hupp Motor Car Company.

NO MORE GLIDDEN TOURS.

At a meeting of the executive committee of the American Automobile Association held in Chicago during the progress of the Coliseum show in that city, it was decided to raise money for a new trophy, to be known as the A. A. A. cup, which will be awarded in future national tours. It is understood that this step was taken in order to eliminate the name of any one man, since the success of the annual tour depends upon the efforts of so many.

The Glidden trophy, which has been the chief award in all but one national tour, was presented by Charles J. Glidden of Boston, and the annual Glidden tour has come to be known as one of the American motoring classics. It is held at present by the United States Motor Company, it having been won in 1911 with a team of Maxwell cars.

It also was determined at the meeting that New Orleans shall be the destination of the 1912 tour. One of the following five cities will be the starting point: Detroit, Cleveland, Buffalo, Cincinnati or Indianapolis. Other plans, including the date, will be announced later.

PRATT HEADS OHIO GASOLINE CONCERN.

At the annual meeting of the directors of the Ohio Motor Car Company, Cincinnati, O., Charles F. Pratt was elected president and general manager. A. F. Schaefer was chosen vice president and factory manager; Robert Kennedy secretary, and O. M. Baker treasurer. The former succeeds C. M. Anderson as the latter resigned to engage in business at Middletown, O. R. E. Northway, chief engineer; H. T. Boulden, sales manager, and C. E. Evans, assistant factory manager, continue in their respective positions.

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The new Heinrich 1912 type mono-biplane, made by Heinrich Bros., Baldwin, N. Y., is presented herewith for the first time. A distinctive feature is the provision for adding a second pair of wings at pleasure, convertng the machine into a biplane, although the illustration shows it as a monoplane purely and simply.

Particular attention has been paid to the design in an effort to reduce head resistance so far as possible. The fuselage is of the box girder type, 22 feet long, running from a blunt point at the front to a sharp point at the rear. Its four ash members are joined at the centre by a sliding fit into square steel tubes one foot long so that the assembly may be taken in half for shipment. The four main members are 1.25 inches square at the front, tapering down to .75 inch at the rear, where they join a sternpost of ash two feet by two inches by .75 inch, to which the rudder is fastened.

The fuselage is 26 inches deep and 28 inches wide at the front, tapering down to one foot deep and one inch wide at the sternpost. It is strengthened by stanchions every 2.5 feet, except at the motor, where these are located two feet apart. All the stanchions aft of the pilot's seat are one inch square, while those around the motor are one by two inches. The whole is further strengthened by No. 33 galvanized steel wire, which is fastened to U bolts of .1875-inch cold rolled steel.

The seat is slightly forward of the trailing edge of the wings, and forward of this point the fuselage is entirely covered with aluminum, with the exception of three windows of celluloid, one in the bottom, two feet wide and extending entirely across the machine, and one on either side one foot by 16 inches. This gives the aviator a good view of the ground at all times, and also allows him to inspect the landing chassis while in flight.

A steel tube, two inches in diameter, runs across the fuselage in front into which the main spars of the wings fit. A box of laminated spruce and ash extends across in front of the seat, into which the warping spar is fitted. This also serves as a dashboard carrying the tachometer, watch and engine controls. The fuselage also is covered with fabric.

The wings are built up of four spars, the two main members of ash being 2.5 by 1.25 inches, channeled out for light weight. The other two are located, one at the leading edge and the other about one foot from the trailing edge. The former is of spruce, one by 1.5 inches, and the latter of ash, one inch square. Ribs are spaced 10 inches apart, and are of I beam section, the middle members being of ash and the others of white wood. The wings are held up by two steel wires in front, two to each wing, capable of withstanding 1500 pounds each. Two flexible steel wires in the rear, capable of withstanding 2000 pounds each, run



Heinrich 1912 Type Mono-Biplane, for Which It Is Claimed That It Is Converted Easily Into a Biplane by Adding a Second Pair of Wings.

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through two tubes on the truss to allow warping. The under fastenings are five in number, two to the front main spar designed to sustain 2300 pounds each, two for warping and a fifth fastened to the small spar one foot from the trailing edge and running over a separate pulley.

The tail is of the flat non-lifting type. It is swallow tail in shape, and the rudder, two by 2.5 feet, swings between the two ends, which are hinged to the main portion and form the elevators. The whole assembly is so constructed that it is a matter of only a few minutes' work to remove for shipment. When on the ground it is supported by a light laminated skid.

The chassis is of the wheel and skid type. One long central skid of laminated spruce and ash, turned up well at the end, is designed to serve three purposes; to protect the propeller in case of a poor landing and the rest of the chassis is damaged, to keep the machine from tipping headforemost in landing, and to form a substantial anchor for the wing wires and warping arm. Two small skids, one on either side of the large member, are braced out with oval tubing. To these are fastened the rubber shock absorbing springs through which the axle runs, with a wheel at either end. The small wheels and skids take all the shock of landing.

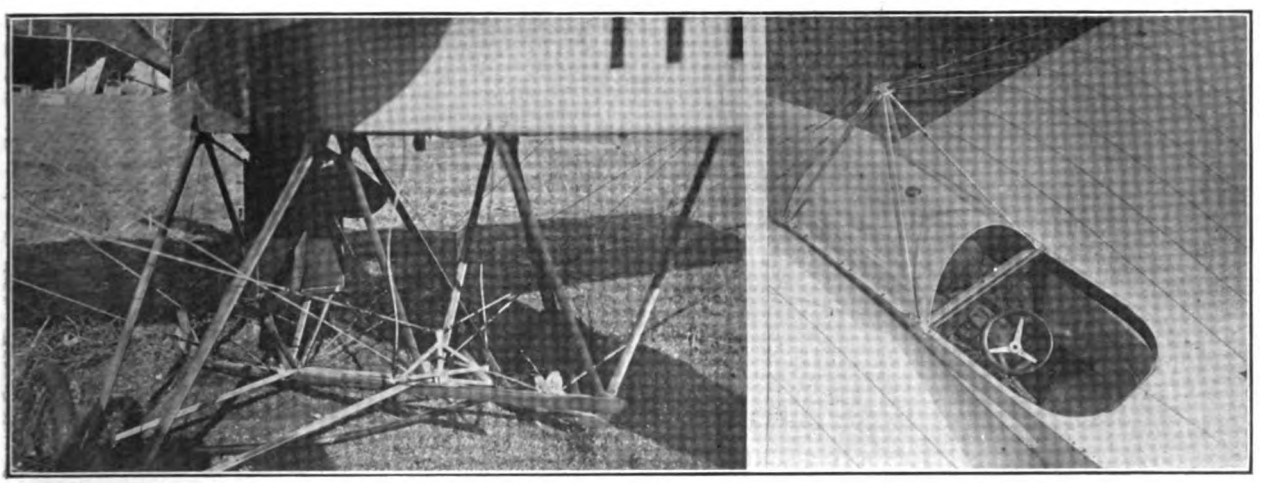
The motor and gasoline tank are so located as to eliminate any possibility of danger from fire. The tank is separated from the motor by an aluminum partition, and the space occupied by it is provided with drains, so that any leakage will immediately drain out. The control consists of the Heinrich one wheel type, by which longitudinal movement works the elevator; lateral, the warping wires, and turning, the steering mechanism.

The monoplane wings have a surface of 180 square feet for the high speed type and 210 for the passenger. The biplane wings have 300 square feet of surface on the high speed machine and 420 on the passenger. Other general dimensions are: High speed—length, 24 feet six inches; spread, 29 feet four inches; chord, six feet six inches; camber of wings, two inches; angle of incidence, six degrees; dihedral angle, 3.5 degrees. Passenger type—length, 25 feet; spread, 33 feet; chord, seven feet; camber, 3.5 inches; angle of incidence, 7.5 degrees; dihedral angle, 3.5 degrees.

Continuing the discussion of 1912 models shown at the recent Paris Salon, it will prove of interest to illustrate and describe briefly some of the more essential features of the machines on display. As already has been noted, the constructional details were worked out much more carefully than ever before, and as a whole the exhibition was one of decided progress in the new science. No attempt has been made herein to present all of the distinctive designs, space permitting of little more than a resume of the show with a few suggestions as to the chief characteristics of the various makes.

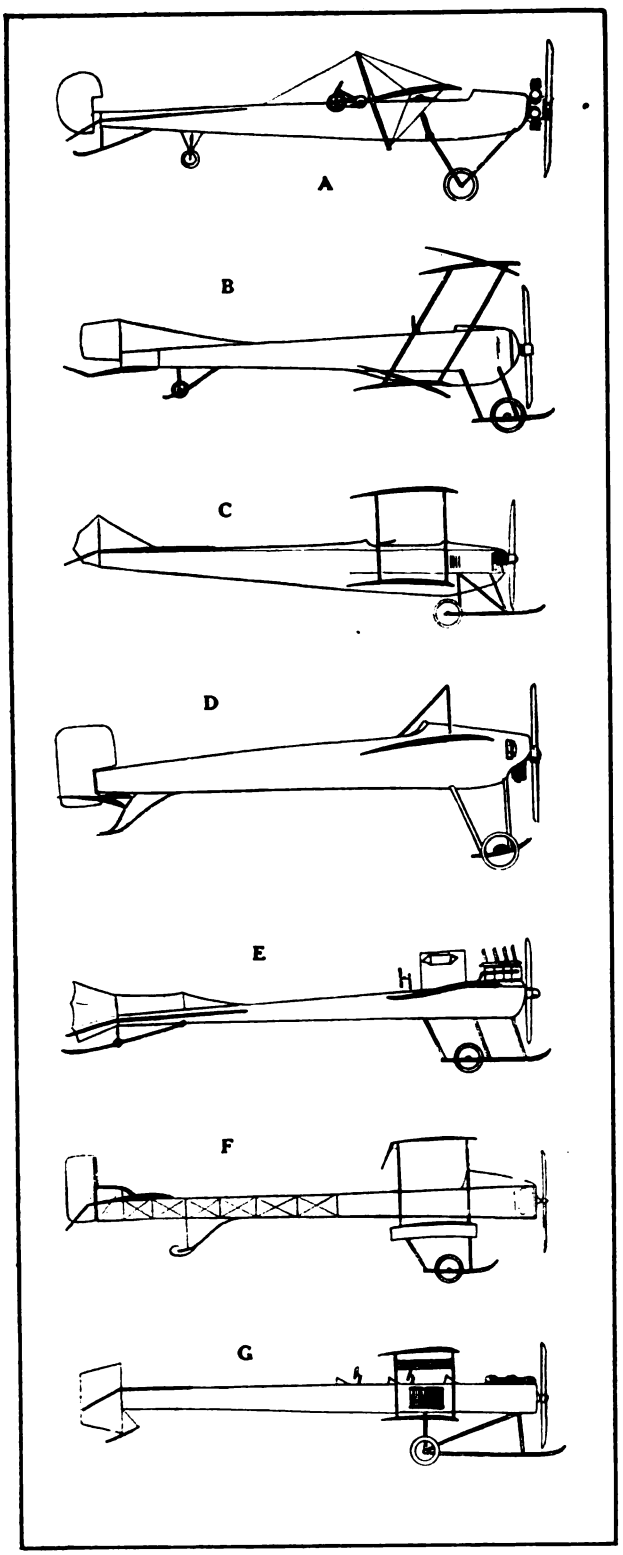
A machine that presents a number of original ideas is the De Marcay-Moonen monoplane, in which the wings are pivoted at their inner ends not only to permit of folding back along the fuselage, but to allow the angle of incidence and the setting of the wings to be altered to suit particular flying conditions. The pivoted pillars are relieved of a greater portion of the lifting strain, this being taken by triangular guys in the usual manner. The leading edges of the wings are connected by a stout cable, which passes over a pulley block in the forward end of the fuselage, while the trailing edges are similarly connected, but in this case the cable is extended to pass over a drum, by which the movement of the wings is controlled. The folding is accomplished by a hand wheel at the side of the fuselage, and the same action also is used for control instead of warping. This wheel is connected to the middle bevel pinion of a small differential gear, which causes one wing to be pushed forward and the other to be pulled back. The landing chassis also is somewhat original, in that two running wheels are carried on a single triangulated angle, which is supported at either end by a pair of struts. The upper ends of these are attached to a slide bar inside the fuselage in such a manner that they are free to work up and down against the action of a set of rubber shock absorbers. At the extreme front is a skid to protect the propeller.

The Goupy biplane is recognized as one of the first to employ the staggered main planes, as well as the monoplane type of fuselage. Each of the main planes is fitted at either end with interconnected



Constructional Details on Heinrich Machine: At Left, Landing Chassis and Special Skid; at Right, Pilot's Cockpit and Warping Wires.

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New Machines at Paris Salon: A, De Marcay-Moonen Monoplane; B, Goupy Biplane; C, Clement-Bayard Military Biplane; D, Borel Monoplane; E, Aviatic Monoplane; F Sloan Bi-Curve; G, Astra Biplane.

ailerons, which formerly were worked in conjunction with similar ailerons at the tail, although the latter have been abandoned in the latest design. The landing chassis is of the so-called Farman type, comprising a pair of wheels connected by a long axle, while the rear skid arrangement is somewhat novel. Here a small pneumatic tired wheel is mounted on a cranked axle, which is supported in bearings by wooden skid struts. At each end of the axle is a small cam arrangement, which when the wheel meets the ground causes the skid struts to be forced apart, thus giving the wheel a certain spring action. If the latter receive a hard blow it is forced upward above the skid, and is then held by niches cut in the cams, under which circumstances it is completely out of action and the running is done on the skid alone.

The Clement-Bayard military biplane practically is the monoplane of the same make, with the addition of another pair of main planes. The construction is of metal, the fuselage being of aluminum. The landing chassis is of steel, although the skids are of wood. The non-lifting tail plane is set neutrally, and is cambered as to both its upper and under surfaces. The elevator flats are of the bat wing type. In design and construction, the Clement-Bayard may be said to have developed a new idea in biplane manufacture.

The Borel, formerly the Morane-Borel, retains all its original characteristics, chief among which is the setting of the wings with practically no dihedral angle. A particular feature is the tail construction, which is of the Bleriot lifting type, and is controlled by a rear flap formed to operate with the pivoted wing tips. Another feature is the unusual size of the rudder.

A German monoplane, which secured a number of prizes during 1911, is the Aviatic, which resembles the Antoinette in many respects. The landing chassis is quite different, however, being more like the old Hanroit in general arrangement. The fuselage practically is triangular in section. The tail is non-lifting, and is protected by a skid furnished with a small trailing wheel. The main supporting surfaces follow the Etrich design, having a pronounced upward turn at the trailing edge.

The Sloan bi-curve follows present day biplane practise, and gains its name from the fact that the upper deck is curved so as to have both a negative and positive dihedral angle, while the lower arc is undulated so as to resemble the end view of a bird's wing. Trailing ailerons are fitted to the extension of the upper plane. The tail is of the slightly lifting type, with an elevator flap at each side of the large rudder. Underneath is the double skid furnished with a suspension composed of a bent strip of steel.

The long covered fuselage of the Astra biplane is triangular in shape, and the entire machine resembles the Avro, of English design. Seats are provided for the pilot and two passengers. The fixed tail plane is triangular is section and non-lifting, with two elevator flaps on either side of the rudder, the latter being somewhat large.

A distinctly new design is presented in the Albatross biplane of German manufacture, as may be gathered from the accompanying illustration. Lateral control is by warping the turned back tips of the main planes. The fuselage is entirely covered, and carries a non-lifting fixed tail plane back of which is an un-

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balanced elevator flap and above this is a large triangular balanced rudder.

Another biplane in which the main planes are staggered is the Zodiac. Lateral control is by a pair of flaps in the rear edge of the lower deck. The tail is of the non-lifting type, and both the centre of gravity and line of thrust are placed fairly high. The landing chassis is more or less of the Antoinette pattern, the running wheels being supported by a central steel pillar, attached to fuselage by a universal joint.

The monoplane produced as the Sotinel-Guerin-Corneloup has the wings arranged in an unusual position and with a dihedral angle, but they are pivoted centrally, so as to swing more or less freely against the action of shock absorbers in relation to the fuselage. In doing so they operate movable wing tips, the function of which is to restore lateral stability. In flight, of course, it is the fuselage which swings relatively to the wings, and the tips are so arranged that if the fuselage be swung toward the right, the right wing tip has its angle of incidence increased, while that of the left is decreased. This is a new machine and its trials have not been very exhaustive as yet.

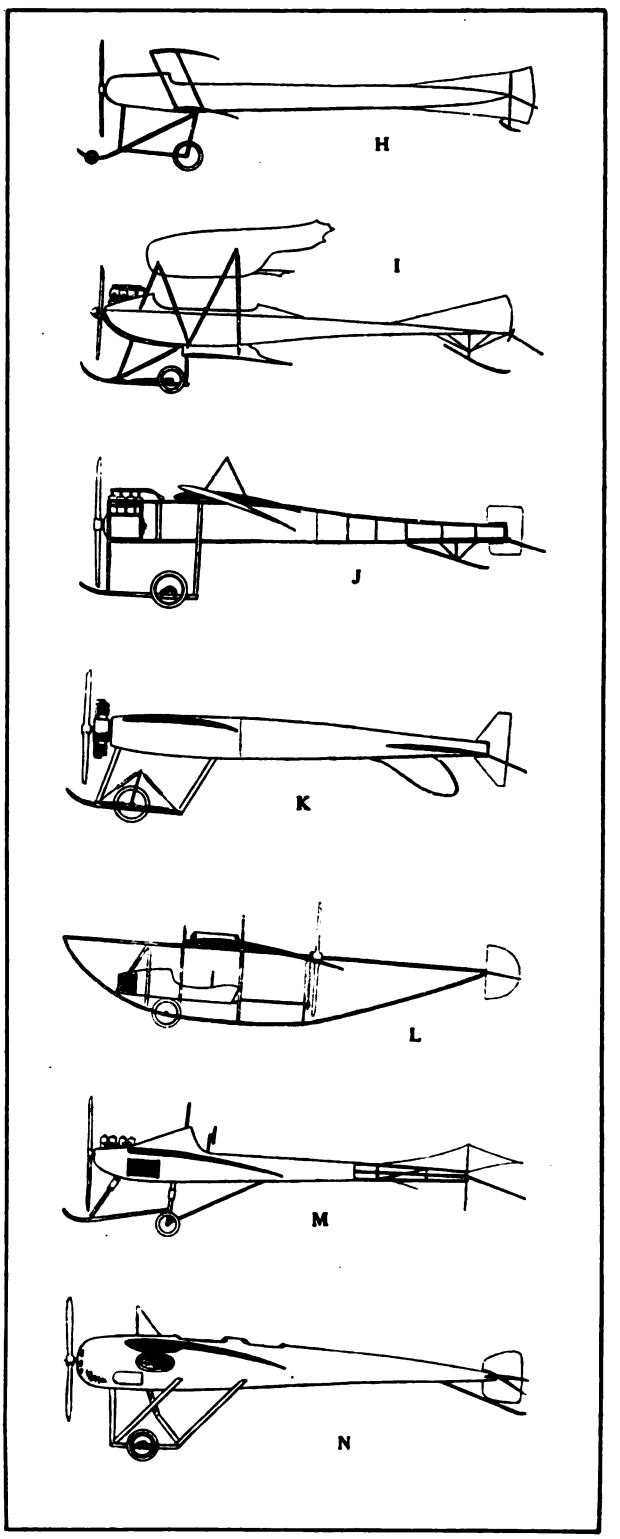
In the Kauffman, which is manufactured by what is claimed to be the youngest successful constructor in the world, the wings imitate in shape those of a bird, although they are not sloped backward to a noticeable degree. Special claims are made for their strength, the principal point being the direct staying of every rib. The landing chassis is quite original, comprising a pair of disc wheels fitted to a common axle, which is not rigidly fixed to anything, but is braced in all directions to the framework of the skids with with rubber shock absorbers.

Another decidedly novel creation is the Tubavion, which is described as a monoplane, although it does not greatly resemble the usual construction at first glance. The machine is of metal throughout. The propeller is directly behind the main plane, being carried directly on the long steel tubing which forms the backbone of the fuselage. Two tensional members perform the office of skids. The centre of gravity is very low indeed. The wings are of aluminum sheeting with ribs of the same material threaded upon a pair of steel bars.

The Berthaud W monoplane is a decidedly graceful machine, the construction being principally of steel tubing. The fuselage is diamond shaped in section. The empennage is a modified Antoinette type, as is also the chassis.

The Morane-Saulnier military monoplane is of metal construction, the fuselage being of steel. The revolving Gnome engine is entirely enclosed within the forward end of the fuselage, a series of holes being provided for cooling and exhaust purposes. Mica windows appear on either side, presumably to permit of taking observations. The landing chassis appears to possess great strength, and is composed largely of elliptical section steel tubing.

New speed records were made so often during January that it is difficult to determine just who holds the honor at the present writing. The year 1911 closed with all marks up to 100 kilometers held by the late Edouard Nieuport, the 150-kilometer record by Charles T. Weyman, and that for 200 kilometers by M. E. Helen, all with Nieuport monoplanes. The



Additional Designs Revealed at Salon: H, Zodiac Biplane; I, Albatross Biplane; J, Sotinel-Guerin-Corneloup Monoplane; K, Kauffman Monoplane; L, Tubavion Monoplane; M, Berthaud W Monoplane; N, Morane-Saulnier Monoplane.

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time for 100 kilometers was 40:27.4, for 150, 1:11:36.2, and for 200, 2:13:35.4.

At Pau, France, Jan. 19, Jules Vendrines in a Deperdussin monoplane covered 100 kilometers in 41:56.8, and 150 in 1:02:43.8. Jan. 24, Maurice Tabuteau covered 200 kilometers in 1:54:21, 250 in 2:22:57 and 300 in 2:51:00. At Douzy, France, Jan. 26, Leon Bathiat flew 100 kilometers in 41:29..

Passenger carrying records also have undergone a decided revision since Jan. 1. Dr. G. L. Ulich flew a Harlan monoplane with three passengers at Berlin, Germany, Jan. 31, in 1:35:00, exceeding the former record of 45:46, made by Adolph Warchalowski at Weiner Neustadt, Austria, Oct. 1, 1911.

Henri Molla of France drove a biplane with five passengers, Jan. 26, at Douzy, France, remaining aloft for 46:27.4. Guillaume Busson of France carried four passengers for 17:28.2 last March.

George W. Beatty, carrying three passengers, a total load of 537, flew a Wright biplane at Nassau Boulevard, Long Island, Feb. 3, covering 16 miles. This is a new American record. The world's record for a three-passenger flight with aviator is held by Guillaume Busson of France at 31 miles.

Prevost of France carried two passengers to an altitude of 7150 feet at Rheims, France, Jan. 23. The previous record was made by Lieut. Henrich Bier at Weiner Neustadt, Austria, Sept. 29, at 3916 feet.

Jan. 23, Dr. G. L. Ulich of Germany carried two passengers in his Harlan monoplane for 2:02:45, exceeding the former record held by Lieut. Henrich Bier in an Etrich monoplane at 1:05:18.3.

Brig.-Gen. James Allen, chief of the signal corps, United States army, has $65,000 left from the appropriation of $125,000 made last year for the purchase of aeroplanes, and has decided to secure eight and possibly nine new machines before June 30. The army now possesses seven biplanes, located as follows: One Wright at Manila; one Wright at San Antonio, Tex.; one Wright, one Burgess-Wright and two Curtiss at Augusta, Ga., and one Curtiss ready for delivery at Hammondsport, N. Y.

At the annual dinner of the Aero Club of America, two new trophies were announced, one donated by Clarence H. Mackay for competition by aviators of the United States army, and one by Henry Payne Whitney for the navy. The details of the competitions have not been arranged as yet. The club awarded the Collier prize for the year's greatest achievement in American aviation to Glenn H. Curtiss for the development of the hydro-aeroplane. A medal was awarded to Calbraith P. Rodgers for his successful transcontinental flight.

A complete copy of the regulations adopted by the Federation Aeronautique Internationale for the government of the 1912 race for the international cup has been received by the Aero Club of America, and it is learned that the course must conform for the the following:

1—The track must have a width not less than 100 meters on its entire extent and a perimeter of not less than 1500 meters.

2—The interior surface bound by the course as expressed in square meters must equal at least the product obtained by multiplying by 25 the perimeter of the track as expressed in meters.

3—There must be between the outer edge of the track and the space reserved for spectators a strip of neutral territory 30 meters in width. On this strip aeroplanes are not allowed to be moved unless when pushed by hand.

4—The surface of the track must be everywhere of such a nature that an automobile can be run over it.

Harold F. McCormick, president of the Aero Club of Illinois, which is trying to secure the meet for Chicago, has asked for an extension of time in which to secure a plot of ground conforming to these regulations. If he is successful, it is probable that the event will be held in that city during the last week in September.

It is announced that the cash awards accompanying the cup have all been made, and that it will be necessary for the winning city to offer a cash prize this year. Entries are expected now from Great Britain, France, Germany, Italy, Russia, Austria and Spain.

E. Percy Noel, secretary of the Aero Club of St. Louis, announces that a movement is under way looking toward an aerial tour of 600 miles, over the States of Illinois, Missouri and Indiana some time in June. The route will lie from St. Louis to Indianapolis, thence to Chicago and back to St. Louis. The tentative course calls for six daily stages with night stops at Champaign, Ill.; Indianapolis, Ind.; Logansport, Ind.; Chicago, Ill.; Bloomington, Ill., and St. Louis, Mo. Suitable prizes will be awarded.

British military authorities have been giving tests to a new "silent" aeroplane at Laffan's Plain, England. The machine is equipped with an eight-cylinder Wolseley engine, and it is said that when it was running it could not be heard at a distance of 50 yards. Another feature is its ability to start without the aid of assistants, the aviator, de Havilland, jumping into the seat and switching on the ignition. The machine arose from the ground within 10 seconds under this demonstration.

The third annual aviation meet at Los Angeles, Cal., during the latter part of January appears to have been no more of a success than previous events of this character. One fatality was recorded, that of Rutherford Page, who had secured his pilot's license only the day before the accident. He is said to have lost control of his biplane while attempting a turn at a height of 80 feet and jumped from the machine.

The programme was decidedly varied, including duration, altitude and speed events, with such added attractions as aerial man hunts, shooting at toy balloons, races between aeroplanes, motorcycles, automobiles, horse and man, etc. One feature was scheduled as an aerial wedding, in which the contracting parties were seated in a biplane while the minister performed the ceremony, to be followed by a short trip aloft, as individual passengers with an experienced aviator. It cannot be said that the meet added much to the sum total of aerial scientific knowledge.

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SELF-STARTERS FOR GASOLINE ENGINES.*

(By J. W. Fitzgerald.)

WITH the invention of the gas engine arose a very serious difficulty, that of starting it, and almost simultaneously with the advent of the first engines we find records of inventors and engineers at work on this problem. There was so much room, however, for improvements on the motors in earlier days, that most of the efforts were directed toward this end, and although many starting devices were made, they proved of little practical value. During the past 10 years the great improvement in gas engines and ignition devices has taken care of the question of easy starting to a great extent. Easily started motors, however, will not answer the requirements of the present day. The demand is for engines equipped with a device that will make them self-starting, and it is safe to say those not equipped with a device of this nature will be in slight demand.

The earlier starting devices are of little interest, as they were designed for engines long out of date. So we will take up the description of only such starting devices as are suitable for present day motors. An engine is started by putting a power fuel in the cylinders and igniting it. This can be done in two ways: By rotating the engine and causing it to supply and ignite a charge in the cylinders, or by igniting a charge in the cylinders independently of an engine movement. This at once puts starting devices in two classes; viz., mechanical and gas. A better term than gas starters is ignition starters, as all devices of this class depend on the ignition of the gas for their successful performance.

Mechanical Starters.

Under the heading of mechanical starters are included all devices that rotate the engine and cause it to perform its regular function of charging and igniting an explosive mixture in its cylinders. Motion is imparted to the engine in two ways: By the use of independent motors or by making a motor out of the gas engine. The chief requirement of this class of starters is capacity; that is, ability to rotate the motor a sufficient number of turns and at such speed as will force it to pick up its own gas and run, regardless of weather conditions and without the necessity of priming the engine. Independent motor devices consist of spring, air and electric motors.

Spring Motors.

Spring motors are being used on automobile and motor boat engines. Energy is supplied by the engine while in motion and stored in the springs. The motor is geared to the engine shaft and automatically thrown out of gear when the springs are fully wound. Means are provided for throwing them into gear and unlocking the springs when they are to be used. On account of weight and space requirements of modern engines, these motors are limited as to power and capacity, and therefore do not meet the main requirements of this class of starters. The application of this device is, as a rule, somewhat difficult and adds considerable weight to the engine, and in most instances makes cranking more difficult in case of a failure. They do possess, however, the good feature of being able to rotate an engine that has stopped on centre.

Air Motors.

Air motors are of two classes, those that impart a continuous motion to the engine and those that impart an intermittent motion. The first class is the better, as the continuous motion has the same advantage over the intermittent as spinning the engine has over a single pull. A continuous-motion air motor must have no dead centre point in itself, and must be able to be thrown in and out of gear. It is ordinarily used for storing its own power, compressed air. The intermittent motion air motor has not the necessary qualifications to entitle it to serious consideration, as it is well understood that it is absolutely necessary at times to spin an engine in order to start it.

A very serious problem, and one difficult of practical solution, concerns all classes of independent air motors, and also all air starters that make use of the engine as an air motor, and that is, the producing and storing of compressed air. Air pressure is obtained either by means of a pump or by the storage of burned gases resulting from the explosion in the engine. All methods of furnishing air by means of air pumps have a distinct advantage, in that the air furnished is clean and can be used for other purposes than starting, chiefly filling the tires. When air compressors are used, they may either be geared permanently to the engine or arranged to be thrown in and out of gear at the will of the operator. In case they are geared permanently to the engine they must be provided with an automatic valve for releasing air when a predetermined pressure is reached.

On account of the continuous load under which the pump works when it is geared to the engine, arrangements must be made for properly cooling it, and it also must be so well built as not to become noisy. Many pumps have been designed to fill these requirements, but as yet there is none that will stand up under the work for any considerable length of time. In fact, they have given so much trouble in practise that the idea of the permanently geared pump has been given up. There are cases on record where permanently geared pumps have been made to do the work satisfactorily, but they have required the greatest skill and the best of material in their construction, and have proven very expensive to build. Air compressors that can be thrown out of gear by the operator when an indicated pressure is reached, are being used with fair success only. There is a great objection on the part of the operator to watching a gauge until the maximum pressure is reached and then throwing it in when the pressure is low.

There is a type of air compressor peculiarly adapted to the gas engine, comprising only a cylinder with a differential piston, the pressure in the engine working on the larger diameter while the smaller end of the piston compresses free air. It is much simpler than the ordinary air compressor, having no crank or connecting rods, and if properly made can be operated without noise. It has, however, the very serious ob-

*Extract from a paper read before the January meeting of the Society of Automobile Engineers.

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jection of being directly dependent upon the engine pressure for the pressure that can be stored in the tank, and unfortunately maximum pressures can be obtained only when the gas engine is being worked under a full load.

A third device for obtaining pressure is a modified form of the ordinary check valve connected to the explosion chamber of one or more of the cylinders, which permits of a small portion of the exploded gases passing into the tank at each explosion. This device is open to the same objection as the differential pump as regards maximum pressures. Being directly dependent on the explosion pressures, it requires high explosion pressures for maximum tank pressures, and these are only obtainable, as in the case of the differential pump, when the engine is working under full power.

Conclusion as to Air Starters.

In conclusion, it would seem that most all classes of air starters require a great deal more mechanism than a good designer would care to attach to his engine, especially in view of the none-too-positive results. Some very good men are constantly at work on the problem of using air, and it is quite likely that a device very much simpler in every detail than any that has been built up to date will be brought out. There does not seem, however, any way to overcome the most serious trouble, viz., that of chilling the cylinder walls by the admission of the compressed air.

There is still left but one independent motor starter and that is the electric motor. Starters employing electricity as a power have been the last ones to enter the field, and unquestionably do go a long way toward answering all of the requirements of an ideal starting device. When properly made and kept in good condition they are capable of rotating the engine for a considerable period, in some cases as long as 20 or 30 minutes. Of course, no engine requires to be spun more than five or 10 seconds at the outside, if it is in running condition; but the enormous capacity of this device permits of innumerable starts without recharging the batteries. These devices further have a distinct advantage of being able to rotate an engine that has stopped on centre. To gain all of these advantages requires a great deal of complicated, heavy and expensive mechanism.

First, there must be a source of electrical supply; second, means for storing the supply, and, third, means for using the power to rotate the engine. The source of supply consists of a motor generator geared to the engine permanently. When the engine is running this motor generator is acting as a generator only, supplying electricity to the source of storage—the storage battery. On account of the varying speeds of the generator, due to the change in speed of the gas engine itself, it is necessary to have an electrical controlling mechanism for connecting and disconnecting the generator to the storage battery as the varying conditions may demand.

For instance, with the engine running at a low speed, the generator will not produce sufficient current to properly charge the battery and must be kept disconnected therefrom until it has attained a speed sufficient to generate a voltage that will overcome that of the battery. Many ingenious devices for controlling the charging and discharging of the batteries have been made, and, although they are necessarily instruments requiring very accurate adjustment and must be exceedingly sensitive, they seem to stand up under the exacting work to which they are subjected. If they are properly made and designed there is no reason why they should not perform their work without any serious trouble. The generator itself requires only good workmanship to last indefinitely.

Conclusion as to Electric Starters.

The combination of electric motor, controller, storage battery and the necessary gearing arrangement adds a great deal of weight to the engine equipment and all of the individual parts are expensive and complicated. But as long as everything is kept in running condition the device gives absolutely perfect satisfaction. An objection to this device would seem to be the difficulty of having repairs made in case of trouble. It is so complicated and so little known as yet that even a first class automobile man cannot make repairs on it. This could be eliminated to a great extent if it were possible to get the device generally adopted and establish a first class service arrangement.

Ignition Starters.

We are now down to the second class of starting devices, those that furnish an explosive mixture to the engine and put it in motion by exploding the mixture in the proper cylinders, performing the same function as the engine itself when running under its own gas. I call these devices "Ignition Starters," as they are all dependent on some part of the ignition system. Devices of this nature were among the very earliest used, some employing the same fuel for power as was used to run the engine, although the general tendency seemed to be to use a fuel that was more easily ignited. Today the successful devices are using but two fuels, gasoline and acetylene.

In starting an engine with an ignition starter all conditions are similar to those when starting the engine on the spark. "Starting on the spark" has become a popular term and means that the engine can be started by throwing on the switch, producing a spark and igniting the charge still left in the cylinder, thus starting the engine. In order to do this, it is necessary that the engine shall have stopped or be balanced in a normal position, which it will do if it is in good running condition, and that a good spark be produced when the switch is thrown on, and finally that there be an explosive mixture in the cylinders to be ignited. All engines will fulfill the first two conditions; it then becomes necessary for the starter to furnish the cylinders with an explosive mixture to be ignited.

Gasoline as Starting Medium.

The general procedure in devices using gasoline is to first form a gasoline vapor and then force it into the cylinders. All styles of carbureting devices have been used. The ones in general favor are in the form of a force feed carburetor. These devices consist of a pump for taking into their cylinders a definite amount of gasoline and air at each stroke, forming a fixed gasoline mixture which is then forced into the engine. A distributing or selecting device of some kind must be used in conjunction with the force feed carburetor. Distributors timed and operated by the engine similarly to those used with air starters give good service. They are usually constructed so as always to put two cylinders in communication with the gas supply when the engine is stopped in a normal position. The two cylinders thus put in communication with the source

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of explosive mixture are the firing and the compressing cylinders; these two having both their inlet and exhaust valves closed. This condition is common to both four and six-cylinder engines. Very simple distributing and selecting devices have been invented, particularly those that do not necessitate mechanical connection with the engine. It is obvious that it is not essential that any timing arrangement be followed, provided an explosive mixture is put in the firing and compression cylinders. It does not matter which one is charged first, or whether we charge only these two or all of the cylinders, as far as obtaining the start is concerned. Starters that inject and ignite a mixture in all of the cylinders have a very decided advantage over a device that only produces an explosion in the firing and compression cylinders.

Conclusion as to Gasoline Ignition Starters.

The failure of gasoline ignition starters can be charged to the operator in most cases, because good judgment is required on his part as to how much mixture to force into the engine. Gasoline has a very small range of explosibility, approximately from nine to 14; that is, a mixture of air and gasoline with less than nine per cent. of gasoline cannot be exploded, nor a mixture richer in gasoline than 14 per cent. This ratio can be maintained easily by the carbureting device, but it is affected greatly by the condition of the engine itself. When the engine is cold it can be charged with a mixture from the force feed carburetor and fired with little difficulty, but when it is fairly warmed up care must be used with the amount of mixture put into it. If too much of the mixture is put into the cylinder when it is warm it floods it. In other words, it makes the mixture too rich in gasoline, so much so that it will not ignite. This is due to the fact that an engine that is warm has, of necessity, been running and still retains a certain amount of gasoline in some state in its cylinders. Just how much is in the engine has to be guessed at by the operator, and it is a question of his judgment how much more he shall add in order to get a firing mixture. The ordinary driver will not, as a rule, have the patience, or take the time to experiment on this point, and consequently is not able to get the best of results from starting devices using gasoline as a fluid. The efficiency of these starters has been increased by the use of ether mixed with the gasoline, and also other chemicals tending to make the mixture more highly explosive and increase its range of explosibility. But this was found objectionable on account of the necessity of providing the additional fluid. Contrary to the general idea, gasoline of high specific gravity does not give as good results as the lower grades, due to its tendency to flood a hot engine much more easily.

Two Classes of Acetylene Starters.

There are two classes of acetylene starters: The one that charges the cylinders with acetylene through the intake manifold and the regular valve mechanism of the engine at the time that the engine is stopped; and the other, which charges the cylinders of the engine in some manner at the time a start is desired to be made. In the first class the gas tank is connected with the intake manifold by means of a small tube, in which is interposed a valve mechanism for connecting the gas supply to the manifold. In one of the earliest devices of this kind the operation of the valve mechanism simultaneously short circuited the magneto, thus causing the gas to flow into the manifold at the time that the engine started to stop. It was found that this device wasted a great deal of gas, because the motor continued to run for 15 or 20 revolutions after the ignition system was disconnected, meanwhile taking in and exhausting the acetylene gas through the muffler. This device was later very much improved by a valve mechanism which opened and admitted gas to the cylinders during the last two or three revolutions only. This was accomplished by means of a valve which was operated by the suction through the intake, only when the speed of the engine was so low as to produce the proper lift of the valve.

First Class Not Satisfactory.

It must be said of this class of starters that they are certainly extremely simple, but they do not prove satisfactory in practice. Acetylene gas has a very wide range of explosibility, but it is necessary to get an approximately proper mixture of acetylene and air into the engine in order to furnish sufficient power to rotate it. The class of starters just described, known as suction starters, delivers a variable amount of gas, dependent upon the tank pressure. This amount can be varied to suit the fall of pressure in the tank by means of a regulating valve, but this requires considerable judgment and experimenting on the part of the operator.

Second Class of Ignition Starters.

The second class of ignition starters consists of those which charge all of the cylinders of the engine at the time a start is desired. This is accomplished by various kinds of valve mechanisms, which make a connection between the tank and each cylinder, generally through one of the priming cup openings or an opening tapped in the valve cap. They are subdivided into two classes, known as high-pressure and low-pressure systems.

Low-Pressure Systems.

With the low pressure systems some sort of a reducing valve is used to reduce the tank pressure of 260 pounds maximum down to a few ounces. In connection with the regulating valve it is then necessary to use some device in the form of a pump for forcing the gas into the cylinders. The pressure of three or four ounces is not sufficient to cause the gas to flow into the engine, as it will not overcome the resistance of the small tubing and the check valves used; and at times it must pass in against the engine compression. The basis of these starters is a reducing valve which is attached directly to the outlet of the tank and consists of a flexible diaphragm which is acted upon by the tank pressure and movement of which works the needle point valve which in turn controls the gas supply. This gas supply is then conducted by means of a small tube to the device for charging the cylinders.

High-Pressure Starters.

The other division of this class is known as high-pressure starters, because they depend upon the pressure of the gas in the tank being sufficient to carry it into the cylinders. No reducing valve is used with these starters, but the amount of gas admitted is controlled by a regulating valve. The variation in tank pressure will vary the amount of gas admitted to the cylinders, but this is taken care of by the operator, as he is able to control the amount of gas admitted by the speed with which he operates the charging mechanism, or by the number of times that he operates it.

All pressure starters have advantages over suction

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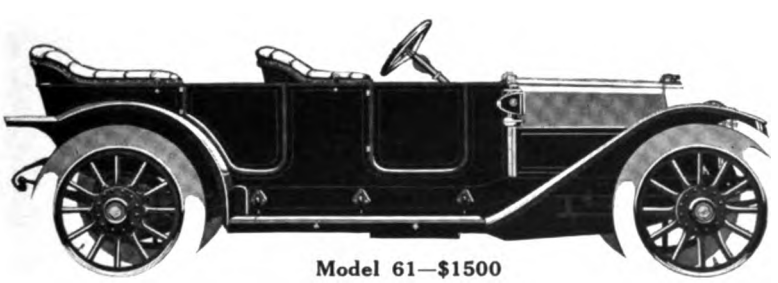
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starters. First, they are able to put the gas in the cylinders at the moment it is desired to use the starter and to put it in all of the cylinders and obtain results from all of them; and, second, they are able to repeat the operation as many times as may be desired; that is, if the engine should not start with the first operation which causes four explosions in the cylinders, the same operation can be repeated indefinitely.

Advantages of Ignition Starters.

The advantages of ignition starters are in general, extreme simplicity, lightness and ease of application and operation. Their main and distinguishing advantage is their ability to warm the walls of the cylinders when the explosion takes place, so that the incoming mixture from the carburetor is warmed and kept in a gaseous state by the heat imparted to the cylinder walls from the explosion of the acetylene mixture. With a very cold engine it is possible to spin it rapidly for 50 to 60 turns without getting any results, because the engine is too cold to hold the gasoline vapor in a gaseous state after it comes from the carburetor. The same motor started by means of an acetylene starter, will often fire its charge on the first few turns due to the warming effect of the starter.

Ed. Note—It has seemed to the Automobile Journal that the subject discussed by Mr. Fitzgerald is particularly timely, although it will be admitted there is opportunity for a difference of opinion. Other articles along similar lines are invited from those who may have reached other conclusions.

KNIGHT ON LECTURING TOUR.

Charles Y. Knight, the inventor of the sleeve valve motor bearing his name, is touring the country lecturing upon his invention. Upon the close of the New York shows he visited Cleveland, Detroit, Philadelphia, Chicago, Minneapolis, Denver and St. Louis, and returned to Chicago in time to witness the show in that city. Additional lectures will be given later.

FLANDERS BECOMES MOTOR SLEIGH.

Many automobilists have taken advantage of the continued cold weather to indulge in spins upon frozen rivers and lakes while others have converted their motor cars into motor sleighs and enjoyed long rides over the roads. Many ingenious methods are noted but the most novel is the design constructed by Frank B. Willis of Indianapolis, Ind., which is presented in an accompanying illustration.

He began his experiments with his 20 horsepower Flanders, made by the Studebaker Corporation, Detroit, by equipping the front axle with runners, and with this arrangement found that he had so much reserve speed and power that he concluded to enlarge the carrying capacity of the car. He obtained an extra Flanders body of the suburban type with front axle attached and joined it to the back of the first automobile. The auxiliary vehicle was fitted with runners at the rear and these were controlled by means of a steering device operated by the usual wheel. The arrangement increased the carrying capacity by five persons although the motor sled has carried as many as 20.



Novel Form of Motor Sleigh Designed by Frank B. Willis and Fitted to Flanders "20" Car—The Rear Vehicle Is Equipped with Runners and Controlled by a Steering Device Permitting of High Speed on Curves.

Considerable speed is developed, it being stated that 40 miles an hour is obtained easily. So successful was the device that Mr. Willis took a party of friends to the Chicago show, where the design attracted considerable attention. He calls the sled "The Skeeter," and owing to the fact that the rear vehicle can be steered makes high speed around the corners of city streets.

BOSCH LED AT AEROPLANE SHOW.

At the recent Paris aerial salon 48 of the 51 machines displayed were fitted with Bosch magnetos, made by the Bosch Magneto Company. One Nilmelior and two Nieuports were the equipment of the other designs. Naturally the company is very much gratified with the showing made by its product.

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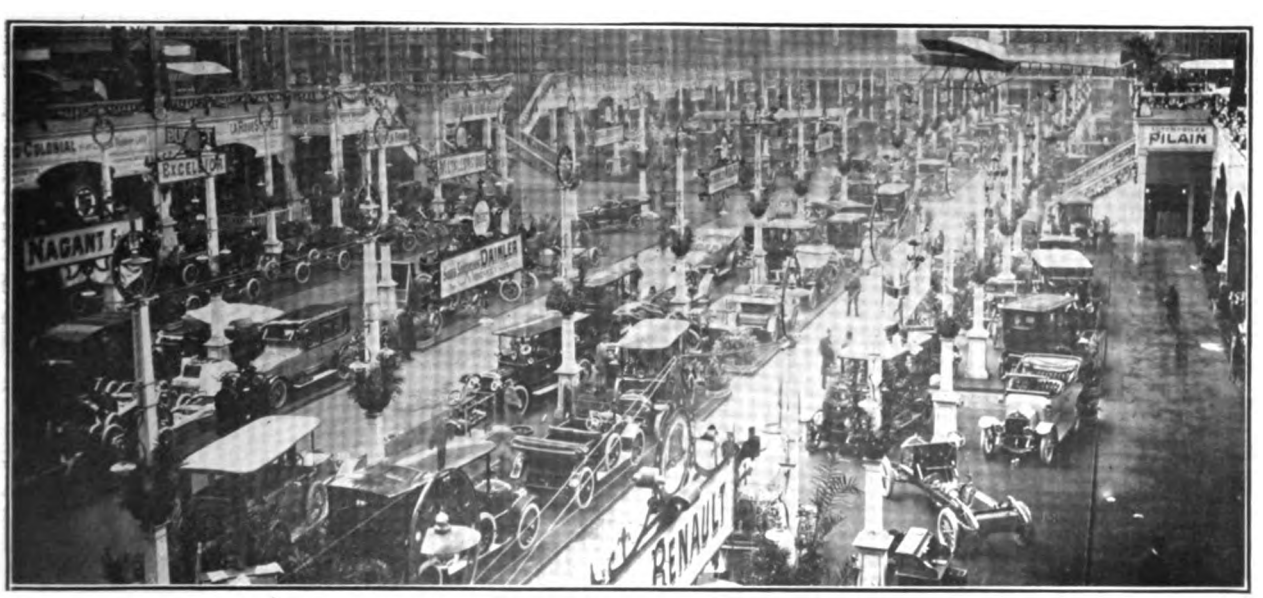
While the annual automobile show in Brussels, Belgium, fails to attract the attention that has surrounded the displays at the Paris Salon and the Olympia show in London, the exhibition held last month was of more than usual interest. Very few new pleasure cars were seen, having in mind the recent show at Olympia, and most of these were of Continental make, although America was represented by the Ford. Rich body designs, for which the Continent, and particularly Belgium, is so famed, were very much in evidence, and some of the coachwork on display appeared to be the result of a strenuous attempt to bring out something distinctly new. Americans would call these extremely freakish. However, it must not be understood that the general impression was anything other than that of a determined effort to produce artistic effects.

The display was a combination of pleasure and commercial automobiles, and aeroplanes, the latter being well represented. Perhaps the most interest attaches to the display of industrial transports, especially as Belgium has been turning its attention toward this branch of the industry with increasing vigor during the past two years. A number of new Belgian firms have been organized for the purpose of manufacturing motor trucks, and some of these made display for the first time. Among these may be mentioned Albert Bory of Brussels, Robinson & Co. of Antwerp, the Auto-Mixte Company of Liege, and the Preudhomme-Prion Works of Huy.

It may be pointed out in this connection that Belgium seems to offer a splendid market for all types of commercial motor vehicles. Since the international road congress of 1909, the government has been engaged in a systematic campaign for the improvement of highways, and in many localities business houses have adopted motor transports to the exclusion of horse drawn equipment. Still others are said to be on the verge of following their example. The question appears to be one simply of supplying the vehicles which will meet the requirements best.

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Thirty-nine cars were entered for the annual winter trials of the Royal Automobile Club of Sweden, Feb. 2-4. While the route was the same as that of others years, it covered twice the distance, being from



General View of the Main Floor During the Progress of the Recent Automobile and Aeroplane Exhibit at Brussels, Belgium.

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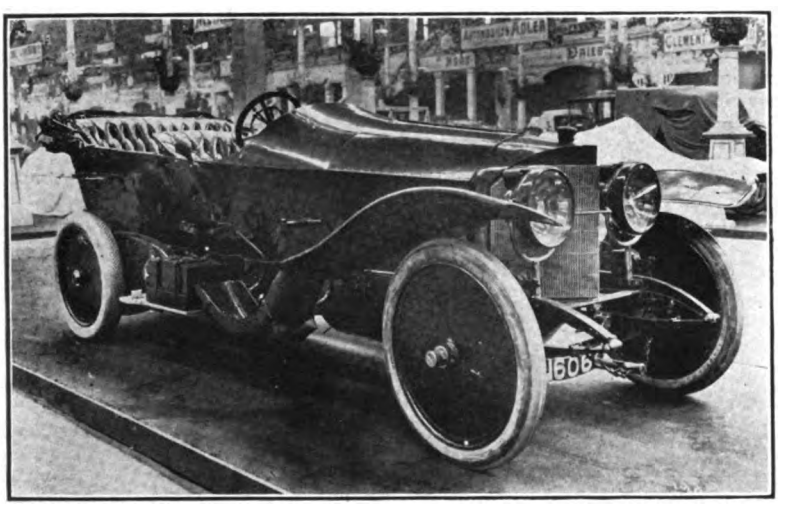
Stockholm to Gothenburg and return, about 600 miles. There were two classes, one without limitation as to price or power and the other limited to cars selling for 6000 krona ($1608) or less.

In the first class, the award is the Winter cup, won last year by the German car, Minerva. Second place went to the American, Cadillac. This year there were 27 entries, of which the American representatives were a 32 horsepower Cadillac and a 36 horsepower Maxwell. The others were divided as to countries as follows: Germany, 13; England, three; France, three; Belgium, three, Sweden, two, and Italy, one.

In the second class, the prize is the Gothenburg cup, won last year by the German car, Piccolo. An American, Ford, finished in second place. This year there were 12 entries, six representing America, and all of 20 horsepower. These were: Four Fords, a Buick and an Overland. The other countries represented were: Germany, two; England, two; France and Belgium, one each.

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The holding of the 1912 Grand Prix race in France is now an assured fact. Forty-eight cars have been entered for this event, and 26 for the L'Auto cup race, which will be held at the same time, over the same course, but for cars of smaller horsepower, and for a shorter distance.



Latest Type of Mercedes Car with Pointed Radiator and Disc Wheels.

Those makes which have entered for the longer event are as follows: Four Lorraine-Dietrich, two Peugeot, two Lion-Peugeot, four Darracq, four Gregoire, four Sunbeam, two Singer, one Mathis, three Vauxhall, three Alcyon, one Ford, three Vinot et Deguingand, three Sizaire et Naulin, three Arrol-Johnston, three Calthorpe, two Th. Schneider, one Excelsior, one Koechlin and two Cote.

For the smaller car event the following makes are entered: Two Lion-Peugeot, one Darracq, four Sunbeam, two Singer, three Alcyon, three Vinot et Deguingand, three Sizaire et Naudin, three Calthorpe, two Th. Schneider, one Koechlin and two Cote.

★

The fact that American automobile manufacturers are able to sell their products on the Continent at a price much below that at which local makers feel called upon to ask, has occasioned some little discussion among the heads of the industry in France. M. Clement has been commissioned by these manufacturers to visit this country in an effort to determine the reason for this condition.

★

The postal authorities of Coventry, England, have decided to replace the horse drawn vehicle utilized in an exceptionally severe rural service covering a distance of 40 miles, by a motorcycle and side car attachment, the latter comprising a hamper for carrying letters and parcels.

★

Although from the standpoint of features which had not been exhibited elsewhere, the annual Scottish automobile show in Glasgow in January, presented nothing new, it was of interest principally because it gave the people of Scotland their only opportunity to inspect the various 1912 offerings in an organized exhibit. It should be remarked that the holding of the display in Glasgow was a new departure, inasmuch as the Scottish Automobile Club, under whose auspices the event was arranged, always has staged the exhibits in Waverley Market, Edinburgh, in the past.

America was well represented, there being six makes shown by Scottish agencies. Of course, no British display would be complete without the White, which has gained an enviable reputation in Great Britain. The Ford also is an old name at Scottish shows. The Mitchell was displayed by five models, the Flanders by three and the E-M-F by two. The Bedford appears to be the English name for the Buick, and is produced in the Bedford works of the General Motors Company.

★

The Austrian military budget for 1912 includes an item for supplying the entire Austrian army with automobiles as a means of transport. Inasmuch as there are 12 army corps of the Austrian-Hungary forces, it is easy to be seen that this item is of no small moment. Tests during the past year have convinced the officials that the most practical vehicle for the service required, taking into consideration the condition of the roads and bridges over which they must travel, is that of the two tons capacity. It is expected that the forthcoming bids will call for trucks of that size.

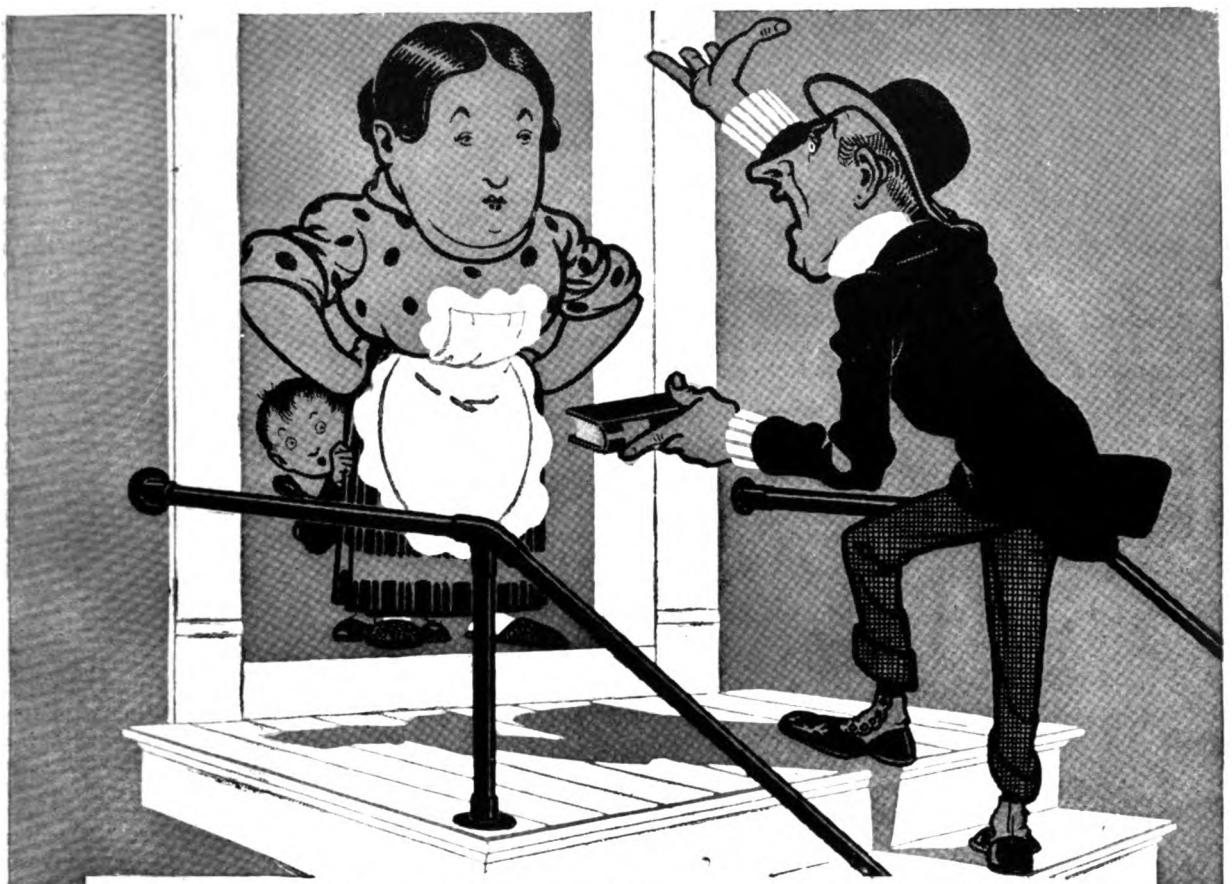
★

A business man in India has informed the American consulate that he is organizing a company for the operation of a freight and passenger service by means of steam wagons. Each wagon must not exceed three tons in capacity; weight 2.5 tons; width of tires, seven inches; length of wagon, 16 feet, out of which 4.5 feet are reserved for engine and driver's seat; width of wagon, five feet; height from ground, 2.25 feet; speed, 12 to 15 miles an hour. About 12 wagons with trailers are required.

★

The Imperial household department of Japan is said to be about to place orders with three large automobile concerns in England, Germany and Italy, for

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We Don't Know How to Get More Than Our Goods are Worth

We don't *over-pay* when we buy and we don't *over-charge* when we sell.

We have always credited the *other man* with just as much common sense and just as much commercial judgment as we possess.

We had a *business* training before we had a *speedometer* training and it taught us that the way to make a *lot of money* is to make a *lot of goods* and a *very little* on each sale.

So we aimed at *output* from the very outset.

We built a *factory* that would give us output.

We believed that the automobile business would *grow* and that there was no *risk* in planning to grow with it.

We installed the *finest* machinery that money could buy, and when we could not find it good enough we had it made special.

We calculated that the day would come when speedometers would *have* to be *sold* at a *normal margin*. and when we found the exorbitant profits that were being charged, we figured that the time to start figuring down to bedrock was the *first day* that we went out for orders.



That's why *four cars* out of five carry *Stewart Speedometers*. Eighty per cent of car owners are so level-headed that they make sure they are getting the utmost for their money.

If the *Stewart* were not more accurate—were not built *stronger*, were not more *reliable*—somebody else would be selling *four* speedometers to our one.

There's no *test* like the test of *sales*.

Magnetic principle—jewel bearings—wearing parts hardened and polished—open dial—large figures—easily read—absolutely accurate—100,000-mile season odometer—100-mile trip register, can be reset to any tenth of a mile—guaranteed for five years—strongest flexible shaft drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB"

Stewart & Clark Manufacturing Company

1926 Diversey Boulevard, Chicago, U. S. A.

Speedometers, $15 to $30
Clock combinations, $45 to $70

Detroit, Cleveland, San Francisco, Philadelphia, New York, Minneapolis, Los Angeles, Indianapolis, Chicago, Kansas City, London, Paris

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nine vehicles of 40 to 50 horsepower, which are to be placed at the disposal of imperial guests from abroad.

★

The biscuit and chocolate concern of Beukelaer, Society Anonyme, Antwerp, Belgium, announces that it is in the market for the purchase of four open automobile trucks for the transportation of its goods. The platforms of these vehicles should be of the same height as the platforms of railway cars, and manufacturers are invited to submit specifications with their proposals.

★

Those who contemplate touring in Bavaria will be interested in the following information concerning the levying of tolls: Townships are authorized by law to levy a toll for the use of the roads belonging to them, and even to lease this right to a third person. The amount varies from 2.5 to 19 cents, and usually is levied both going and returning.

Because of the large number of townships, toll is levied on an average of six times in 25 miles. In many cases the charge is unreasonable, because the roads are very poor. Motorists are compelled to stop every little while to pay these few cents and wait for change, and heavy fines are imposed for failure to stop.

Most automobile maps published in Germany underline the towns where toll is levied, in red, and many clubs print special lists of such localities and advise their members to avoid them so far as possible.

★

A new headlight has been brought out by a firm in Bradford, England, and has been named the Diva, because of its similarity to a diver's headdress. It is announced that its use may be extended to include an application to signalling searchlights for the army and navy. It is spherical in shape and divided in halves, vertically. The front portion has a double convex lens in the centre, while the rear portion has four similar lenses, at the top, bottom and either side. The interior is nickel plated, and for illuminating purposes electricity is employed.

A bulb is placed in the exact centre of the sphere and the rays from the four back lenses are directed onto four circular mirrors, focused so as to obtain the maximum of light at an angle to throw the beams forward in a straight line parallel with that of the front lens, or otherwise as desired. The lamp is held in position by a special hinged gate or frame in front of the radiator.

The special advantages claimed are: That five times more light can be obtained from any given alignment; there is no glare as the driver approaches and draws to one side to pass; economy of upkeep, owing to there being only one electric light bulb of small power, and the exceptional penetrative power for driving through fog.

★

A report from an American consular office in Spain indicates that as the popularity of the automobile increases in that country, the buyers are being recruited more and more from the ranks of those whose incomes are moderate. The limousine and landaulet are the types most favored, and a reasonably low priced machine of either class would meet with a ready sale. Because American made cars are sold at prices under those obtained by Continental makers, there has been a growing tendency to purchase them, and the consular agent appears to be of the opinion that Spain will offer a splendid market in the near future.

★

According to the Brazilian Review, Rio de Janeiro, Brazil, a special committee of the Brazilian Chamber of Deputies has been studying the rubber question with a view to suggesting what measures should be taken to avert what appears to be an impending disaster. The conclusions of the committee take the form of a bill to be laid before Congress, the main lines of which are as follows:

Exemption from import duty on all utensils and material to be used in the extraction of seringa, caucho, manicoba and mangabeira. The provision of prizes for persons establishing new plantations of the above mentioned rubber trees. The founding of experimental and demonstration farms for the growing of seringa rubber in the Acre territory and in the States of Matto Grosso, Amanazonas, Para, Maranhao, Piauhy and Bahia, and of manicoba and mangabeira in Piauhy, Ceara, Rio Grande de Norte, Pernambuco, Bahaia, Minos Geraes, Sao Paulo, Goyaz, Parana and Matto Grosso.

FEDERAL AID HIGHWAY CONVENTION.

The good roads federal aid convention called by the American Automobile Association in Washington, D. C., recently placed itself on record as favoring the passage of a bill creating a national highways commission to consist of a chairman and 15 members, appointed by the President and Congress. The purpose of the commission is to be the study and investigation of the good roads problem from the viewpoint of the federal government's position, to prepare a plan for government participation, and to report its findings to the President not later than Dec. 1, 1913. The representation at the convention was extremely diversified, 38 states being represented, including 115 delegates named by governors of 23 commonwealths.

E-M-F GETS TIEDEMAN TROPHY.

During the progress of the first week's show at the Madison Square Garden the Tiedeman trophy, won by Frank Witt in an E-M-F car, made by the E-M-F Company, Detroit, during the Savannah meet of Thanksgiving week, was presented to Mr. Witt by Fred Wagner, official starter of the American Automobile Association. The cup was placed in the E-M-F space at the display. It will be remembered that the three E-M-F cars entered in this event finished with place, the first time in the history of American automobile racing that this result has been noted.

NEW FERRY FOR MOTORISTS.

April 1 the new automobile ferry of the Twin City Ferry Company across the East river, between Clason Point park in the Bronx and College Point, Long Island, will be open to the public. There has been an increasing demand for a ferry here, owing to the large number of automobilists who utilize Long Island's roads and those of the motor parkway. At present there is none between 92nd street and Rye. The new one will be operated the entire year.

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RELATION OF MAGNETO TO ENGINE DESIGN. *

(By F. E. Moskovics.)

THE magneto manufacturer has had considerable annoyance to combat in the past, due to the fact that many engineers have not given sufficient thought to the correct disposition of the magnetos in their original designs. Some of this is adjusting itself automatically with the advent of the long-stroke motor, because inlet and exhaust manifolds are considerably higher than previously. But there still remains considerable room for work in this direction. These points, if considered in the first stages of motor design, will necessitate practically no additional work or cost and will certainly be of advantage to the user and in many cases to both the car and magneto manufacturer.

In considering the magneto in its relation to engine design, it might be well to make five classifications, as follows: First, there is the consideration of the proper location of the magneto, so that it will be free from excessive dirt, grit, water, oil, heat and other engine discharges; second, to so locate that the main parts of the magneto are accessible and visible, also not to obstruct or interfere with the accessibility of adjacent engine parts; third, accurate means of alignment with the driving mechanism—to eliminate undue wear on the universal joints, which in turn results in other disastrous strains, such as end thrust in the armature shaft, etc.; fourth, to so locate spark advance levers that they will operate freely and smoothly, giving full advance and retard without undue strains being set up; fifth, proper wiring of both primary and secondary and location of coils.

Location of Magneto.

Under the first head precaution should be taken that the magneto be so located that water or oil connections that might in time become leaky should not be close enough to cause trouble. Protection from the usual oil discharges from valve tappets and gear drive should be given. The enclosing of valve mechanism is curing much of this evil.

Care should be taken that the exhaust manifold is sufficiently clear of the distributor parts to absolutely insure their not being affected by that heat. Some magneto manufacturers are using a form of fire-proof distributor for that very reason, such as bakelite.

In motor layouts where the carburetor is on the same side as the magneto it is often situated dangerously near the magneto circuit breaker and the distributor. This practice is to be deplored for many reasons. The carburetor flooding directly on the magneto or allowing waste gasoline to collect near the sparking apparatus is frequently the cause of dangerous fires. This is especially the case with web-supported crankcase arms. It must always be borne in mind that most magnetos are supplied with an exposed safety gap which if surrounded by a combustible mixture will immediately cause fire.

Accessibility.

Under the second head the writer would strongly urge that great care be taken by the engineer that the parts necessary to properly time the motor be easily accessible without the necessity of any unusual acrobatics on the part of the operator. This refers especially to the universal joint and the breaker box. Forms of joints which allow variable and positive means of setting are strongly recommended, and if accompanied with explicit instructions for timing will avoid the usual demounting of the gear covers to shift those usually inaccessible parts. It is also urged that in those motors where the magneto and carburetor are on the same side, sufficient room be allowed to make easy the examination of the platinum points in the breaker box without the use of mirrors and other makeshift methods.

On some cars the magnetos are placed so low that it is impossible to get at these essential parts without the removal of the sodpan. In many instances, to properly inspect the magneto it is necessary to entirely remove it; and in such cases the car owner has been compelled to pay for many makeshift and improper adjustments or for the time expended in removing and again setting the magneto. If properly placed the adjustment would have been made quickly and easily by himself. It is therefore strongly recommended that the magneto drive be on the same plane horizontally as the crankshaft and if possible even higher, which will, of course, bring the breaker box into full view.

Alignment of Driving Mechanism.

Under the third head we come to probably one of the most prolific sources of trouble, due to either improperly designed joints or improper machining of the magneto base, or both. To this is due largely the noise in the magneto and magneto gears, also the eventual breaking down of the bearings supporting the armature shaft, especially in ball bearing magnetos. The ordinary type of Oldham coupling in which the female member has become worn tends to create end thrust in the magneto bearings which they were never designed to absorb. So great care should be taken in machining the magneto base plate to the exact height and then furnishing rigid means of securing the magneto and seeing that the joint used is one that under a little wear will not tend to create undue end thrust. The writer would strongly urge that all universal joint parts be carefully hardened and that the material used be one which will take a good coat of case hardening.

General Design of Base.

Under this head it might be well to call attention to the general base design. Manufacturers employing cast iron crankcases are strongly urged to make the magneto base up separately from the engine base and use a non-magnetic metal in its construction. Experiments have shown that with certain magnetos the use of a magnetic metal in the engine base has caused a loss of as much as seven per cent. in the magnetic flux, which in turn affects the total efficiency of the magneto and more glaringly in slow speed operation. The base should be designed to be rigidly supported and properly webbed to avoid vibration.

Locating Spark Advance Levers.

The fourth consideration is purely a case of mechanics. Many designers leave this matter in the hands of inexperienced men, with the result that the breaker box is often subjected to strains for which it

*Extract from a paper read before the January meeting of the Society of Automobile Engineers.

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was not intended. Levers are often inadequate for the work in hand; proper regard is not paid to the levers, and often only a small part of the quadrant is used, and owing to an entire disregard of the law of the lever it is a matter of some inconvenience to advance and retard the breaker box.

Particular attention should be paid to the method of rotating the cam house, for if the force is not applied in approximately the same plane as the cam house bearings, there is a decided tendency toward undue sticking and consequent wear. In order to avoid cramping and stiff working of the control mechanism properly designed cranks and clevises, and ball knuckle joints are advised. If possible the control mechanism should be so arranged as to be easily taken down. Split pins are very easy to put in but often difficult to get out.

Wiring Location.

Too little attention has been paid to the extremely important matter of wiring. On the modern car the high-tension circuits are usually well placed, due to the fact that trouble in them is so self-evident and develops so early. The art has progressed to such a point that probably any suggestions on the disposition of the secondary wiring would be superfluous. But it is to be urged that it is equally important to carefully segregate and insulate the primary wiring if for no other reason than the fact that it takes a long time for them to give trouble, but when they do it is one of the most annoying things to locate in the motor car. They should be located in such position that they will be free from oil and gasoline drippings and the heat of the exhaust manifold and that vibration of different parts will not tend to chafe or wear them. It is also suggested that where the primary wires leave a rigid part, such as the dash, a sufficient length should be left slightly coiled to fully compensate for any motion between these parts.

With the advent of the acetylene and other starting devices of the internal combustion type the matter of the location of the secondary coil again becomes a subject of some import. Practically all ignition manufacturers supply weatherproof coils, but all are not heat or oil proof. Therefore, it is suggested that it would be good practise to so locate the coil that the heat of the motor will not affect it any more than is absolutely necessary and also that it be free from the oils, water, gasoline and other engine discharges. This will add considerably to the life of the ignition system.

Conclusion.

In closing it is safe to say that the magneto has arrived at a very high state of perfection, due mainly to careful specialization. Considering the work in hand, the instrument gives but little trouble and with the few points indicated, carefully watched the lot of the car owner will be made perhaps a little easier and the instrument itself will repay in longer life the slight expenditure of time necessary to accomplish these things. The manufacturer also will be well repaid now that car upkeep has become a considerable factor in his sales arguments. Many motors seem to be very carefully designed in all details except the magneto, which when installed appears entirely as an afterthought. Now that the magneto has become a permanent part of the motor it is felt that with these few suggestions the magneto manufacturer and the automobile manufacturer probably can work to a little better purpose and in combining their efforts work towards making the lot of the owner and repairman somewhat less complex.

GAGE WILL SELL COLES.

The Grand Central Palace show in New York City proved too much for the determination of William M. Gage, for the past year manager of the United States Hotel at Saratoga, N. Y., to retire permanently from the automobile business. For 12 years he was engaged in the sale of Mercedes and White cars, but he announced his retirement early in 1911. During the show above mentioned William L. Colt; president of the Colt-Stratton Company, of New York City, eastern distributor for Cole cars, made by the Cole Motor Car Company, Indianapolis, Ind., offered him the position of sales manager in his company, and the offer was taken at once.

STEWART & CLARK MAKES COMPLAINT.

The Stewart & Clark Manufacturing Company, Chicago, has entered a complaint with the Interstate Commerce Commission at Washington, D. C., stating that the rate on speedometer equipment from Chicago to San Francisco and Los Angeles, Cal., is too high. At present first class rates prevail and the Chicago concern asks that a classification be made upon the material to include flexible brass tubing, sprockets, clamps and all metal parts except speedometer heads, as third class.

SYRACUSE CLUB ELECTS OFFICERS.

At the annual election of officers of the Automobile Club of Syracuse, N. Y., held recently, Hurlbut W. Smith was re-elected president for the 11th consecutive term. Other officials chosen were: First vice president, H. W. Chapin; second vice president, Alexander W. Chapin; secretary-treasurer, Forman Wilkinson; directors, E. L. Pierce, W. L. Brown, J. H. Valentine, J. C. DeLong and Dr. A. D. Babcock. Resolutions were passed requesting the state department of highways to complete several roads started. The club intends to post many signs during the coming season.

HARTFORD CLUB SEEKS NEW ROOMS.

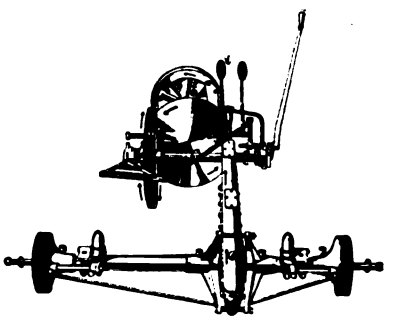
Included in the business transacted at the annual meeting of the Hartford Automobile Club, Hartford, Conn., was the appointment of a committee to seek new quarters and the decision of the members to remain in the state association. The election of officers for the ensuing year resulted as follows: President, Col. Louis R. Cheney; vice president, Hiram Percy Maxim; secretary, William T. Plimpton; treasurer, Albert M. Kohn. Committee chairmen: House and entertainment committee, John G. Hawley; membership, Frank J. Knox; contest, S. A. Miner; rights and privileges, W. S. Schutz; good roads and signs, Willard A. Rice.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

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No Gears!

Notice this transmission of the Cartercar carefully. You will see that it has absolutely no gears of any kind whatever. No matter how well gear transmissions are made they will strip—and howl. There are just two unit parts to the Cartercar Transmission—affording the maximum durability, silence and efficiency.



Cartercar

The Friction Disc running against the fibre faced wheel gives any number of speeds—all controlled with one lever.

This adapts the Cartercar to crowded streets. It will also go through any possible roadway. The tremendous leverage provided by this transmission at low speeds will take this car up a 50% grade and through sandy and muddy roads where a gear transmission would probably be stripped.

With such simple, easy control a boy or lady can drive a Cartercar as well as a man. The control is made more complete by three independent systems of brakes.

Every detail of the construction of the Cartercar is in keeping with the most advanced ideas of motor car building.

Chain-in-oil drive, full floating rear axle, three-quarter elliptic rear springs, long wheel base, large wheels and attractive design combine with the friction transmission to make the Cartercar the most pleasing car from every standpoint.

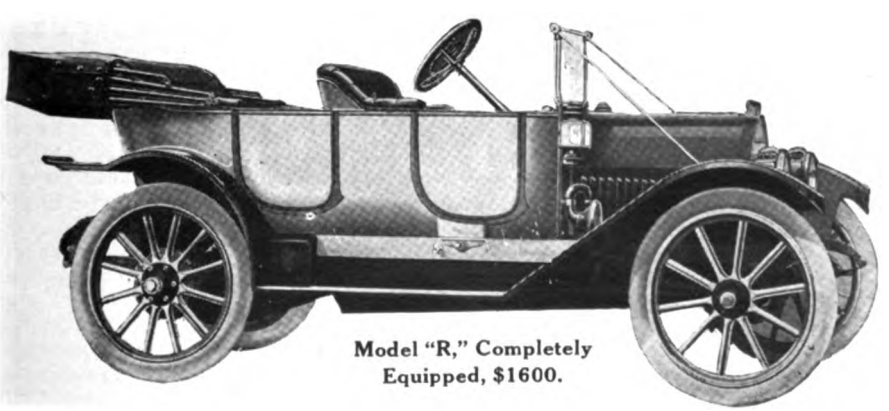
In winter and summer your Cartercar is always ready—no matter whether you wish to take a pleasant little drive or a long, hard run.

Equipment includes self starter, gas tank, top, top cover, speedometer, full lamp outfit, demountable rims, trunk rack, tools, robe rail, tonneau mat, etc.

If you want a car that will give you the utmost in service and enjoyment—that is adapted to all road conditions—and is easy for any one to drive—then you should know about the Cartercar. Let us send you complete catalogue.

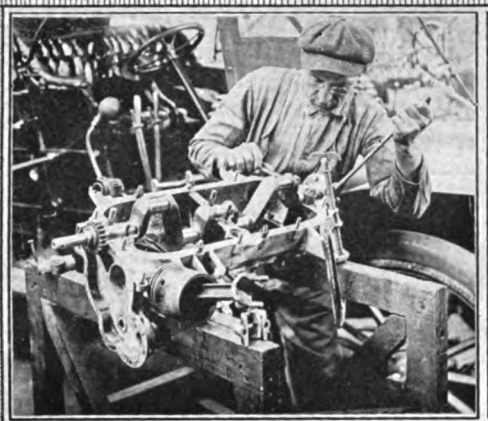
CARTERCAR COMPANY

PONTIAC, MICHIGAN.



Model "R," Completely Equipped, $1600.

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

HOT AIR FOR THE CARBURETOR.

Carburetion is an important factor in the proper operation of the hydrocarbon motor and the subject is being given more serious attention by the makers of the vaporizer than formerly when a higher grade of gasoline was marketed. While it is admitted that the present fuel is productive of more power, it is slower to vaporize and starting is consequently more difficult.

This is especially true in cold weather, and during

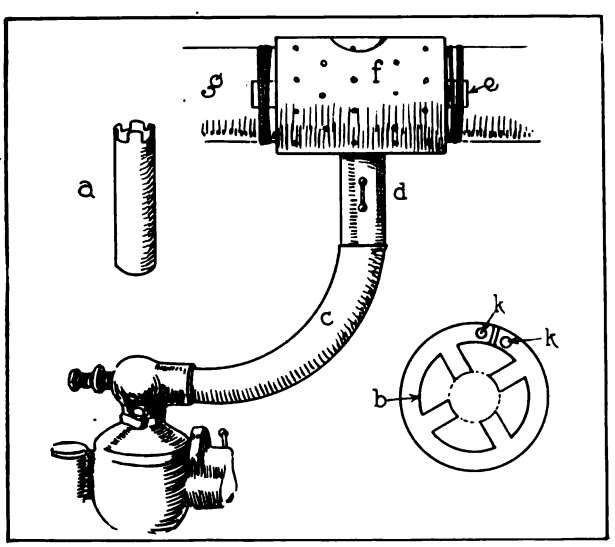


Fig. 1—Device for Supplying the Carburetor with Hot Air from the Exhaust Pipe or Manifold.

the past year there has been a growing tendency among automobile manufacturers to equip their product with a water jacketed carburetor. Others utilize warm air from the exhaust. Both systems make toward the same end, that of facilitating the vaporization of the fuel. The advantages of warming the mixing chamber are many. Not only is a better mixture maintained but a greater economy of gasoline is effected, both desirable features.

Although the majority of the new machines are fitted with devices for warming the carburetor there are many older cars which are not thus equipped, nor are they provided with a pan. Under the latter conditions the carburetor is drawing in cold air and foreign elements, both of which contribute toward trouble, and even in the summer the vaporizer should be protected. That more or less dirt is drawn in through the intake pipe was demonstrated by an analysis of the deposit on a piston head of a car which was not fitted with a pan. It was shown that a large percentage of the material was road matter.

It is a simple matter to fit a hot air device to a carburetor and at Fig. 1 is presented an inexpensive and easily made attachment which consists of a piece of rubber hose, an ordinary can and two pieces of wire. In selecting the can, one should be obtained that has not been opened by the usual methods as both ends are necessary in making the device. It is an easy matter to select one of the proper size and to empty its contents by cutting a small hole in the centre of one end.

A circle is then scribed on each end, this being of the same diameter as the exhaust pipe or manifold, depending upon which member is to be employed. Another circle is then marked, as indicated at b and with a pair of tin snips the metal is cut as illustrated, leaving four small ends. These are bent outward as shown at e.

A metal tube d, which will fit snugly into a piece of rubber hose, is cut at one end, as depicted at a and passed through the can, the ends of the pipe being bent over and riveted. If the large part be placed on the exhaust manifold it will be necessary to split the former to attach it.

The device is then passed over, or sprung open and placed on the exhaust member and drawn together by wire through the openings kk. The part f is then fastened securely to the exhaust pipe by wiring the extensions as shown at e.

The rubber tubing c should be clean and its walls sufficiently thick to prevent kinking. Garden hose of the wired type is preferable. One end of the pipe is slipped over the tube leading from the heating device and the other passed over the air intake of the carburetor.

A number of holes may be drilled in the heater to correspond to the opening of the vaporizer, or a small circle cut of the same diameter. The device

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may be improved further by fitting a shutter through which the quantity of air admitted from the outside may be regulated. A butterfly valve also could be installed as shown at d to facilitate starting if the carburetor be not equipped with a similar device.

After attaching the heater the air inlet of the carburetor may require readjusting but this should not be attempted until after the motor has become warm. The apertures or shutter may be regulated until satisfactory results are obtained. In addition to facilitating carburetion the device will prevent dirt and mud being drawn into the carburetor.

FITTING A CLUTCH STOP.

It is not uncommon to note that some operators in changing gears cannot make the shift without the movements being attended by a more or less grinding noise. The designer of the modern automobile has overcome many of the gear changing troubles and if the operation be attended with noise it is usually the fault of the driver. There are, however, many cars which have seen considerable service and with some of these it is almost impossible to change speeds without a grinding of the pinions.

While there are several conditions which may be responsible for the noise, one of the most common is that when the clutch is withdrawn the member continues to spin, and if this inertia of the flywheel as it is called, be not overcome, difficulty will be experienced in making a quiet change. In order to effect a silent meshing the pinions to be engaged must rotate at approximately the same speed, and if one be turning faster than the other the slower member must be brought up to the same number of revolutions as the other, or vice versa. This subject was considered fully in recent issues of The Automobile Journal.

It is obvious that if the design of the clutch be such that the inertia of the flywheel cannot be overcome through proper operation not only will the changing of gears be attended with noise, but more or less wear will result upon the pinions, and continued abuse of these members will create serious trouble. It is poor practise to utilize the chamfered edges of the pinions as braking members to reduce their speed in gear changing.

In some types of cars difficulty is experienced in engaging the low speed when starting from a standstill. Sometimes this trouble may be obviated by cutting down the amount of mixture supplied by the carburetor; that is, the valve of the latter may be adjusted to slow the motor down to its minimum speed when running idle.

The inertia of the flywheel may be overcome, however, by fitting a clutch stop or brake, and at Fig. 2 are presented several practical designs adaptable to the cone or expanding type of clutch. The object of the stop is to retard partially or wholly the spinning of the clutch shaft and to enable the driver to change up or down as the case may be without grinding the pinions in the gearbox.

The stop depicted at A is suitable to a car having a cross frame member upon which is mounted the device. It consists of a .5-inch round rod which is threaded at one end, and fitted with a wooden block and leather pad at the other extremity. To the cross frame member is bolted a T piece and the latter is threaded to take the rod, which is held securely by lock nuts. By this arrangement the stop may be adjusted and any wear of the brake member taken up.

At B is presented another form of clutch stop. This consists of a piece of spring steel, one end of which is slotted to engage with the studs of the transmission housing, while the other is bent upward as shown in the sketch, and a piece of hard leather is riveted to the end. This method is preferable where the design of the car will permit of its use, as it is made easily and by means of the slot can be set accurately. Being constructed of spring steel it will give more or less and will not be so harsh in its action as the stop previously described.

Where the design is such that the stop cannot be placed upon a cross member or on the gearbox, the sub-frame may be employed, and at C is outlined a method of attaching the braking device. A plate is bolted to the frame and the former drilled to take two bolts, these being employed to lock the stop proper. The latter is constructed of spring steel and slotted to permit of adjustment for position as well as wear of the leather pad. In setting the device, the clutch is thrown out and the stop moved forward until it comes in contact with the periphery of the

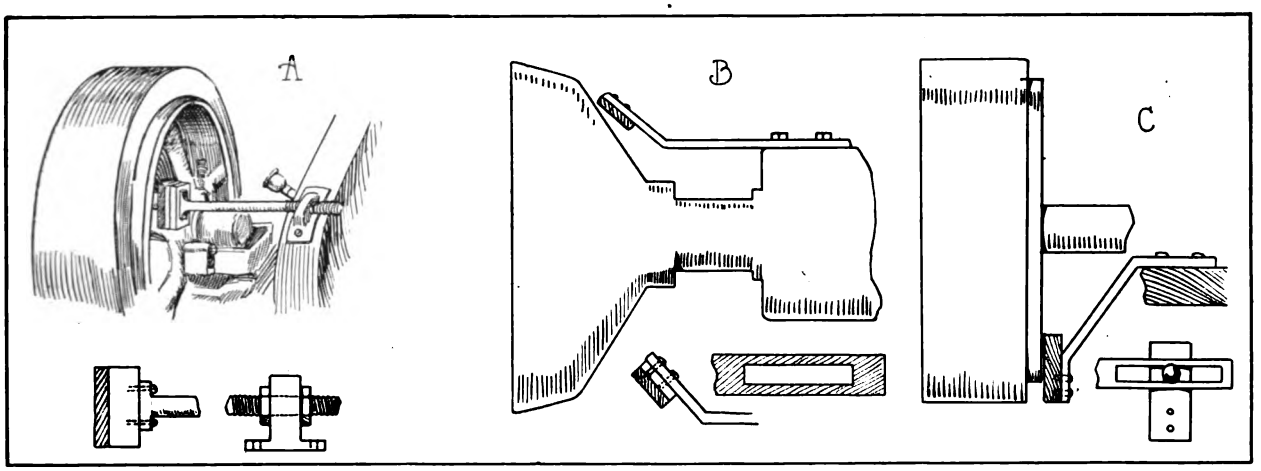


Fig. 2—Simple Forms of Clutch Stops: A, Adjustable Rod Attached to Cross Frame Member; B, Steel Spring Bolted to Transmission Case; C, Method of Fastening to Frame.

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female member, and the bolts can then be locked securely.

In adjusting these devices it should be borne in mind that they should not be so set that a harsh engagement will follow. Their object is to slow down the spinning member to the required speed for meshing of certain pinions in the gearbox. In utilizing the stop in changing gears it will require but a short time for the driver to learn the "feel" and if properly adjusted and operated it will make changing up or down an easy matter and eliminate the undesirable grinding noise.

DIRECTORY AND MAP HOLDER.

Many motorists make it a practise to carry an automobile directory or road maps on the car while driving. Frequently a machine passes and it is desired to ascertain the identity of the owner. It is sometimes inconvenient to reach the book when it is carried under the seat or in the pocket.

At Fig. 3 A is shown a neat device made by a motorist and attached to the top of the coil box. The

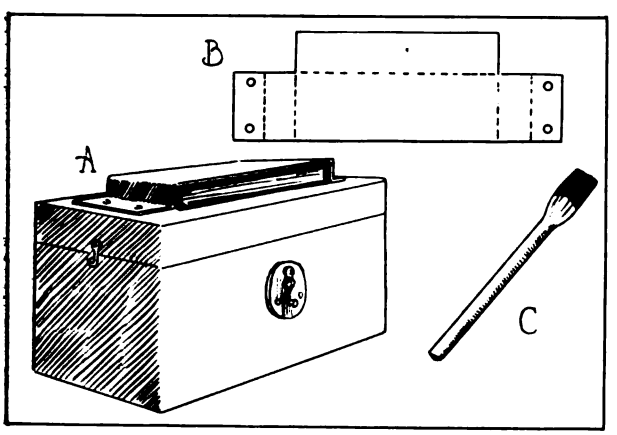


Fig. 3—Home Made Accessories: A, Directory or Map Holder Made from Sheet Copper; B, How the Metal Is Cut, C, Spark Plug Brush Constructed of Tubing and Bristles.

material was sheet copper and at B is depicted the method of its manufacture, the dotted lines representing the lines of bending. In preparing the metal the thickness of the book or map should be ascertained and the copper cut accordingly. It is fastened to the coil box by small brass screws or it may be attached to any other convenient place.

HOME MADE SPARK PLUG BRUSH.

For cleaning dirty spark plugs a brush with stiff bristles is best, and while these may be purchased for a small sum at any accessory house one may be made without any expense. Around the garage or house usually will be found an old brush which is worthless. Enough of the bristles are cut off to fill the ends of an old piece of a .25-inch or larger copper or brass tube which may be procured from the scrap heap. The metal is then flattened with a hammer and the result is as depicted at C. Being thin the brush will remove dirt between the points of the plug.

STARTING A COLD MOTOR.

Some owners complain of difficulty in starting the motor of a model T Ford in extreme cold weather. This is not the fault of the design, but a trouble experienced by operators of other cars in winter, and is due to the heavy fuel now being employed. These troubles did not exist when the automobile industry was in its infancy and the writer seldom experienced difficulty in starting a motor that had been exposed to a temperature below zero.

A method suggested by a repair man who has had considerable experience with this car, is employed by a number of operators. It consists of screwing down the adjustable member on the dash thereby cutting off the supply of fuel to the needle valve, and then cranking the motor smartly, several times. The needle valve is then opened two or more full turns, the carburetor flooded by priming, and when the engine is again cranked it usually will start easily after which the vaporizer may be adjusted.

RADIATOR HINTS.

Some motorists are more or less careless in the use of anti-freezing solutions. A common error is to believe that after filling the radiator with an alcohol or other solution further attention is not necessary. Tests should be made from time to time to ascertain if the solution be of the proper strength, as alcohol evaporates easily, especially if the motor be operated on a mild day.

It is an excellent plan to empty the anti-freezing mixture from the circulating system, and flush out the latter with clean water. It will be noted that the solution has a reddish color, due to a deposit similar to brickdust. This should be allowed to stand until the sediment settles at the bottom of the container, then if the fluid is poured out carefully, the greater part of the dirt will remain in the bottom of the vessel. It should not be allowed to collect in a radiator, as in time it will seriously affect the circulating system.

PROPER USE OF TIRE CHAINS.

Many drivers believe that tire chains will always prevent skidding and are careless in fitting these devices to the traction wheels. Properly used, tire chains give efficient service, but when improperly adjusted they impose a severe strain upon the rear construction of an automobile. The chains should be snug, not loose, for when the latter condition exists the wheels will skid some distance before the slack of the chain is taken up. The result is a violent shock to the rear mechanism, and the car may continue to skid because of the momentum attained.

SCRATCH AWL FOR FINE WORK.

A common sewing needle inserted in a suitable handle makes an excellent scriber for accurate work. It is so cheap that regrinding is unnecessary. When dull it can be replaced by a new one. The point on the needle is ground by an expert, and is far superior to anything made by the ordinary machinist.

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WHY PEDALS WEAR SHOES.

Those who do considerable driving in crowded traffic of the cities operate the clutch and brake pedals considerably more than the average driver, and in the continual contact and rubbing between the metal and the leather the latter suffers most; in fact, a pair of light soled shoes are soon reduced to a state where repairs are necessary. Obviously the remedy would be to employ heavy soles, but many object to these, as they claim they cannot "feel" the pedals. A driver whose work is mostly in the city treats the soles of his foot apparel in the same manner as the leather of the clutch by dressing them with castor oil, applying several coats and allowing the lubricant to soak in. This not only softens the leather but adds to its wearing qualities. The soles of new shoes may be similarly treated.

A VALVE LIFTING KINK.

The amateur in attempting his first removal of a valve in preparation for grinding, is often bothered in lifting it high enough to be grasped by the fingers. It may be operated easily by inserting the tang of a file in the slot of the valve stem and moving it upward as far as it will go, then holding the stem with the point of a screw driver while another lift is made with the other tool.

HAYS GAS ANALYSIS INSTRUMENT.

A device for testing the mixture of a carburetor as well as for making an adjustment of that member, has been brought out by the Combustion Appliances Company, Rogers Park, Chicago. It is the invention of Joseph W. Hays, the well known combustion engineer, and is known as the Coapco special gas analysis instrument.

Being very compact the device may be carried on the car while the mixture is being examined, and it is held to be so simple that it may be operated by a novice. Its principle consists of taking a sample of the burned gases and these are analyzed by the instrument instantly, the amount of carbon dioxide and carbon monoxide being registered by its mechanism.

When gasoline is burned properly in the cylinder of a motor, the resulting product from the combustion of the carbon is carbon dioxide, while that resulting from the hydrogen is water vapor. When combustion is incomplete, carbon monoxide will be present and there also may be hydrogen and perhaps certain hydrocarbon gases. Both carbon monoxide and hydrogen are highly combustible gases and when found present in engine exhaust, indicate a decided waste of fuel.

The Hays instrument checks the amount of these products as follows: A short piece of gas pipe or brass tubing is inserted in the muffler or exhaust and the instrument suspended. After the motor has been started a sample of the exhaust is taken and its condition noted readily. The device may be utilized when the car is being operated on the road by placing the analyzer in the tonneau, and by means of tubing conveying samples thereto. This arrangement permits of examining the mixture under varying conditions, an important factor in the adjustment of carburetors. By it the adjustment troubles are eliminated as with an accurate record obtainable of the proportions of air and gas being employed, a new or old vaporizer may be set very quickly.

BOSTON MOTOR BOAT SHOW A SUCCESS.

The ninth annual motor boat show held at Boston recently was noticeable for the large display of motors, these embracing both two and four-cycle engines. The event was well attended and a high grade of exhibits marked the display. Among those represented were: Havoline Oil Company, New York City; K-W Ignition Company, Cleveland, O.; Connecticut Telephone & Electric Company, Meriden, Conn.; Apple Electric Company, Dayton, O.; Indian Refining Company, New York City, and Wolverine Lubricants Company, New York City.

NEW GLASS FOR WINDSHIELDS.

According to Charles F. Splitdorf, New York City, maker of ignition specialties, a new glass for windshields has been brought out by a firm of French glass makers. It is produced by a secret process and its thickness and care in construction are the principal essentials. It is about .75 inch thick, and on test resisted the impact of a 10-pound weight thrown from a distance ranging from 10 to 20 feet, with no other damage than a small hole less than two-fifths of an inch being made in the glass.

REMOVES WALL TO EXHIBIT PREMIER.

Exhibiting automobiles in lobbies of hotels is a practise not alone confined to New York City. John F. Turk, Rochester, N. Y., agent for the Premier line, made by the Premier Motor Manufacturing Company, Indianapolis, Ind., made arrangements to show a seven-passenger Premier in a hotel at Rochester during a show in that city. It was found that it would be necessary to remove a wall of the building to permit the entrance of the car, and this was done.

COLE WITHDRAWS FROM RACING.

Following the lead of many automobile manufacturers it is said that the Cole Motor Car Company of Indianapolis, Ind., will not re-enter the racing field in 1912. Although no official announcement has been made it is said that the funds which have been employed for racing purposes will be utilized in connection with a plan in the service promotion departments.

The Henderson Motor Sales Company, general sales agent for the company, has concluded a plan for organizing a corps of expert factory mechanics and it is intended to have these men travel all over the country in the interests of Cole agents and owners. The experts will visit the agencies and service stations and explain the technical points to the workmen.

Claim Freight Rates Are Excessive—The National Association of Automobile Manufacturers was represented before the Interstate Commerce Commission at Washington, D. C., recently, alleging excessive freight rates on motor cars by all railroads east of the Mississippi and north of the Ohio rivers.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



SPECIAL FEATURES AT THE SHOWS.

As a whole the two displays of commercial vehicles at the recent New York shows revealed but little in the nature of radical mechanical changes, although a number of new models were shown for the first time. The general impression was one of decided progress in construction, but this was more particularly with reference to so-called minor details. However, there were a number of new features in design and body work which will admit of brief comment.

From the first there has been a decided tendency toward providing for complete accessibility of the power plant. This has been accomplished in various ways, but there appears to have been decided progress along this line within the past few months. In this attempt to solve a problem, another has entered into the consideration; namely, that of supplying the possibility of ready removal and replacement in cases where it is desired to operate a fleet of commercial vehicles, the owner purchasing an extra power plant to be placed in service during the time required for making necessary repairs. Special attention may be directed to a few of the designs exhibited.

Accessibility of Power Plant.

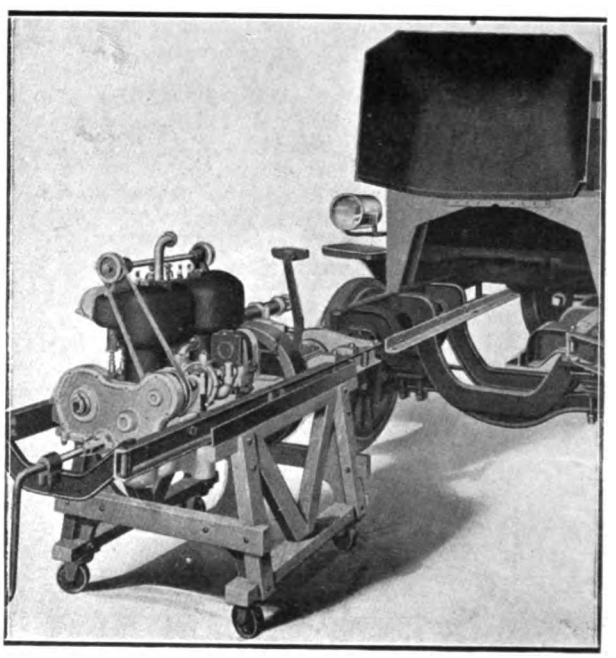
The Knickerbocker, a new truck displayed at the Grand Central Palace by the Knickerbocker Motor Truck Company, New York City, presented a somewhat simplified arrangement, in which provision is made for withdrawing the motor through the front, as a drawer is withdrawn from a desk. The radiator, which is of the honeycomb type, is suspended on springs or stanchions attached to or supported on the bumper. The latter is hinged so as to swing open carrying radiator clear, and permitting full access to the motor, which is mounted on a hickory sub-frame.

The Grabowsky, made by the Grabowsky Power Wagon Company, Detroit, and shown at the Madison Square Garden, has a similar provision for accessibility. The motor, transmission and clutch are mounted as a unit on a sub-frame, which is removable bodily from the chassis through the front. The short hood is hinged at the top, and the front cross bar at the left. These being opened, the power plant unit is so arranged that it slides in and out like a drawer. A wooden horse, on which is mounted a pair of rails registering with those carrying the motor in the chassis, is rolled into place and the work of removal thus becomes a most simple matter.

Tilting or Removable Seats.

A number of makes offer a tilting seat, with which it is possible to expose the power plant without disturbing the load. The Speedwell, made by the Speedwell Motor Car Company, Dayton, O., tilts the entire seat and side panels to the side. The Autocar, the product of the Autocar Company, Ardmore, Penn., folds the seat and floor boards upward. Several others tilt the seat backward, and among these may be mentioned the new Pope-Hartford, made by the Pope Manufacturing Company, Hartford, Conn., in which the seat and floor boards are hinged separately, permitting the turning of one or both as the operator desires.

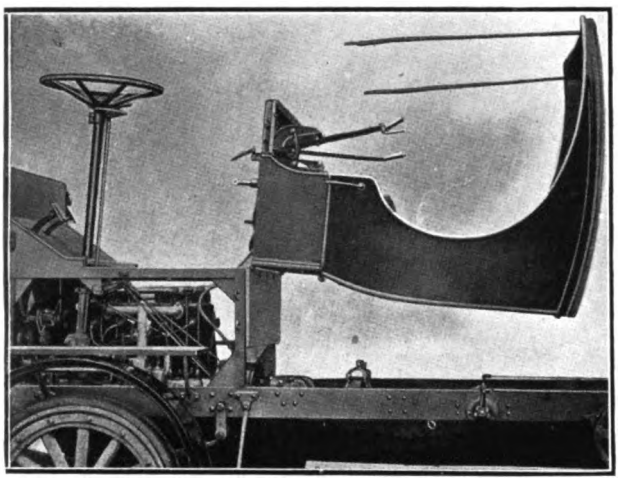
The new six-ton Knox, made by the Knox Automobile Company, has the motor located in the cab, as with the Morgan, Hewitt and Garford. The latter is made by the Garford Company, Elyria, O., and this particular feature is not found on all models. With the smaller cars, provision is made for lifting the hood and drawing the motor out the front. With the



Illustrating Accessibility of Grabowsky Power Plant.

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larger sizes, however, it is possible to make adjustments in the cab without leaving the seat, as, of course, is true also of the other makes utilizing this



Tilting Seat Exposing Power Plant on Pope-Hartford.

method of location for the power plant.

The Decatur, made by the Decatur Motor Car Company, Decatur, Ind., goes a step further. The body is held in place by four bolts, and above this are located the dash and seat units, the former comprising the radiator, dash, floor boards, clutch and brake pedals, foot throttle, gasoline tank, side panel locks, change speed lever and emergency brake control. This also is held in place by four bolts, as are the seat and side panels. The radiator is hinged at the side, so as to open like a door. If it be desired to remove the entire power plant, the loosening of four bolts permits the seat unit to be lifted off, and loosening four more bolts allows the removal of the dash unit. This makes if possible to replace the motor without affecting the load.

The five-ton Lozier, a new product of the Lozier Motor Company, Detroit, makes provision for lifting the floor boards and turning the seat out of the way, or these may be entirely removed and the power plant exposed for thorough inspection. The sub-frame is hinged at the rear end to a cross frame member, while the forward end rests on independent auxiliary springs. The removal of four bolts in front and two in the rear enables the entire power plant, consisting of motor, cooler, clutch, transmission, steering wheel and driver's seat, to be taken from the chassis.

This is by no means a complete list of the various methods employed, but will serve to illustrate the attention that is being paid to this important feature.

Location of Driver and Levers.

Another suggestion as to the trend of design has to do with the location of the driver and the placing of operating levers. This also has a strong bearing on the matter of accessibility, inasmuch as there is a division of opinion as to whether or not it is possible to place the motor under the seat or floor, thereby securing additional carrying space in the rear of the seat, and at the same time providing for easy removal or adjustment of the power plant. As has been shown, this problem has been met in a variety of ways.

Considering now, the proposition of left or right hand control, it is significant that many of the concerns which favor the right hand location of driver in pleasure car manufacture have adopted the opposite in commercial vehicles. With some of these the control levers are placed at the left as well, though it is possible that a majority prefer the centre location for these.

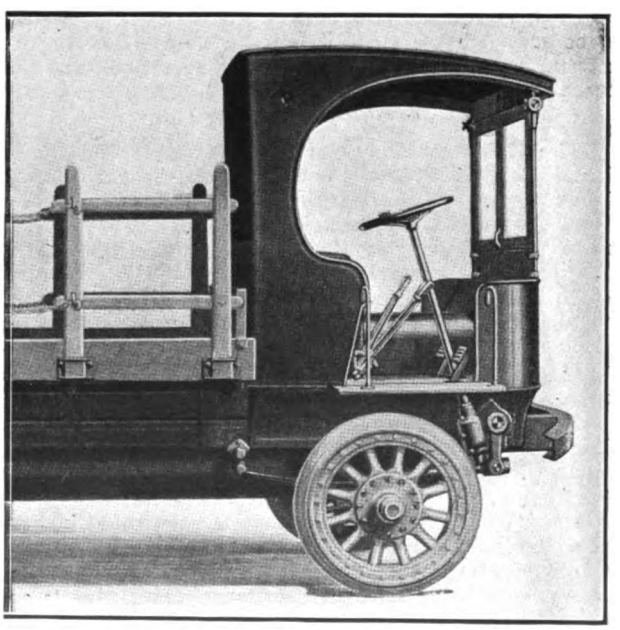
Other Mechanical Details.

Several new transmissions were shown, and very many cars displayed were equipped with some form of governor. Self-starting devices were not numerous, although it is understood that several makers are at work upon designs which will be placed in the market soon. The worm and worm wheel drive of the Pierce-Arrow, made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y., was the only device of this nature at the 1911 exhibits, but this year the Grand Central Palace show brought out two others, although but one of them was shown. These were on the Newark, made by the Newark Automobile Manufacturing Company, Newark, N. J., and the Rowe, the product of the Rowe Motor Company, Coatesville, Penn. Both are new makes, and the latter offers the worm drive as an option only.

The matter of body design has been given decided attention. The first glance about either exhibit would seem to indicate that special interest attached to brewery wagons and dumpers, although of course, general utility vehicles with express bodies were in the majority. Some of the dumpers disclosed decidedly ingenious operating devices, and deserve more than passing mention.

Mack Dumping Body.

The International Motor Company, New York City, showed a seven-ton Mack truck, with a distinctly new and novel arrangement for dumping. The hoisting device is mounted on special braces fitted to the back



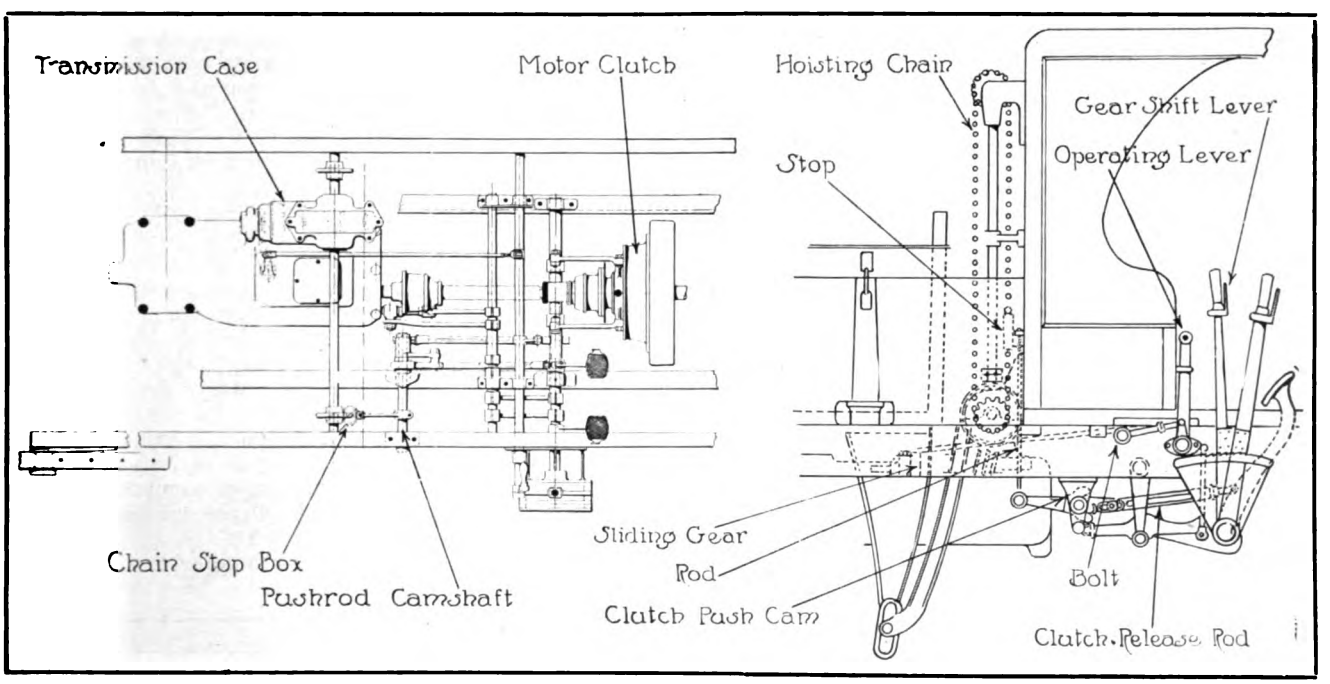
Location of Motor in the Cab on Five-Ton Garford.

of the cab, and the mechanism is operated by means of a transverse shaft directly beneath and in the same plane as the upper cross shaft. This is driven from

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a small countershaft, situated in the transmission, by means of a worm and worm wheel, and this small shaft is in turn operated by a sliding spur gear, which meshes with the second speed gear on the main transmission countershaft, when the hoist is to be used. When the sliding spur gear is thrown into mesh, the driving dog for the main countershaft gear is thrown out, which makes it impossible to move the vehicle while the body is being raised. The latter, however, can be stopped in any position, and the truck driven over the road without the body being drawn back to its original position.

Driving into position for dumping, the operator moves the small hand lever at the right of the seat forward and downward, bringing a sliding gear into mesh with the second speed gear and at the same time disengaging the intermediate gear clutch. The gear shifting hand lever will be moved into the second speed, and the clutch let in, when the body immediately will begin to ascend. When in extreme upward position, the clutch automatically is thrown out by means of a stop on the hoisting chain, which prevents the lifting arm being drawn over centre.



Sketch Outlining Features of New Self-Dumping Body on the Mack Truck, Operated by Motor Without Leaving Seat.

To lower: The reverse is engaged, and the clutch let in, when the body begins its descent. As before, the clutch automatically is thrown out, just before the body reaches the frame, which prevents the former coming down hard upon the latter. The small hand lever is pulled back into position and the driver is free to resume his journey for another load. The whole operation takes about 20 seconds. In the device shown the tail gate was operated automatically, although it is possible to obtain this for hand operation if desired. With the equipment as displayed, it is possible to unload the entire contents of the vehicle without leaving the seat, simply by moving the hand levers and depressing the clutch pedal.

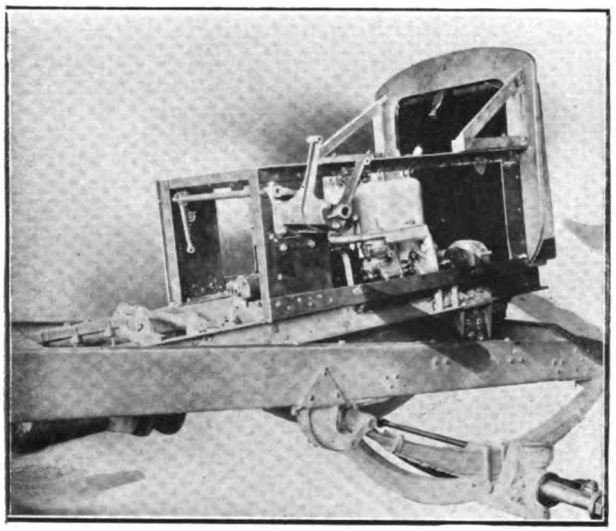
Sampson, Morgan and Gramm.

The Mack was shown at Madison Square Garden, as was the Sampson dumper brought out by Alden Sampson Manufacturing Company, Detroit. In this the dumping arrangement is decidedly new, a cylinder behind the driver's seat serving to raise and lower the carrying receptacle by means of compressed air. This air is stored under pressure of 100 pounds in a tank on the rear end of the chassis frame, a single-cylinder pump being operated from the change gear mechanism. This compressor may be connected directly to the pneumatic hoist, in case the storage tank should become punctured or the air line should develop a leak. A Westinghouse brake, operated from the seat, controls the admission of air to the cylinder. The end gate is so arranged as to open automatically, so that the entire operation of dumping the load may be performed without the driver leaving his seat.

Still another novel dumper was exhibited in the Morgan, made by the Morgan Motor Truck Company, Worcester, Mass. Strictly speaking, this is not a dumper in the usual sense of the term. The body and load remain stationary, the coal or other material being discharged through a metal chute by means of an Archimedian screw. Power to operate this is conveyed from the motor through a change gear mechanism, in which an extra gear and a shaft lead to a chain wheel mounted on the side of the chassis. A much larger wheel is mounted on the end of the conveyer shaft opposite to that on which the chute is attached to which it is fastened by a key. The withdrawal of this key permits the chain and wheels to rotate idly while the truck is being driven. When the load is drawn into position, the operator slips the key into place, when the motor turns the screw and the coal is forced out through the chute.

Of the dumping bodies at the Grand Central Palace that shown on the Gramm, made by the Gramm Motor Car Company, Lima, O., was of special interest. In this a nickel steel pinion keyed into the rear end of the propeller shaft engages with either one of a

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Method of Mounting Motor in the New Lozier Truck.

pair of meshed gears of the same size hung in a pivoted cage. One of these communicates to a universal shaft extending forward to a point just behind the seat, driving the gears of the body actuating mechanism. The cage is connected by a lever at the driver's seat mounted on a quadrant, the three positions of which give forward, reverse and neutral movements. Incorporated in the mechanism is an irreversible worm and wheel, which holds the body in any positon when the control gears are shifted into neutral.

The winding drums for raising are located immediately back of the seat. Chains from these extend upward and over sheave wheels supported on a derrick, thence downward to the lower end of two upright legs on the front of the body, where they are secured by means of steel fastening brackets.

KNOX PUMP PROVES SATISFACTORY.

During a recent big fire in Richmond, Va., opportunity was had to demonstrate conclusively the superiority of the modern motor driven fire apparatus over the old type. For 13 hours a big Knox pumping engine, made by the Knox Automobile Company, Springfield, Mass., kept two streams of water working on a fire practically without intermission and within a few minutes after its return to quarters it was ready for another call.

The only attention needed was supplied by the chauffeur, who also was engineer and mechanician. Throughout the entire time the engine was in service, from just before 6 in the evening, until ordered back to the station by Chief Joyce at 7 the next morning, this man occasionally poured a bucket of gasoline into the tank and went over his machine with an oil can.

The steam fire engines competing with it during the same period, required two men in attendance, an engineer and a fireman. Their total consumption of fuel was more than 25 tons of steam coal, while the bill for running the gasoline pump at full speed for 13 hours was $4.50.

REORDERS FOR GENERAL VEHICLES.

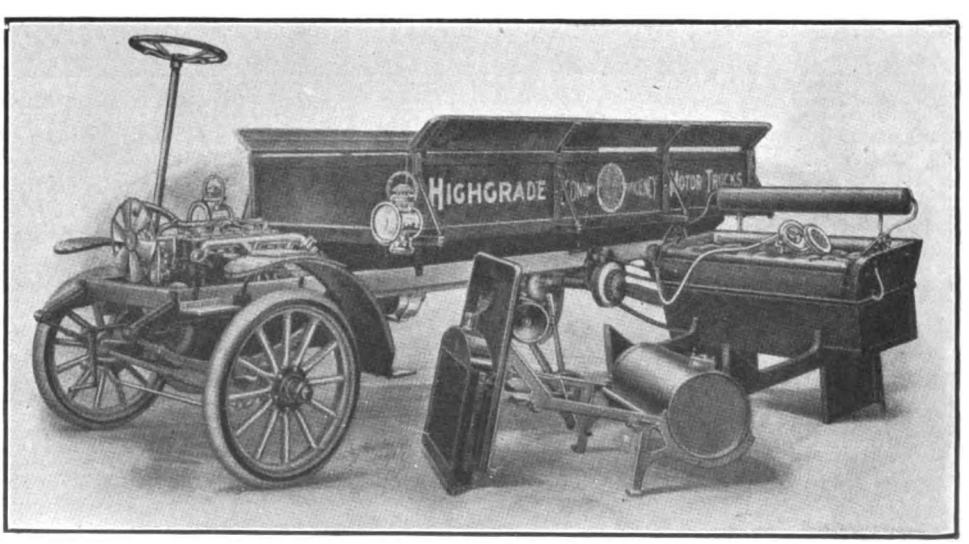
The General Vehicle Company, Long Island City, N. Y., maker of General Vehicle electric trucks, had a decidedly successful month during January, as is evidenced by the sale of 158 machines. Several of these were reorders, among them being the following: Jacob Rupert, 21, making a total of 72; Peter Doelger, eight, making 47; Muehlback, seven, making 10; Commonwealth Edison, nine, making 15. Some large initial orders also were placed, including the Schaefer Brewing Company with eight, and the General Baking Company with 10. Sixty-nine per cent. of the concern's 1911 business was reorders, and Feb. 1 found it with 671 trucks in the hands of 25 customers alone.

SAMPSON TRUCKS SAVE MONEY.

It will be remembered that the officials of Kansas City, Mo., purchased six Sampson trucks, made by the Alden Sampson Manufacturing Company, Detroit, about a year ago. Three of these were of two tons capacity and the remainder of three tons. All were placed in service with the street cleaning department.

Recently, Commissioner W. C. Weaver reported that each of these machines displaced from seven to nine horse drawn wagons, and that the average cost for maintenance was $125.25 a month, as compared with $960 for the horsed equipment. These figures do not include depreciation or tire renewals.

The two-ton cars are utilized in collecting cans of



Decatur Seat and Dash Units Dismounted to Illustrate Acces sibility of Power Plant.

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street cleanings, which are dumped, and often they are called upon to assist the fire department in cases of emergency. Two of the larger vehicles are employed in hauling asphalt, crushed rock, sand and paving materials, these being fitted with self-dumping bodies. The sixth machine is used in general street repair work, carrying laborers, tools, material, etc.

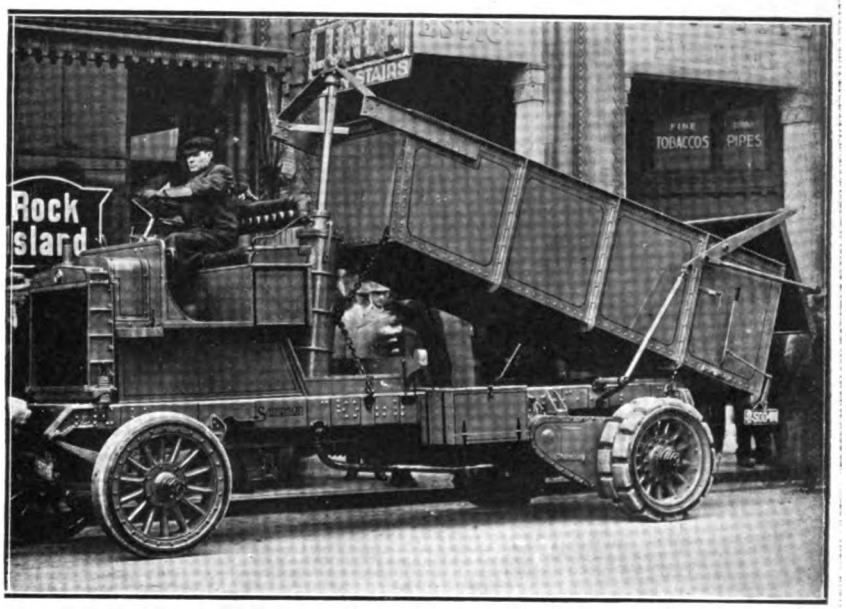
BALDWIN COMBINATION TIRE.

L. F. N. Baldwin, Providence, R. I., who is noted as a racing driver, and is one of the best known motorists in America, has invented a sectional steel tire which he claims possesses qualities that particularly adapt it to heavy vehicle service and which, he maintains, can be adapted to any rim now in use. This tire is designed to be used in combination with solid shoes of the present types, Mr. Baldwin claiming for his invention that it will minimize the wear and greatly prolong the life of the rubber tire used with this device. The tire is unique in that it may be adapted to conform to the reduction in size of the rubber shoe through wear and that the diameter of the wheel as a whole may be varied as desired. This is accomplished by using metal liners or shims between the block and the rim. By these the external diameter of the tire may be increased or lessened, a process that requires but little time.

As may be known, rubber and rubber compositions cannot be compressed, but can be distorted. Under the pressure of loads and driving stress any solid tire will change its form and the tendency is for the material to be forced from the actual place of contact of the tire and the ground or paving on which it stands. As the tire wears the resiliency from the elasticity of the rubber compound is lessened because there is a reduction of material. Because of the rear wheels carrying the greater part of the load as well as transmitting the power the tires wear more rapidly than the forward shoes, for which reason dual tires were adopted. Mr. Baldwin claims for his invention that the steel shoe carries the load and resists the wear, and the rubber shoe affords the traction necessary. He holds that on ordinary unpaved roads there is no need of carrying the load on rubber alone and that on paving traction is a condition more required than a cushioning effect or the reduction of noise. The steel tire is to be used with the surface slightly lower than the normal face of the rubber shoe so that under compression the rubber and steel surfaces will contact with the road surface. With the weight of the load largely carried by the steel tire he claims economy in that there is reduction of the rubber surface a half, while the combination insures traction under all conditions of service.

The tire blocks may be made of any metal desired, but manganese steel is a probable material because it may be cast and it has unusually enduring qualities. As will be noted at Fig. 3 and Fig. 4 the blocks are formed so that when installed there is a space between the ends, which is to provide for the reduction of the external diameter of the tire. This space will vary from an inch to an inch and a half in width and it will afford traction on all unpaved roadways where the blocks contact with the ground. Reference to Fig. 6 shows a cross section of a block, which is cored to secure lightness. The blocks are secured to the rim and felloe by bolts cast integral with them. The blocks are so located that the bolts are about midway between each spoke. They are secured by nuts and lock washers or other device.

The method of installation is to fit a special rim to the wheel, the form of which is illustrated at Fig. 6, and this is shaped with a flange at the inside. Against this flange the shims are placed, and on these shims the block, the same bolt that retains the block retaining the shims. The channel section carrying the rubber tire is installed as is any solid wheel shoe,



Pneumatic Dumping Device Displayed at the Sampson Exhibit.

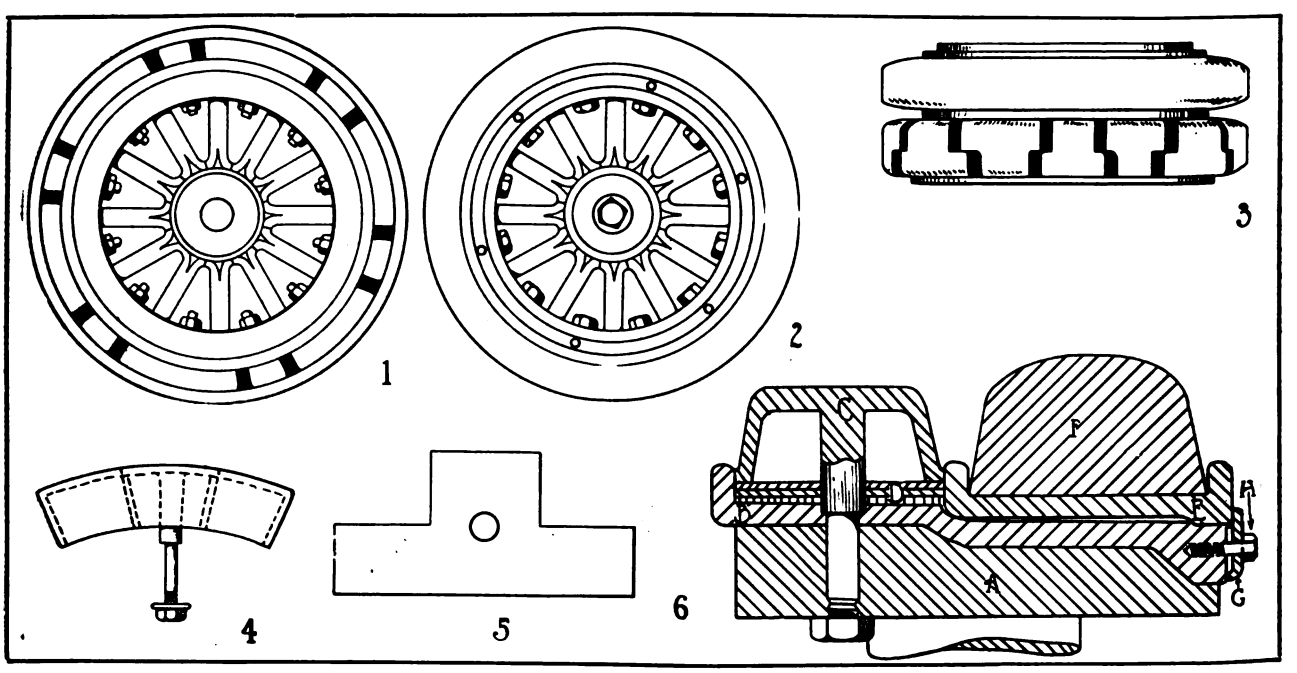
one flange of the channel holding the block rigid against the wheel rim flange. When a new installation is made the surface of the rubber tire is about an eighth inch above the steel blocks, or a quarter inch more in diameter. As the rubber is worn a shim may be removed from beneath each block, and the shims may be of any thickness that practise will dictate, so that the diameter of the steel tire is uniformly reduced until a point is reached where the rubber tire is no longer serviceable.

With the rims now the vogue the blocks may be installed by drilling the rim and felloe for the retaining bolts and the blocks may be retained against the rim flange of the rim by the channel of the rubber shoe. The wheel felloe and rim may be made any thickness and width that is desirable and the width of the steel tire whatever proportion is necessary to yield the best service. The rubber shoe is mounted on the outside of the rim to facilitate ease in installation or removal. It is not believed there will be occa-

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sion to remove the blocks unless for the reduction of diameter by the thickness of a shim as necessitated by the wear of the rubber shoe. The construction has the merit of cheapness and endurance and it is held by the inventor that the tires, when used wherever dual shoes are installed, will yield equal results so far as riding qualities are concerned, will give far greater mileage for the rubber tires, thus lessening the expense from one point of view, while the metal castings, after the first equipment, will be useful for a considerable period—perhaps several years.

The descriptions of the detail drawing are: Fig. 1, side elevation of wheel, showing side of sectional blocks retained by bolts through the felloe. Fig. 2, reverse elevation of wheel, showing rubber shoe retained by flange and bolts or cap screws. Fig. 3, plan or top view of tire assembly, showing blocks and spaces. Fig. 4, side view of steel tire block, the dotted lines indicating the core. Fig. 5, plan view of steel shims. Fig. 6, cross section of tire assembly with these components: A, wooden wheel felloe; B, steel tire or wheel rim; C, cored steel block and retaining bolt; D, shims between steel block and wheel rim; E, demountable channel carrying rubber shoe; F, rubber tire; G, retaining flange or ring; H, retaining bolt.



The Baldwin Combination Steel Block and Rubber Tire for Service Wagons.

NEW WHITE SERVICE BUILDING.

The new service building of the White Company, Cleveland, O., maker of White pleasure and commercial vehicles, in New York City, has been opened at West 57th street, between 11th and 12th avenues. The location is held to be ideal for this purpose, owing to the fact that it is in the centre of the district in which a large number of industrial transports are operated.

The structure is a one-story building, but has a floor space of 25,000 square feet, due to its construction. No posts or pillars are employed, the roof being supported by trussed work. Overhead lighting is secured by means of large skylights. The department for maintenance and repair is very complete and comprises a modern machine shop, carpenter shop and a large stock room for a full line of White parts.

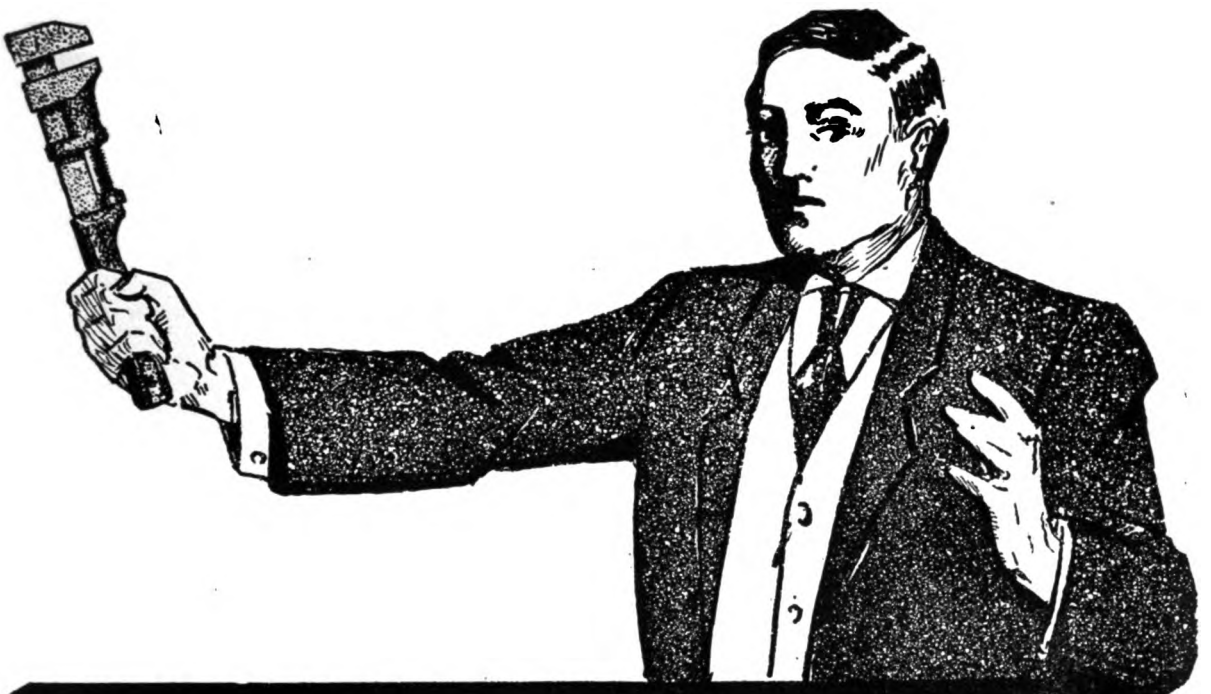
VELIE TRUCK IN WINTER RUN.

Having occasion to deliver a Velie speedster in Milwaukee, Wis., the Velie Motor Vehicle Company, Moline, Ill., decided to utilize one of the three-ton trucks made by it, thereby demonstrating the practicability of Velie commercial cars for winter service and in competition with the railroads. The pleasure vehicle was mounted on the power wagon and the 124 miles between the Chicago branch and Milwaukee were covered without trouble, a night stop being made at Racine, Wis. Throughout the journey an average speed of 10.2 miles an hour was maintained, despite the extreme cold and heavy roads, due to recent snows. The fuel consumption was about 4.1 miles to the gallon.

REO PAYS FOR ITSELF.

R. M. Owen & Co., New York City, distributor for the Reo Motor Truck Company, Lansing, Mich., reports that a Reo light delivery wagon sold six months ago by R. E. Ingersoll, metropolitan agent for this line, has covered 4553 miles and made 3773 stops, at a total cost for gasoline, oil and repairs of $78.86. The average figures out at about 1.75 cents a mile. During this service the car has earned $900.54, or some $150 more than the original cost of the vehicle. In addition, it is pointed out that the vehicle was able to maintain its regular schedule during snowstorms and under other conditions in which horse drawn equipment would have been seriously handicapped.

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THE MAN WITH A COES

is not "bowed by the weight of centuries" as was the Man with a Hoe—but he will be bowed with the weight of years before his COES wears out.

When a salesman tries to sell you a wrench of doubtful pedigree tell him you want a COES. Look for the star ★ trade mark and you can't go wrong. If he's loaded up with "near-Coes" counterfeits, he's "in bad" and we're sorry for him.

You'll need a COES sooner or later. Buy a COES now and save what you might have thrown away on imitations.

Five styles—50 sizes, from 4 to 72 inches.

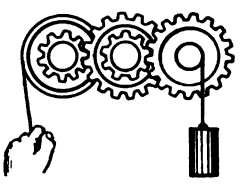
30 per cent. stronger than any other wrench.

Coes Wrench Co., Worcester, Mass.

Agents: J. C. McCarty, 21 Murray St., New York
John H. Graham & Co., 113 Chambers St., New York

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RECENT MOTOR VEHICLE PATENTS



Emergency Tank Device.

Letters patent have been issued Edward C. Smith, San Diego, Cal., for a gravity feed emergency fuel device for motor vehicle. It comprises a gasoline container mounted under the hood and near the radiator, and of peculiar shape, being flat on one side and curving to a point at the lowest end. A pipe is led from the vessel to the carburetor and interposed in the line is a stop cock which is operated by means of a rod extending upward and through the dash to a position convenient to the operator. Another pipe leads from the upper portion of the auxiliary tank to the main supply line and is connected thereto. The pipe leading to the extra vessel is fitted with a check valve its object being to allow the fuel to flow from the regular tank by gravity to the auxiliary member, but not back into the former. The small container is automatically filled by gravity as the main member is considerably higher and the fluid flows through the usual channels to the extension and thence to the emergency vessel. Here it is held by the stop cock until required. The auxiliary tank is fitted with a safety valve also a wall with air spaces to protect its contents from the heat of the motor, as well as to provide a circulation of air. It is claimed of the device that in addition to providing emergency fuel a flow of gasoline may be furnished to the carburetor with the car operating on unusually steep grades.

Emergency Spring Device.

Broken springs are not uncommon and among the devices intended to make a temporary repair is the invention of George S. Spreyer, Canon City, Col., to whom a patent has been issued. It differs from the usual construction of these appliances inasmuch as the leaves of the springs are riveted together at the centre, although the members bear loosely upon one another. The ends of the springs are so spaced apart that when clamped together they form a resilient spring end. An upturned extension is provided at one extremity while that of the opposite end is equipped with an eye and means are adapted to bear on the upturned extension and pass through the eye for securing the ends of the auxiliary spring on opposite sides of the line of cleavage in the vehicle spring.

Multiple Electric Switch.

A patent has been granted to Edward E. Taylor and David H. Elkins, Amesbury, Mass., assignors to William Gray of the same place, for a multiple electric switch for lighting purposes. The device is similar in construction to the usual ignition members, being fitted with a throw lever which is pivotally mounted but so arranged that three movements are provided from right to left in operation. The first lights the side and tail lamps; the second, the head and tail members, and the third, all five lamps, this arrangement providing means for lighting the different members at the will of the operator. This is accomplished by means of three separate insulated contact pieces within the switch housing, two of the contact members having a continuous unbroken surface, while the third has a base and two separate curved surfaces located in the same arc of a circle. The spring lever is fitted with contact pieces of spring metal. The wire from the battery is led and attached to the terminal forming the retaining member of the lever and a single lead from each of the three contact members to the tail, side and head lamps, respectively, any group of which may be lighted or extinguished, as previously outlined.

Tire and Trunk Holder.

Many motorists object to attaching brackets to the body of the motor car for the purpose of fastening the extra tire and trunk. A patent has been issued to Archibald U. Campbell, Toledo, O., for a combined tire and trunk holder which obviates the use of body attachments, and in addition is adjustable permitting the retention of different sized shoes, a feature which will appeal to motorists when exchanging their machine for one equipped with larger or smaller tires. The locking device consists of a base block which is attached to the running board and provided with a movable lug which rises from the inner side and extends outwardly and downwardly over the tire, and means are provided for locking the bar to the base member in the usual manner. Two telescoping arms are attached at one end to the base block extending upwards, and are provided with curved ends for the purpose of securing the shoe. The design is such that a tire cannot be removed by forcing it away from the upper supports as the lower part of the shoe is held securely by the locked lug. In addition it is claimed that a tire may be removed or replaced in a few seconds as there are no straps to unbuckle, the operation involving merely unlocking the lug.

Electric Wire Terminal.

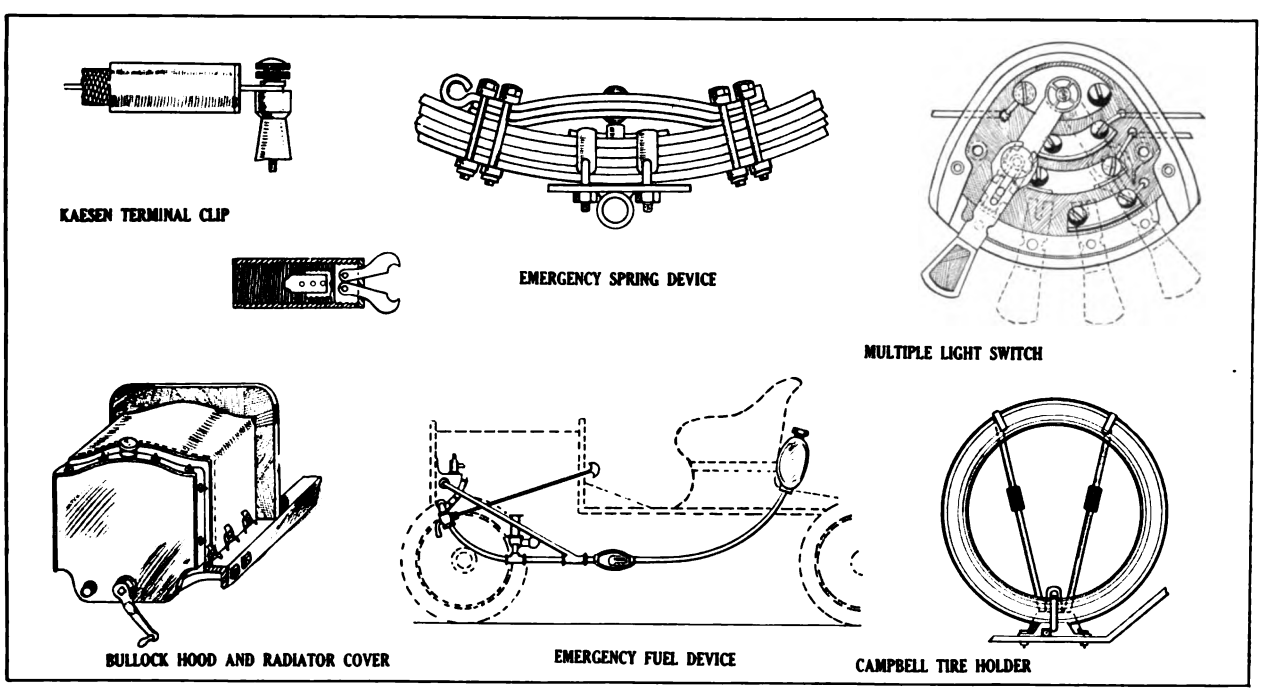
A device for the purpose of connecting electric conductors with spark plugs in internal combustion engines, although the appliance is not limited to spark plugs in its scope, has been patented by Julius Kaesen of New York City. It is claimed that by it a connection may be made quickly and securely to the central electrode of a spark plug or binding post of any telegraph or electrical instrument, and that its construction is such that it cannot work loose. It comprises an internally screw threaded sleeve and an externally screw threaded member is said sleeve with its threads in engagement with the former, also a fastener at the inner end of said body for the conductor. A pair of jaws are pivotally mounted to the inner member. In attaching the device the outer sleeve

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is unscrewed and moves backward allowing the jaws to expand. To fasten the latter, the sleeve is rotated in an opposite direction, which movement closes the jaws firmly upon the electrode or binding post as the case may be. The device for attaching the wire consists of a strip riveted to one side of the inner member and extending beyond is bent over and doubled upon itself to produce, with a screw, the fastener proper.

Hood and Radiator Covering.

A covering for the radiator and hood of a water-cooled motor car, the design of which is such that one or both parts may be protected from the cold or elements, has been invented by Calvin Bullock of Denver, Col., to whom a patent has been granted. It comprises three parts; namely, a body member for covering the hood, a relatively narrow strip for the top and sides of the cooler, and a third or cap member for the exposed end of the radiator. The third member is designed for use in cold weather and is fastened to the narrow strip by a form of curtain fasteners which makes for easy removal. The hood member is held in place by straps fastened to buckles attached to the side board members of the frame. When utilized in the summer the hood device is intended to prevent water and moisture reaching the power plant.



Some Patents Applicable to the Motor Car and of Interest to Owner, Maker and Manufacturer of Parts.

MAYNARD HEADS UTICA CLUB.

At the annual meeting of the Utica Automobile Club, Utica, N. Y., held recently, the membership was stated to have been almost doubled during the past year. The election of officers resulted as follows: President, Arthur B. Maynard; first vice president, Frederick T. Proctor; second vice president, Perle W. Harter; secretary, John M. Ross; treasurer, Charles W. Wicks; directors, Edgar B. Odell, Charles H. Yates, F. W. Bensberg, Ray P. McLoughlin, Tom W. Johnson, Russell Wheeler, Harry W. Roberts.

COLE COMPANY DROPS FIGURES.

Following the policy of the majority of motor car builders the Cole Motor Car Company, Indianapolis, Ind., has dropped the figures "30" and "30-40" which have been used after the trade name of its car, the Cole. These figures which signified the horsepower of the motor had a value from an advertising standpoint, but it developed they were confusing to some extent.

DEMOUNTABLE RIMS FAVORED.

That there is a growing tendency to fit cars with demountable rims was evidenced at the New York shows, and this practise was by no means confined to the high priced cars. According to the Firestone Tire & Rubber Company, Akron, O., 162 of the 227 automobiles at the Madison Square Garden show were thus equipped. At the Grand Central Palace display 90 of the 146 vehicles had similar fittings, and the Firestone predominated. This was also true of trucks, 20 of 82 power wagons at the Palace exhibit displaying removable rims.

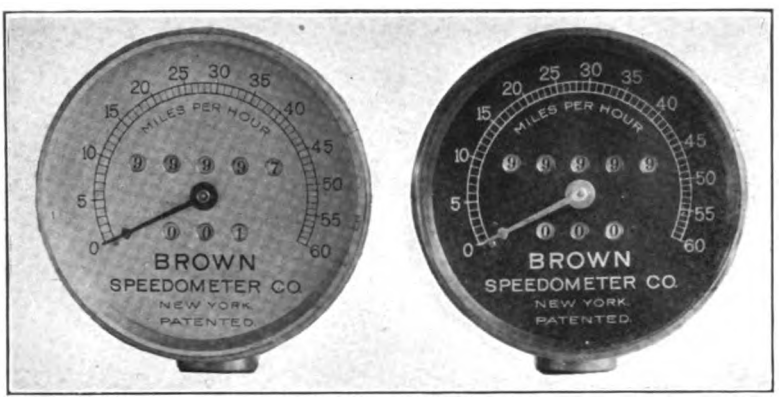
Change Santa Monica Race Dates—The dealers' association of Los Angeles, Cal., which has the management of the Santa Monica races, has changed the date from May 11 to 4. The events will be at 202 and 250 miles.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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THE NEW BROWN SPEEDOMETER.

THE Brown speedometer, a speed and distance indicator recently placed in the market by the Brown Speedometer Company, has a number of especially interesting mechanical features that are claimed to insure for it qualities that make for unfailing accuracy and endurance. This instrument is produced at the factory at New Britain, Conn., which has been equipped with the highest class machine facilities, and by workers specially skilled in accurate and exacting work.



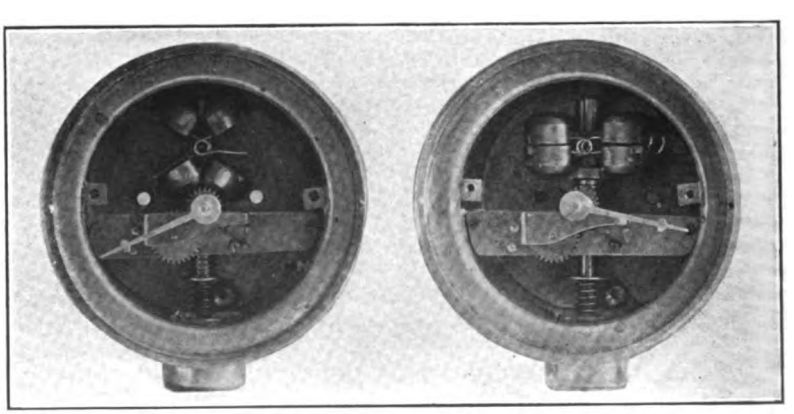
Brown Speedometers: At Left the Original Dial, and at Right the New Brown Dial, Illustrating the Ease of Reading the Latter and Wide Sweep of the Indicating Hand and the Long Speed Scale.

In general appearance the Brown speedometer does not differ from other instruments of this class. Three types are made which differ only in that the maximum of registration is 60, 80 and 100 miles an hour respectively. All have four-inch dials. The indicator hand is mounted in the centre and has a sweep of 240 degrees of a circle from zero to maximum. There are two registers for distance, the upper recording to 99,999 miles, and the lower to 99.9 miles, they being respectively season and trip records. The trip register may be set at zero by a push button at the side.

The models now produced are unique in that they have brown dials with the scale and characters made by the metal of the dial plate itself exposed through the enamel, the indications being made by the white metal hand. The readings of the registers are from black figures on white backgrounds exposed through the ports in the dial face.

The odometer register is claimed to be the only type made in which it is impossible to make any change save through the movement of the mechanism, so that it is proof against tampering or possibility of any of the train of gearing being changed by accidental jar or shock. The mechanism is decidedly ingenious. On the main shaft of the instrument is a worm gear which engages with a pinion on the odometer driving shaft. On this driving shaft, as shown at Fig. 1, is a ratchet having an eccentric motion. The ratchet end is carried in a clip that maintains it in correct relation to the teeth of the first pinion of the train of trip indicator gearing. A dog or pawl attached to ratchet arm by a spring prevents any movement of the pinion unless made by the ratchet arm. No matter whether the driving shaft is turned forward or backward the eccentric-driven ratchet arm always moves the pinion in one direction. It cannot be reversed. This insures that any movement of the car will be indicated on the register in tenths of miles, and any movement will be registered on the speed scale.

In the odometer semi-Geneva gears are used. As will be noted from Fig. 2, which shows the season's mileage register train, there are six of these gears, five in one line, these carrying dials with numerals from 0 to 9 inclusive. The large cam that actuates this train is driven by the pinion engaging with the arm of the ratchet. This camshaft also carries the gear that drives the pinion that operates the trip odometer. By noting Fig. 2 it will be seen that each gear or star wheel is held by a dog and the first dog is held by a spring retained pawl. The disc in connection with each gear is notched and when one end of the dog retaining this gear engages with the notch the other end of the dog is moved outwardly so the gear may be moved one tooth by the engaging cam. To describe this another way would be to say that the cams actuating the registers move by tenths the star wheels carrying fingers that engage with the star wheels on the unit of the season and trip registers. The timing is such that a pawl drops into a notch on the disc of the first wheel of the season register and the cam carries the second wheel forward one figure or tenth at each complete revolution of the first wheel. Then the dog is pushed out of the notch in the disc and the wheel is securely locked.



Brown Speedometer Governor: At Left Is Shown the Speed Indicating Hand at Zero and the Compound Weights Widely Separated; at Right the Hand Is at Extreme of Speed Scale and the Weights Are Closed Against the Springs Between Them.

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The entire train of gears or wheels is locked by the action of the pawl and spring holding the first wheel. The trip register may be reset to zero at any time by a release.

Another feature is the governor, of the centrifugal

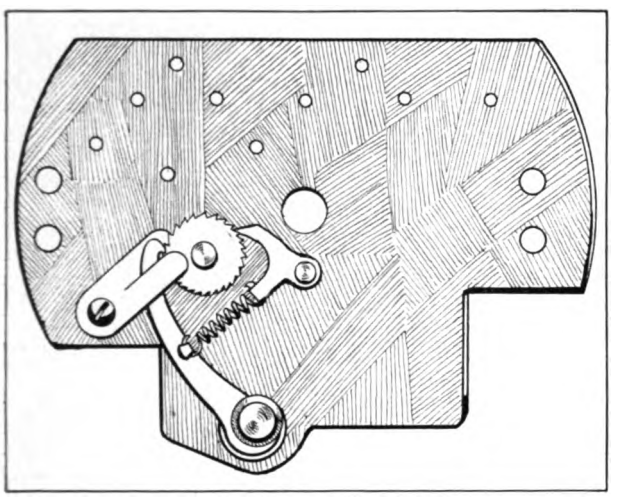


Fig. 1—Bottom of Odometer Plate of Brown Speedometer, Showing the Eccentric Ratchet Arm Actuated by Odometer Driving Shaft and the Pawl-Retained Odometer Driving Pinion.

type, which is shown in the positions of zero and maximum by the removal of the dial and the odometer plate. This governor is carried on a shaft mounted in ball bearings at the top and bottom of the case, the lower bearing being screwed into the boss at the base and secured by a lock nut. Above the bearing on the shaft is the worm that operates the odometer, and above this is a disc oil shield that prevents lubricant from the bearing reaching the mechanism of the instrument. Resting on this shield when idle is a bronze rack on a sleeve that slides on and revolves with the shaft. Across the case may be noted the handstaff frame that carries the handstaff. On this handstaff is a pinion that meshes with a gear mounted on the frame, which in turn drives a shaft that parallels the handstaff. On this parallel shaft is a pinion that meshes with the revolving rack. As the revolving rack moves on the governor shaft it turns the pinion of the parallel shaft and this in turn through the gears and pinions swings the handstaff that carries the indicating hand.

The governor is four weights in compound form, so-called. It is connected with the revolving rack, there being a collar on the rack and between this collar and the governor is a helical spring that normally forces the rack downward on the shaft when the instrument is idle. The upper end of the governor shaft carries a cross shaft or pin, the end of the revolving rack sleeve being slotted to allow movement up and down on the governor shaft. The cross shaft ends are tapered and on these ends are mounted four connecting arms which carry the four semi-circular governor weights, which normally are at extreme height and depth, being kept separated by four calibrated springs. The upper end of the governor shaft is mounted on a ball bearing fixed in the case.

As the governor shaft is revolved the centrifugal force throws the weights outward and consequently nearer together. The revolving rack is carried upward on the governor shaft and the pinion on the parallel shaft is partly revolved, the shaft, through the gearing, moving the handstaff and the indicating hand. At the same time the worm gear on the governor shaft actuates the odometer mechanism.

Extreme care is observed to secure endurance, the pinion operating the revolving rack being of steel, cut and hubbed to secure exact uniformity and smoothness of finish. The main wearing parts in contact are steel and bronze. Every component is produced under closest inspection, and the steel parts are hardened and ground, while the revolving racks are finished in watch lathes. In the assembly the odometers are tested in series against a standardized plate, the test being usually a registration of about 1000 miles, driven at a speed of 85 miles an hour. This is sufficient to develop any defects. In standardization the registers are subjected to severe work, one being noted recently that had been driven 90,952 miles at a speed of 85 miles without perceptible wear.

The governor is adjusted by calibrating the springs. This is done by a standardized instrument driven constantly to indicate a speed of 30 miles an hour. This means a uniform speed of the electric motor during the test. The governor under test is driven off the same motor shaft and by varying the diameter of the driving pulley the instrument is required to show the exact ratio of increased or decreased speed the variance of the driving wheel bears with reference to the driving wheel of the standardized indicator. Any necessary adjustment can be made through change in the springs spreading the governor weights. That is to say, the spring resistance may differ substantially but each instrument must register correctly at all speeds. After the governor is calibrated the odometer plate and dial are attached

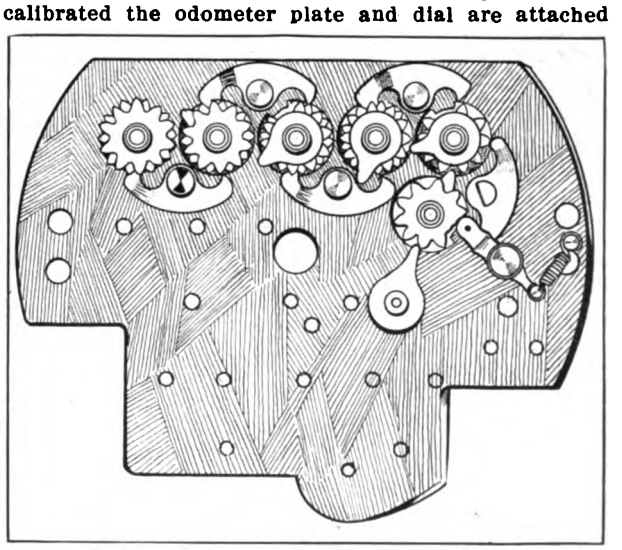


Fig. 2—Top of Brown Speedometer Odometer Plate, Showing the Train of Semi-Geneva Gears of the Season's Register Driven by Cam, and the Pawl and Dogs That Securely Lock the Gears Against Any Movement Not Mechanically Provided For.

and the whole is enclosed in a heavy drawn brass case and enclosed with a drawn brass ring bezel into which the glass dial cover is spun securely.

The instrument is driven by a high grade flexible shaft with a specially made swivel joint and a spe-

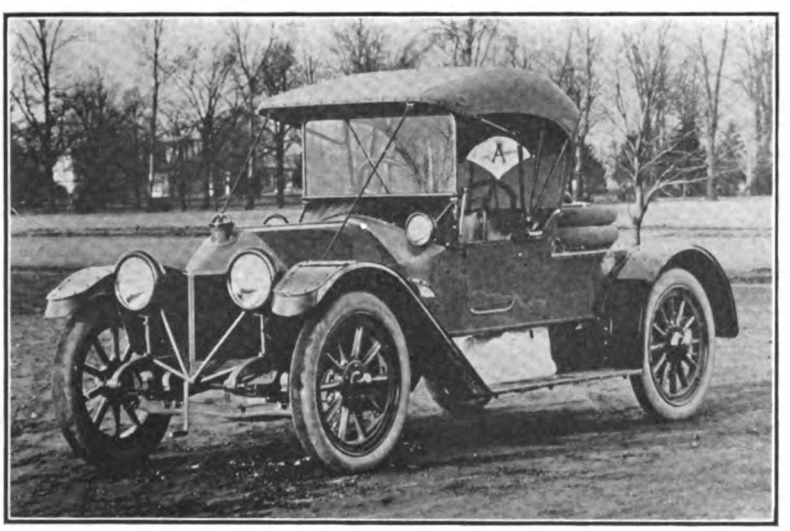
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cially cut pinion and a driving gear that is attached to the wheel spokes. The shaft pinion is carefully hubbed that each may be exact and certain in its relation. The entire assembly is finally inspected and prepared for shipment. The manufacturing is under the supervision of a mechanic of long experience in speedometer production and the instrument as sent out is guaranteed to be perfect and to give complete satisfaction.

DICKSON SUGGESTS NOVEL PLAN.

George M. Dickson, general manager of the National Motor Vehicle Company, Indianapolis, Ind., manufacturer of National cars which hold the world road race record, makes a novel suggestion regarding a race for stock cars. "What I would like to see," he says, "is that the American Automobile Association ask the manufacturers for a list of our dealers. Then unknown to us, this official body might drop in on these dealers, and select a car off the floor. Let them do this at three or four different cities without our knowledge. Then allow them to enter the machines in a race and the result will answer all questions about stock cars.

"Although we have won races with stock models, every now and then we find someone who questions our honesty, and although we refer them to the American Automobile Association, still they are inclined to doubt that a stock car could hold together and perform as well. If we could get the kind of a contest I have outlined, I have no doubt as to the result."



Wedge Shaped Radiator Which Not Only Reduces Wind Resistance, But Adds to the Appearance of the New Abbott-Detroit Roadster.

PHYSICIANS FAVOR MOTOR CARS.

According to the United States Motor Company, New York City, the medical profession not only heads the list of those who utilize automobiles in their vocations, but there is a comfortable margin between its figures and those of the nearest competitor. It is estimated by the Maxwell-Briscoe Motor Company that there are 51,000 Maxwells in service at the present time and that 16,527 are used by physicians. The latter are quick to realize the advantages over the horse drawn equipment, as the motor car has greater speed, endurance and is cheaper to maintain than a number of animals.

COLE WESTERN AGENTS CONVENE.

Continuing an established practise of holding meetings at which their various representatives may have an opportunity of discussing the methods of furthering the sales of Cole automobiles, the second annual smoker of the western agents of the Henderson Motor Sales Company, distributor for the Cole Motor Car Company of Indianapolis, Ind., was held in the Hotel Lexington, Chicago, recently. The event was well attended and many interesting addresses pertinent to the occasion were made.

ATTRACTIVE ABBOTT-DETROIT ROADSTER.

A certain percentage of the power of a motor is consumed in overcoming the resistance of the wind and to reduce this loss designers have brought out new types of bodies, the lines of which are not only attractive but add to the speed of the automobile. This feature has been incorporated in the design of the Abbott Motor Company, Detroit, which concern manufactures a roadster fitted with a racy appearing radiator as will be noted in the accompanying illustration.

The cooler is wedge shaped and the filler cap is of ample proportions and sets off the design. A feature of the radiator is that its construction protects it from possible injury, inasmuch as it is safeguarded by four substantial rods which form the starting crank support. The machine is equipped with fore doors and the design of the top and windshield is such that the occupants are fully protected from the weather. Liberal fenders and splash shields protect the passengers as well as mechanism and add their full value to the attractive appearance of the vehicle.

STUTZ ENTRY NAMES DRIVERS.

The Ideal Motor Car Company, Indianapolis, Ind., which has entered two Stutz cars in the second annual 500-mile race in that city, will entrust the machines to the care of Leonard Zengel and Gilbert Anderson with William Knipper as a relief driver. Zengel is well known in racing circles having formerly piloted Chadwicks and Nationals. He started 13 times last season winning nine firsts, three seconds and one third, finishing with place in every contest.

ANNUAL RUBBER PRODUCTION.

According to the United States Tire Company, New York City, the annual production of rubber is about 75,000 tons. Half of this is utilized in the manufacture of automobile tires and accessories.

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PECULIARITIES IN FOREIGN DESIGN.*

(By William Guy Wall.)

The majority of American engineers are familiar with the general design of foreign cars. There are a few minor details, however, which are not only interesting but worthy of discussion. The only difficulty lies in picking out those which have not been described in the trade papers.

One of the most noticeable features is the broad nosed admission cams. In fact, in several instances the foreign manufacturers are using identically shaped cams for both intake and exhaust and allowing the period of opening to be the same. In a few exceptional cases this is done by the closing of the exhaust late and the opening of the admission early, so that they overlap, which is a poor thing in making an easy starting engine. In most instances a greater lag is given to the admission valve, not closing it in some cases until 55 to 60 degrees past centre. Of course, most of their engines being small and running at high speed, this works out very well, and is also beneficial, as is well known, for motors in racing cars. But for large motors which run at comparatively slow speeds it evidently is not good practise. Most of the cams noticed had straight, though not tangential, sides, while a few were under-cut, or laid out with a constant accelerating curve. Ease in grinding is very much in favor of the straight sided cam, especially so when such methods of grinding are used, as is the case with one large concern which makes use of a surface grinder and turns the camshaft back and forth by hand, not grinding the nose at all.

A number of engines have valve lifter levers, between the cams and tappets. These were used to quite an extent on American cars several years ago, but in most instances have been abandoned. There may be a revival of this practise, however, as great claims are made for it, as to advantage in producing quietly operating poppet valves.

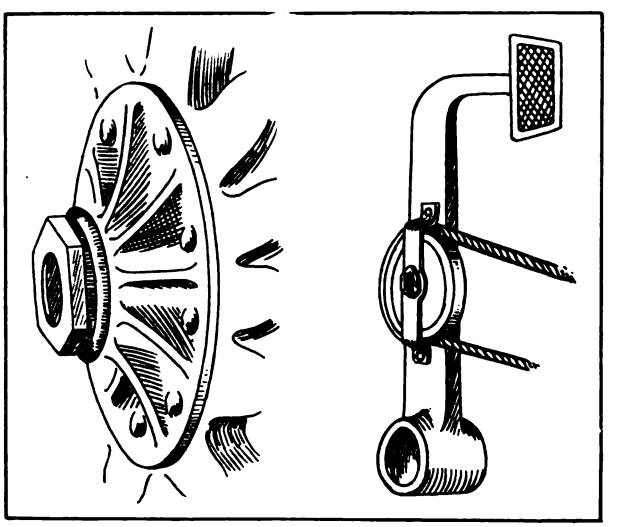
The use of rather narrow piston rings is very noticeable, especially on the Continent. While narrow piston rings are without question an excellent thing as far as holding compression is concerned, as the ring conforms to the slight inequalities of the cylinder, at the same time it is a very questionable proposition as far as durability is concerned.

The water jacketing of the intake pipe occurs on a number of foreign cars. This is generally accomplished by making a double pipe of copper and necessarily increases the expense, but is without doubt a good thing.

Several manufacturers are using on their engines a combination strainer and cooler for the lubricating oil. Most engines have strainers for the lubricating system, but the idea of cooling the oil as it is continually circulating in the crankcase is something which has received very little attention on this side. One company in particular has a very simple device consisting of a ribbed sheet metal retainer made in the form of a radiator, which no doubt lowers the temperature of the circulating oil a number of degrees.

In the use of the silent chain for driving camshafts, which is very extensive, no good way seems to have been devised to take up the slack due to elongation. The chain manufacturers claim that the chain readjusts its pitch centres to a slight extent, taking up the wear by riding higher on the gear teeth. This is not sufficient, however, to be of much practical value. Some are using an eccentric around the bearing of the magneto gear, taking up the stretch of the chain by this means. Of course, this necessitates either the moving of the magneto every time this is adjusted, or else allowing the magneto to get out of line with the driving shaft, which is hardly permissible. Others use an idler gear to take up the elongation. A non-adjustable arrangement is practically out of the question when the necessary accuracy which is required for the chain is considered.

An ingenious contrivance is used by the Itala in its rotary valve motor to equalize the pressure on this valve. This is accomplished by making a recess in the opposite wall and having a small hole, about .125 inch in diameter, project directly through the rotating member, so that during the explosive stroke the pressure is nearly equalized around the entire valve.



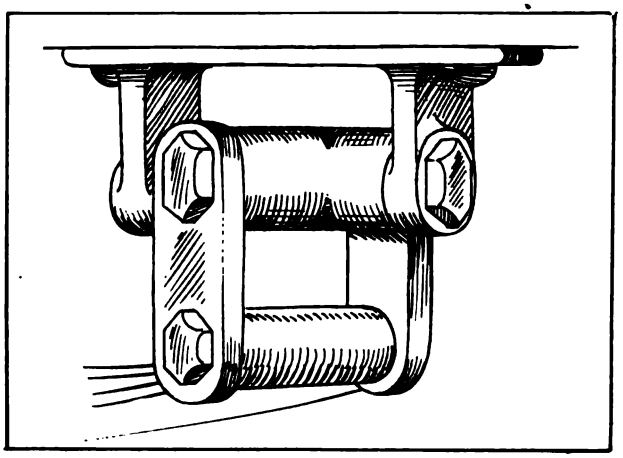
Ribbed Hub, at Left; Brake Equalizer Attached to Pedal, at Right.

There have been a good many comments made on the Daimler's practise of chilling the inside of the cylinders when they are cast and finally grinding them so as to eliminate most of the chilled portion. This no doubt has a tendency, as it is claimed, to make a closer grained casting, but seems rather dangerous in practise on account of the possibility of varying differences in hardness, due to different depths to which the iron would be chilled; for any spots in the cylinders at this point, which were harder than the surrounding metal, would undoubtedly score the pistons.

The use of drop forgings, or, as they are called over there, steel stampings, for pistons, as used on the Lanchester engine, seems rather an expensive propo-

*Extract from a paper read before the January meeting of the Society of Automobile Engineers.

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Unconventional Form of Spring Shackle.

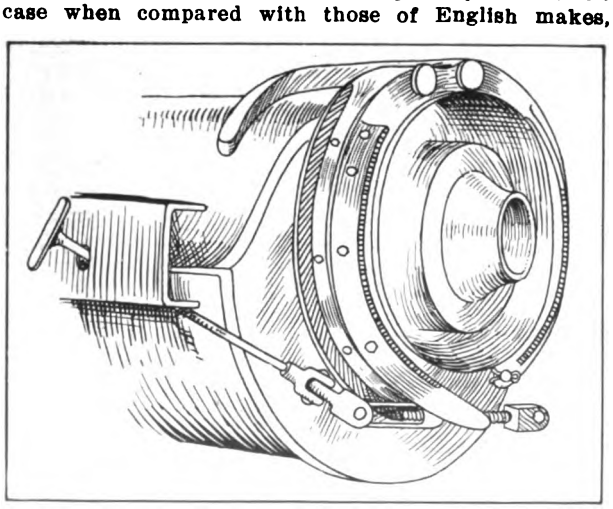
sition, due to the amount of machine work necessary, and also questionable as to the frictional qualities of the metal, and cannot be compared with what another manufacturer is doing in the use of malleable iron, which seems to be giving very good results, and allows the piston to be made very light.

The idea of placing the carburetor in the bottom of crankcase surrounded by oil, as is done on the R. E. P. aeroplane motor, looks as if it might be a possible solution of the great question of keeping the gasoline vapor at a uniform temperature.

The valve springs on a great majority of the motors are enclosed. In some cases the design is such as to make them readily accessible, while in others it looks as if it would be next to impossible to remove them when necessary.

Considerable ingenuity is being used in devising means to do away with the H slot arrangement in shifting selective transmission gears. One firm partially accomplishes this by the use of a large cam arrangement in its transmission case, which, working with a single lever backward and forward, carries the sliding gears through all their different operations. The advantage of this device is rather questionable.

As is well known, the transmission gears in Continental cars are very narrow; especially is this the case when compared with those of English makes,



Method of Adjusting Brake by Hand Lever.

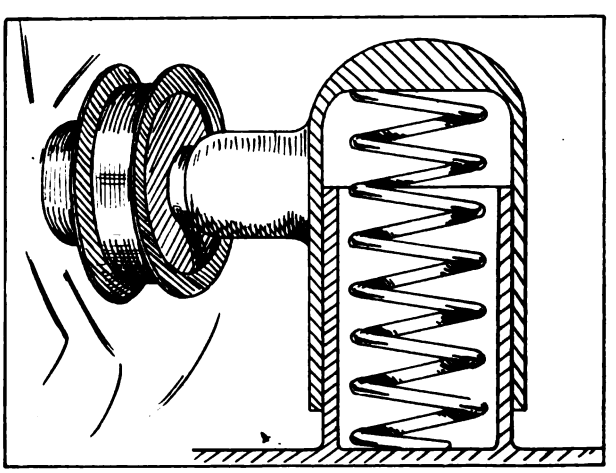
which approximate more nearly our own. The narrow face gear is very hard to make so that it will run quietly, as the pressure a square inch on the teeth has to be much higher than if the gear were wider.

In regard to the design of rear axles the inaccessibility of the gears when bevel gears are employed is very noticeable, as most of the gearcases are split through the centre and the halves bolted together, so that there is no possible way of looking into these cases or adjusting the gears without taking the axle from under the car.

A noticeable thing is the elimination to a great extent of the distance rods running from the rear axle to frame; most cars driving through the springs with the assistance of a torque member, or when this is not the case through a centre torsion tube surrounding the driving shaft and fastened to a well-braced cross member in frame back of transmission.

A great majority of manufacturers are using metal to metal brakes, some of them going so far as to use cast aluminum lined with cast iron working against iron shoes.

An idea worthy of note found on some cars is the



Spring Tensioning Device for Fanbelt.

use of radial ribs on the outside flanges of hubs to strengthen them. This no doubt fulfills its mission but makes a hub which is very hard to clean and paint.

The use of a bolt in each spoke where wood wheels are employed is met with quite frequently. While this may be correct in theory, it has a tendency to weaken the spokes, due to cutting away so much of the wood.

It is very easy to see by inspecting the front axles of different cars which manufacturers have had racing experience to any extent. All of those who have been racing for several years past use steering arms without shoulders, whereas those who have had no experience in racing generally have shoulders on these arms where they go into the knuckles. The latter construction tends to concentrate the vibrations at one point and will eventually cause them to crystallize and break. The Renault has a very excellent design at this point, but fairly expensive, this consisting of a long tapered square on the end of the arm, which projects through a corresponding square in the knuckle and is held in place by a large nut. The change from the round main portion to the square section is very gradual so as to leave no shoulder.

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The Renault idea of placing the radiator back of the engine has been followed by a number of manufacturers on the Continent; whereas a few others have used this position in which to place the gasoline tank. The idea of the gasoline tank in the dash, however, is subject to considerable criticism on account of making it much more difficult to put coils and other equipment on this part of the car.

Most manufacturers are coming to the use of very large diameter universal joints in their shaft drive between transmission and rear system. There also seems to be a decided tendency to make sharp pointed or oval fronts of radiators and to slope the bonnets at a very sharp angle so as to eliminate wind resistance. This is especially noticeable on two makes of cars which claim very high speed.

There are a great many details of cars made abroad which could be mentioned, some of them useful and others of questionable value; among them such things as: Oil filler cast on back end of rear axle case; the use of herring bone or double spiral main gears in transmission; brake adjuster on transmission brake made so that the adjusting rod goes through side of frame; fanbelt tighteners; a cheap brake equalizer, consisting of cable running over a pulley on brake pedal; different forms of couplings for magneto; the idea of attaching speedometers to the driving shaft instead of to the wheels; and a coiled spring covered with wire netting for use in filling the trimming on arm rests and where rolls are used in the upholstering.

A word might be said in regard to motor starters, which seem to be extremely scarce. With the exception of two manufacturers using compressed air startters, one of them returning the compressed air from the tank to the cylinders, and the other using a small motor for turning the engine and a mechanical starter on one make of car, there seem to be no forms used.

STODDARD RESIGNS AS VICE PRESIDENT.

Announcement is made by the United States Motor Company, New York City, that C. G. Stoddard has resigned as vice president but will continue as a director of the company. O. S. Goan succeeds Mr. Stoddard as chairman of the operating council which comprises the heads of the various departments. J. W. Stoddard, father of C. G. Stoddard, continues as a director of the organization.

ISSUES BALL BEARING DATA.

The New Departure Manufacturing Company, Bristol, Conn., is mailing the trade a new 76-page catalogue containing information of a technical nature of value to engineers. The book is profusely illustrated and may be obtained from the company upon request. The latter suggests that applications be made upon the letter heads of the concerns they represent.

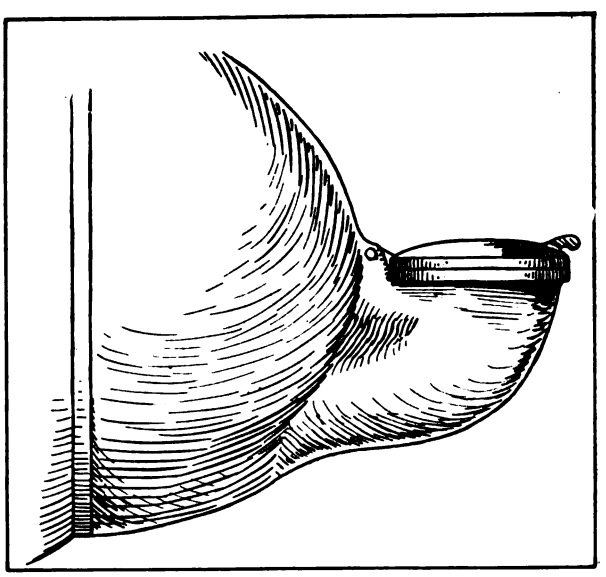
British Engineers to Visit France—The British automobile engineers will not visit this country during the present year as arrangements have been concluded to make a trip to France instead.

Advocate uniform motoring laws in the interests of pleasant and profitable interstate touring.

MICHIGAN CAR WELL REPRESENTED.

The automobile industry is keenly interested in the rapid progress being made by the Michigan Buggy Company, Kalamazoo, Mich., maker of the Michigan "40." This concern is one of the largest manufacturers of high grade carriages in this country and its product is known throughout Europe as well. In the last quarter of a century the company has built up a selling system which includes a large army of dealers and which is conceded to be one of the most comprehensive and economically operated selling plans of the age.

When the first Michigan automobile was completed two years ago there were 10,000 representatives of the company ready to absorb the entire output as years of satisfactory dealing with the company had taught them that the new vehicle would be in keeping with the policy of the maker of carriages. Orders were received from remote sections and many of these were



Rear Axle Housing Grease Filler.

accompanied by letters of encouragement and promises of support. One well known dealer ordered 200 machines without having seen a catalogue or the car.

Having a perfected selling plan, this expense was a negligible quantity with the Michigan concern and enabled it to place a motor vehicle upon the market in which was incorporated money which otherwise would have been expended in introducing the new production.

BURMAN TO RACE AT NEW ORLEANS.

The feature of the race meet at New Orleans, La., Feb. 17 and 18, will be the appearance of Robert Burman with his 300 horsepower Blitzen Benz, who will endeavor to lower the track record. Other cars expected to compete include: E-M-F, Ohio, Case, Halladay, Ford, Fiat and Cino. At the conclusion of the events Burman expects to try out his new machine on the beach at Daytona, Fla.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



New Members for January.

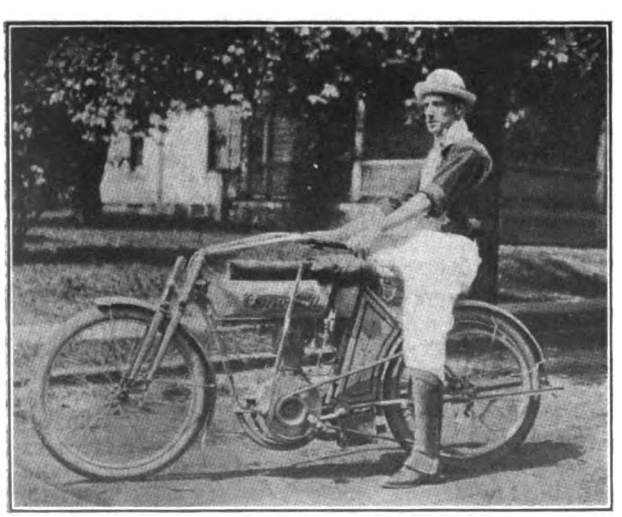
The official report of Dr. G. B. Gibson, secretary-treasurer of the Federation of American Motorcyclists for January, shows a grand total of 402 new names for the month. These were divided by districts as follows: Lake, 107; Southwestern, 98; Atlantic, 67; Gulf, 31; Pacific, 27; Central, 25; New England, 16; Peninsular, 15; Insular and Canadian, three each.

The new members were classified according to states as follows: California, 104; Ohio, 47; Pennsylvania, 34; Washington, 25; Texas, 21; New York, 20; Michigan, 19; Indiana, 15; Missouri, 14; Iowa, 12; Massachusetts, 10; Maryland, 10; South Carolina, nine; Louisiana, nine; Kansas, nine; Panama, nine; Illinois, six; Wisconsin, six; Connecticut, four; New Jersey, three; Florida, three; Canada, three; Colorado, two; Nebraska, two; New Hampshire, Vermont, North Carolina, Georgia, Alabama, Mississippi, Minnesota, South Dakota, Arizona, New Mexico, Montana and Oregon, one each.

Motorcycles at Chicago Show.

There were the same number of makes on display at the Chicago show as at New York. The Wagner, made by the Wagner Motorcycle Company, St. Paul, Minn., was the only one not seen at New York, and the M-M, made by the American Motor Company, Brockton, Mass., which was represented in the metropolis, displayed at its new salesrooms, 2724 Michigan avenue, instead of at the Coliseum annex. The remainder of the list follows:

Emblem, Emblem Manufacturing Company, Angola, N. Y.; Indian, Hendee Manufacturing Company, Springfield, Mass.; Flanders, Flanders Motorcycle Company, Pontiac, Mich.; Excelsior, Excelsior Supply Company, Chicago; Harley-Davidson, Harley-Davidson Motor Company, Milwaukee, Wis.; Henderson, Henderson Motorcycle Company, Detroit; Minneapolis, Minneapolis Motor Cycle Company, Minneapolis, Minn.; Merkel, Miami Cycle & Manufacturing Company, Middletown, O.; New Era, New Era Auto Cycle Company, Dayton, O.; Pierce, Pierce Cycle Company, Buffalo, N. Y.; Pope, Pope Manufacturing Company, Hartford, Conn.; R-S, Reading Standard Company, Reading, Penn.; Thor, Aurora Automatic Machinery Company, Aurora, Ill.; Yale, Consolidated Manufacturing Company, Toledo, O.



Caleb H. Johnson of St. Marys, O., and His Emblem.

Happy with His Emblem.

An accompanying illustration presents Caleb H. Johnson of St. Marys, O., and his Emblem motorcycle, made by the Emblem Manufacturing Company, Angola, N. Y. Mr. Johnson has missed riding very few days this winter and says he takes more comfort out on the road with his mount than in any other form of enjoyment he could devise.

Motorcyclists Ride to Dance.

The San Jose Motorcycle Club, San Jose, Cal., recently gave a dance in that city, and among the guests were a number of riders from San Francisco and Oakland, who covered the 50 miles between cities on their machines.

Rhode Island Club Officers.

At the February meeting of the Rhode Island Motorcycle Club, Providence, R. I., the following officers were elected for 1912: President, E. E. Ryder; vice president, I. C. Hylisted; secretary-treasurer, W. L. Medhurst. The road officers and committees will be appointed at the March meeting. At that time plans for the coming season will be made, starting with the annual smoker.

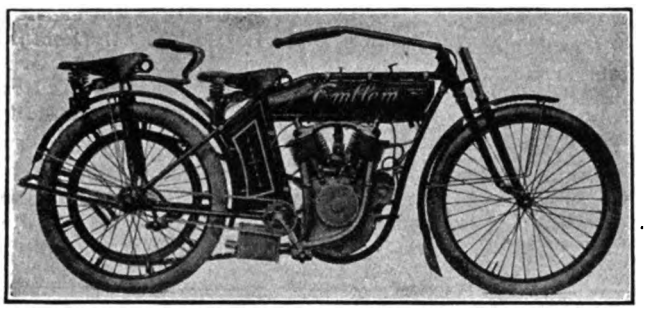
Chicago Dealers Organize.

During the latter part of January, the motorcycle dealers in Chicago decided to combine efforts in a campaign which shall result in a decidedly increased business during the coming year. P. B. Whitney, manager of the Indian wholesale branch, presided at the organization meeting, at which the Chicago Motorcycle Dealers' Association was formed with the following officers: President, H. W. Angsten of the Angsten-Koch Company; vice president, R. C. Crist

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EMBLEM MOTORCYCLES

"They are Different because they are Better"



Everything that is best in modern motorcycle construction is incorporated in Emblem Motorcycles for 1912. Almost every motorcycle boasts of some of these improvements—Emblem Motorcycles have them all, including the Free Engine Clutch. Compare the entire line of Famous Sturdy Emblem Motorcycles with any other first class make and you will see the great difference in price, and at the same time more dollar-for-dollar value than in any other make of motorcycle manufactured. The 1912 EMBLEM is racy looking, possesses unlimited speed and reserve power and is built to withstand the roughest possible service, because nothing but the finest material possible to buy enters into its construction. If we have not an agent in your town and you are the right sort of enthusiast, write today, we may need you to represent us.

EMBLEM MANUFACTURING COMPANY
Dept. D.
ANGOLA ERIE COUNTY NEW YORK

of the Edwards-Crist Company; secretary, F. D. Freeman, Cook county agent for the Thor, and treasurer, R. P. Miller, Excelsior agent. A board of directors, consisting of 11 members, each representing a different make of machine, was selected as follows: J. E. Edwards, Indian; J. V. Turley, Thor; C. H. Lang, Harley-Davidson; Fred I. Huyck, Merkel; A. S. Clausen, Yale; I. H. Whipple, Flanders; Guy M. Greene, M-M and Eagle; L. J. Leonard, Excelsior; A. J. Musselman, American; R. R. Hill, New Era, and H. E. Halbert, R-S.

Columbus Wants F. A. M. Meet.

The Columbus Motorcycle Club, Columbus, O., has begun an active campaign for the 1912 assembly of the Federation of American Motorcyclists. It is announced that the club now has a membership of over 200 and will make this more than 300 before July 1. The track is a one-mile oval, dirt, but regarded as exceptionally safe. W. H. Snyder, president of American Machine Company, agent for Emblem motorcycles, is chairman of the committee in charge of the campaign and promises to secure the convention, if possible.

Latest Registered Repair Shops.

The following registered repair shops have been added to the list recently published: John Steele, 165 Paterson street, Paterson, N. J.; J. B. Quinn, 201 Ridge street, Fall River, Mass.; Whipple & Forman, 51 Genesee street, Auburn, N. Y.; C. J. Mitchell, Temple, Tex.; W. A. Myers, Williamsport, Penn.; P. M. Thompson, 826 Dodge street, Lake Geneva, Wis.; Sonneborn's Sons, 713 Main street, Laporte, Ind.; Apex Bicycle Company, 12 12th street, Portland, Ore.; Fred Strowbridge, 324 West Dominick street, Rome, N. Y.; G. A. Allen, 44 Church street, Livermore Falls, Me.; Baltimore Gun & Bicycle Works, 336 West Second street, Albany, Ore.; Turlock Cyclery, Turlock, Cal.; Wolverine Auto-Cycle Company, 59 South Jefferson avenue, Battle Creek, Mich.; C. A. Sherman, Middleboro, Mass.; Garrison Motor Company, 454 Monroe street, Memphis, Tenn.; F. P. Fentress, 247 Commerce street, Tacoma, Wash.; Greenough & Greenough, 24 King street, Charleston, S. C.; A. J. Gladwell, 207 South Main street, Lima, O.; Motorcycle & Supply Company, 42 Walton street, Atlanta, Ga,; Charles S. Cobb, South street, Plainville, Mass.; Kenton Motorcycle Company, 122 South Detroit street, Kenton, O.; Petmecky Company, 505 Congress street,

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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Austin, Tex.; P. J. Arbuckle, 813 Ninth street, Greeley, Col.; American Motor Company, 2724 Michigan avenue, Chicago; Consolidated Manufacturing Company, 145 Michigan avenue, Toledo, O.; D. & M. Hardware Company, Hortonville, Wis.; A. L. Johnson, 311 North Fourth street, Rockford, Ill.; R. I. Davis, 911 West Broadway, Louisville, Ky.; R. L. Howell, 17 North street, Danville, Ill.

It is anticipated there will be considerable touring during the coming season, and as F. A. M. members are entitled to certain discounts and other courtesies from the official repair shops, it is suggested that riders file away these lists for future reference.

Providence Club's Annual Banquet.

The annual banquet of the Providence Motorcycle Club was held in Perkins' restaurant, Providence, R. I., Jan. 28, with President E. L. Buffington as toastmaster. The menu was distinctly original, comprising the following delicacies: Olives a la John Kay, Blue Streak celery, roast saddle (spring chicken), T. T. mashed potatoes, boiled onions a la P. M. C., Big Four mashed turnips, hot butt end rolls with hard grease, magneto pineapple tapioca pudding with carburetor whipped cream, assorted side car ice cream, race track cheese, Swenson coffee, gasoline, medium oil and ignition cigars.

B. A. Swenson outlined the coming events of the club, starting with the herring run to Taunton in April, and W. A. Bardgett of Buffalo, N. Y., spoke very encouragingly concerning the revival of racing in that city. Others who spoke were: W. W. Scott, F. E. Domina, Thomas G. Mulgrew and William L. Hughes, Jr. An interesting programme of songs was rendered by Misses Bertha Baker, May Murray and Ada Kimball, assisted by Mrs. Alice L. Smith as accompanist.

Those present included: John J. O'Connor, New York; W. A. Bardgett, Buffalo; George F. Fleurant and F. L. Pond, Woonsocket; Joseph F. Leddy and Clifford Frazier, Pawtucket; Charles W. Rayhill, Warwick; Charles J. Ephriamson, Natick; David R. Clark, Cranston; E. L. Buffington, W. W. Scott, H. E. Winslow, Albert B. Carlson, Edward Lutz, John Kay, A. V. Howe, B. A. Swenson, E. O. Spencer, W. D. Burt, A. R. Magee, Eli Domina, George W. Hayden, J. E. Pierce, W. L. Hughes, Jr., J. G. Edwards, F. Labonte, G. Koener, Clarence Loftes, F. E. Domina, C. H. Westcott, L. P. Witcher and H. H. Smith, all of Providence.

Racing Results at Tampa.

The Tampa Motorcycle Club, Tampa, Fla., held a race meet in that city, Jan. 19, in which three events were run off with excellent results. Albert Nowlin on an Indian and John Marsicano on an Excelsior exchanged places from first to last in the seven-mile race. The summary follows:



Members of the Providence Motorcycle Club and Invited Guests at the Annual Banquet in Perkins' Restaurant, Providence, R. I.

Seven miles, professionals—First, Nowlin, Indian; second, Marsicano, Excelsior; third, Johnson, Indian; time, 9:04.2.

Fifteen miles, professionals—First, Marsicano, Excelsior; second, Nowlin, Indian; third, Johnson, Indian; time, 19:08.

Five miles, professionals—First, Johnson, Indian; second, Torres, Harley-Davidson; third, Malone, Harley-Davidson; time, 6:52.4.

New Curtiss Sidecar.

The Curtiss Motor Company, Hammondsport, N. Y., announces its intention of marketing a sidecar of original design, which is expected to be very easy riding and to sell for a moderate price. This makes the third sidecar to be placed on the American market, the others being the imported design brought over from England by the Hendee Manufacturing Com-

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pany, Springfield, Mass., and that produced by the Majestic Manufacturing Company, Worcester, Mass.

Rides Indian to Milwaukee.

Carl A. Leander of Chicago, an Indian rider of some note, recently undertook a little winter trip of practically 100 miles from that city to Milwaukee. Until reaching Kenosha, Wis., he found the roads fairly good, but between that point and Racine, they were badly drifted. The last 24 miles from Racine to Milwaukee, presented decidedly strenuous travelling, but the entire run was made without mechanical difficulty.

Indians in Police Service.

During the last few years numerous cities have equipped their police departments with motorcycles, many of them selecting Indian machines, made by the Hendee Manufacturing Company, Springfield, Mass. The accompanying illustration shows several members of the Canadian mounted police, stationed at Winnipeg, Manitoba, and equipped with motorcycles of this make. The modern method of transportation seems to have been carried to this picturesque organization, which looks decidedly unfamiliar with its new mounts.

Boston Club Holds Banquet.

Forty members of the Boston Motorcycle Club enjoyed a banquet at the Copley Square Hotel in Boston, Jan. 27. Dr. R. L. Colson presided as toastmaster and called upon a number of those present for short speeches. Plans for for the coming season were laid, and it is announced that 1912 is to be the biggest year the organization ever has known.

Where Emblems Are Manufactured.

An accompanying illustration presents the factory of the Emblem Manufacturing Company at Angola, N. Y., where the Emblem motorcycle is produced. The business conducted by this concern has been increasing very materially during the past few years, until it has proven something of a problem to keep up with the orders. The entire structure is given over to the production of motorcycles and bicycles, and has abundant shipping facilities.

Baxter Moves Excelsior Agency.

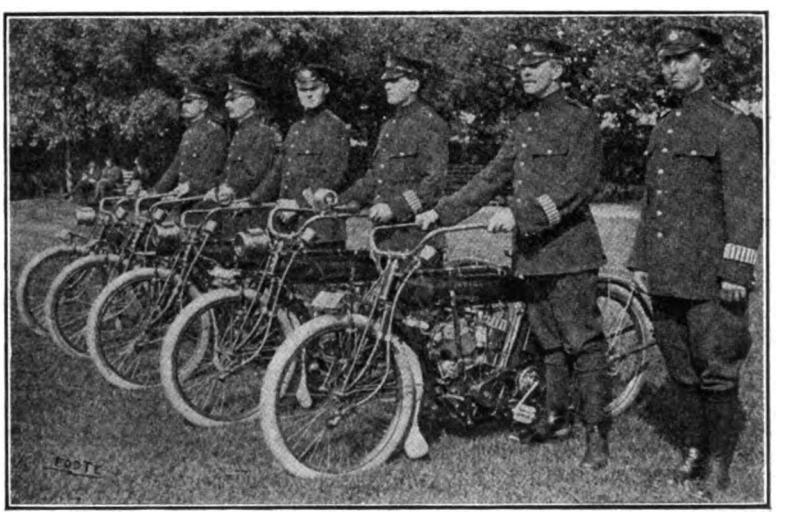
Hirah G. Baxter, Providence, R. I., agent for Excelsior mounts, has found it necessary to remove from his old location to more commodious quarters at 172 Washington street, corner of Snow, where he will have better facilities for handling both the sales and repair ends of the business.

Keene Riders' Annual Show.

For three years the Consolidated Motorcyclists of Keene, N. H., of which C. C. Wilber, formerly vice president of the Eastern District, Federation of American Motorcyclists, is the moving spirit, have held a successful automobile and motorcycle show in that city. The fourth annual event will be held Feb. 21-23, and it is anticipated that it will prove an even greater success than its predecessors.

New Officers for R-S.

At the meeting of the directors of the Reading Standard Company, Reading, Penn., maker of R-S machines, last month, the following officers were elected for the ensuing year: President, Abner S. Deyshar; vice president, Jacob B. Fricker; secretary, William F. Remppis; treasurer, John M. Hill.



Members of the Canadian Mounted Police Stationed at Winnipeg, Man., and Their Indian Mounts.

Pope Agency in Rhode Island.

The Pope machine, made by the Pope Manufacturing Company, Hartford, Conn., will be handled in the future by the Rhode Island Motor Car Company, Providence, R. I., which has had the agency for the Pope-Hartford cars, made by the same concern, for a number of years.

Mercier Re-Enters Racing Field.

Fred Mercier of New York City, who last fall announced his intention of retiring from the racing field to open a repair shop, will ride an Excelsior in racing events during 1912. He has abandoned the repair shop plan to take the management of the Central

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head, as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON

296 Blackstone St., Cor. Prairie Ave. Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY Boston, Mass.

Branches: 49 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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Motorcycle Company, 1220 Bedford avenue, Brooklyn, N. Y., which handles Flanders and Excelsior mounts. Mercier formerly rode an Indian.

Club Notes, Here and There.

Millstone, N. J., is still grinding out prospects for a new 100 per cent. F. A. M. club, and B. M. Dooly is duly on the job.

E. Frank Winfield, who has the happy faculty of organizing a motorcycle club wherever he lives, recently removed to Grand Junction, Col., and reports that he will soon add another affiliated club to the list.

New clubs recently affiliated with the F. A. M. include the following: Turlock, Cal., No. 217; W. G. Cooper, secretary, 12 members. Tacoma, Wash., 218; A. F. Hoska, Jr., 1807 Pacific avenue, 21. Quaker City, Philadelphia, Penn., 219; W. A. Stark, 2512 North Gratz street, 27.

Wauchope Bros., enthusiastic motorcycle dealer in Lodi, Cal., the components of which are members of the Stockton Motorcycle Club, proposes to celebate its sixth anniversary in business by organizing an affiliated club. The date set for the accomplishment of this purpose is about the first of April.

Leon F. Riche of Great Barrington, Mass., reports local conditions as favorable for organizing an F. A. M. club early in the riding season. There are about 40 local riders in the immediate vicinity, many of whom have signified their desire of joining a club for the benefits which organization affords them aside from sociability and companionship.

C. A. Jenner, physical director of the Brush Union high school, Brush, Col., is an enthusiastic motorcyclist, and reports that local road and other conditions are exceptionally fine for the sport in his vicinity. He has it in mind to organize a local club in order that sight-seeing runs and short tours may be the more enjoyable.

Henry Fisher of Southold, N. Y., believes in sociability, clean sport and companionship in motorcycle trips and tours, and is working for the organization of a local club in that town.

The Dayton Motorcycle Club was organized recently in Dayton, O., and has plans under way for securing a suite of rooms for headquarters.

The Madera Motorcycle Club, Madera, Cal., intends to construct a one-mile track in the vicinity of that city in the near future.

The Charleston Motorcycle Club, Charleston, S. C., is planning a series of races for Washington's Birthday.

The Galveston Motorcycle Club, Galveston, Tex., is planning to locate its clubhouse on an island.

The Newark Motorcycle Club, Newark, N. J., is arranging an endurance run for Memorial Day. The proposed route will cover 250 miles.

The Columbus Motorcycle Club, Columbus, Ga., is contemplating a race meet in the early spring, and expects entries from Savannah and Atlanta.

The Atlantic City Motorcycle Club recently held its annual banquet, at which 20 members sat down to well filled tables. The officers of the organization are: President, Albert C. Stephany; vice president, William Haenline; secretary, William F. Specht; treasurer, William Shannon.

The Maryland Motorcycle Club, Baltimore, Md., has selected the following officers: President, Frank O. Boyd; vice president, August Zimmermann; treasurer, William Wood; secretary, Elmer Snyder; captain, W. S. Standiford; first lieutenant, William F. McCauley; second lieutenant, Herbert Stubbs.

The following officers have been elected by the Chattanooga Motorcycle Club, Chattanooga, Tenn.: President, O. G. Von Long; vice president, Wells Boyd; secretary, Jesse J. Lesh; road captain, Edward Marler.



Factory of the Emblem Manufacturing Company, Angola, N. Y., Where the Well Known Emblem Motorcycles Are Produced.

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The following companies have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

General Automobile Company, Boston; capital, $15,000; incorporators, Leonard M. Cotton, Herman P. Bell, Lemuel W. Peters.

Rowan Automobile Company, Dover, Del; capital, $5100; incorporators, Ludwig Isenberg, David Isenberg, Oscar Isenberg, all of Philadelphia.

The Burgner-Cade Auto Company, Veedersburg, Ind.; capital, $6000; incorporators, D. S. Cade, J. W. Burgner, O. E. Cade.

Buffalo Auto Novelty Company, Buffalo, N. Y.; capital, $5000; incorporators, George A. Orr, Donald S. Carroll, Henry L. Jauch.

Taylor Motor Company, Lynchburg, Va.; capital, $25,000; president, T. A. Jennings; vice president, R. C. Taylor; secretary, H. P. Taylor.

Cobb Motor Company, White Plains, N. Y.; capital, $5000; incorporators, Frederick W. Cobb, J. Oakley Hobby, Jr., Arthur L. Strang, Frank J. Lamb.

Mohawk Garage Company, Brooklyn, N. Y.; capital, $50,000; incorporators, B. J. Roesler, Jr., A. M. Roesler, W. Roesler.

Lichty Sales Company, 602 Blackhawk building, Waterloo, Ia.; capital not given; H. F. and O. Lichty, owners and managers.

Edwards Auto Company, Watertown, N. Y.; capital, $7000; incorporators, Frank H. Edwards, Rose E. Edwards, Ross C. Brimmer.

Universal Motor Car Company, Pittsburg, Penn.; capital, $10,000; incorporators, Jacob W. Kennedy, Harry A. Cornelius, William M. Carleton, Harry E. Weiskopf.

Allen B. Laing Company, Plainfield, N. J.; capital, $20,000; incorporators, Allen B. Laing, Isabel M. Laing, George F. Graves, Augustus V. Searing, Eugene M. Laing.

F. B. Williams Company, Cincinnati, O.; capital, $10,000; incorporators, Fanny B. Williams, George C. Kuhn, Dwight F. Jerauld, Samuel Hummel, David S. Buchanan, Jr.

Jay A. Rickard Company, Schenectady, N. Y.; capital, $72,000; incorporators, J. A. Rickard, Jesse A. Rickard, B. C. Wheaton.

Louis L. Crane's Airship Transportation Company, Inc., Brooklyn, N. Y.; capital, $100,000; incorporators, Louis L. Crane, C. Crane, John F. Callaghan.

The Devney Automobile Machine Company, Glasgow, Ky.; capital, $50,000; incorporators, R. S. Devney, W. H. Jones, J. S. Cable, J. R. White.

The John Kohl Carriage & Automobile Company, Mason, O.; capital, $10,000; incorporators, John Kohl and others.

Auto Supply Manufacturing Company, Chicago; capital, $50,000; incorporators, C. Youngberg, O. Albertson, A. W. Olsen.

The Stafford Illuminated Auto Lamp and Number Company, Dallas, Tex.; capital, $25,000; incorporators, M. M. Parks, F. W. Schaub, Felix Greenwood.

The Rockmore Motor Company, Brooklyn, N. Y.; capital, $5000; incorporators, George F. Morrison, Walter R. Herrick, Philip W. Carney.

The Expansion Spring Rim & Tire Company, Boston; capital, $500,000; incorporators, Charles O. Doyle, Harris L. McNeill, Orrie T. Bowman.

Pope-Hartford Company, Chicago; capital, $20,000; incorporators, James L. Russell, Jessie Shields, E. X. Jones.

The Safe Auto Tire Company, Martinsburg, W. Va.; capital, $125,000; incorporators, J. W. Scott, G. W. Buxton, E. S. Bottomly, W. C. Kilmer, S. W. Walker.

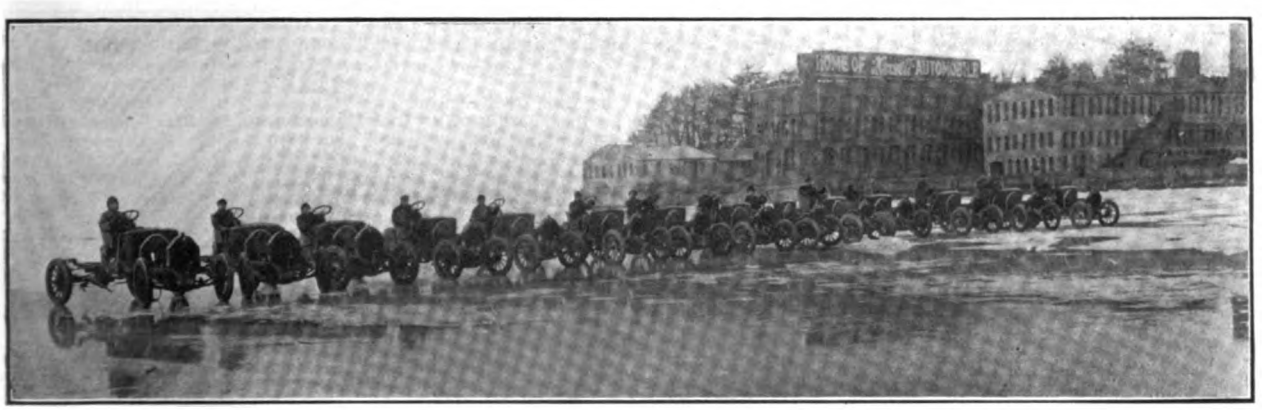
Starn Tire Manufacturing Company, Camden, N. J.; capital, $500,000; incorporators, G. E. Starn, G. M. Cline, W. C. Mayne.

Franklin Motor Car Company, New York City; capital, $10,000; incorporators, Glenn A. Tisdale, Albert F. Avid, 264 West 78th street; M. E. McDonald.

The Central Auto Supply Company, Des Moines, Ia.; capital, $10,000; president, A. W. Eggertsen; vice president, B. M. Starr; secretary and treasurer, A. J. Starr.

The Acme Auto Company, Cleveland, O.; capital, $10,000; incorporators, Willis C. Pollack, John D. Meyer, Mary E. Pollack, Susie K. Meyer, Elmer Edgerton.

Dwyer & Roche Company, Hartford, Conn.; capital,



During the Recent Cold Weather the Testers at the Maxwell-Briscoe Motor Company's Tarrytown, N. Y., Plant Tried Out the Cars on the Ice.

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$25,000; incorporators, Joseph J. Dwyer, John F. Dwyer, Thomas H. Roche.

Maxim Tri-Car Manufacturing Company, Morgantown, W. Va.; capital, $50,000; incorporators, Harry R. Warfield, Joe K. Buchanan, John L. D. Streator, H. B. Long, A. A. Hall.

Lexington Company of New England, Portland, Me.; capital, $10,000; president and treasurer, George E. Fogg.

Panwood Manufacturing Company, Grand Rapids, Mich.; capital, $60,000; incorporators, Fred Z. Pantlinf, Harold B. Woodcock, Robert G. Woodcock.

Keystone Garage Company, Chicago; capital, $2000; incorporators, Charles C. Loucke, Ephraim E. Atwood, Burell J. Cramer.

The Bernhard & Turner Automobile Company, Des Moines, Ia.; capital, $60,000; president and treasurer, J. C. Bernhard; vice president and secretary, Jay Turner.

GARAGE AND DEALER.

The Shafer Motor Car Company, Rochester, N. Y., has been formed and will handle the Cole line, made by the Cole Motor Car Company, Indianapolis, Ind.

The Scott County Mercantile Company, Davenport, Ia., has taken over the stock and business of the Buck Auto, Carriage & Implement Company. H. H. Derrough will



Handsome and Commodious Quarters of American-Marion Sales Company New York City.

continue to have charge of the motor car department of the concern.

C. B. Snyder is the manager of a new concern formed at Spokane, Wash., under the name of the Spokane Cole Motor Car Company, which company will handle the Cole line.

J. P. McCullom of Carthage, Ill., has purchased the Santa Fe Trail Garage at Dodge City, Kan. He will continue to handle the Cole product.

The Metropolitan Motor Car Company, Ltd., Vancouver, B. C., is the new name of the Pacific Garage & Auto Company. Mr. Boothby is the manager of the company.

The Butler Sales Company, Waterloo, Ia., has established headquarters on Park avenue and will handle the Colby cars, made by the Colby Motor Company, Mason City, Ia.

The E. E. Loving Auto Company, Memphis, Tenn., agent for the Cole line, has moved into new quarters at 289 Court avenue. The new building is two stories in height, of fire proof material and capable of housing 50 machines.

Harvey Parker, the well known tire man of Worcester, Mass., who recently secured the agency for the Palmer-Singer line, made by the Palmer & Singer Manufacturing Company, Long Island City, N. Y., is visiting the factory to acquire a mechanical knowledge of the car. He will return over the road with a demonstrator.

The Carhart Motor Company, Oklahoma City, Okla., has established two new branches, one at Guthrie and and another at Muskogee. Blake & Varley will have charge of the former and H. A. Benefiel of that at Muskogee. The company represents the Overland line, made by the Willys-Overland Company, Toledo, O.

Leonard Zengel, the well known racing driver, has associated himself with Thomas A. Phillips in the Phillips Motor Car Company, 324 West Third street, Dayton, O. The company plans the erection of a fine concrete garage, and will handle the Stutz, De Tamble and Fiat.

A. W. Trevor and W. E. Snider of Rock Island, Ill., have formed a partnership to handle the Stearns-Knight machine.

Russell P. Taber, Hartford, Conn., for several years agent for the Reo line, made by the Reo Motor Car Company, Lansing, Mich., has opened an agency at Waterbury, Conn., which will be in charge of Carl Humphrey and Samuel W. Taber. A garage and repair shop will also be maintained.

J. W. Naughton, Ware, Mass., has completed a structure on Pleasant street and will conduct a repairing business.

The Kentucky Motor Car Company, Cincinnati, O., of which Paul Hesser is at the head, expects to occupy new quarters at Park place and Scott street where a fire proof garage is being erected.

Brown, Thomson & Co., Hartford, Conn., has taken the agency for two lines of electrics in addition to gasoline automobiles. These are the Rauch & Lang and Standard.

The Buffalo Automobile Trade Association, Buffalo, N. Y., has elected the following directors to serve for the ensuing year: Ralph E. Brown, John J. Gibson, Charles F. Monroe, George Ostendorf, William Densmore, Gustave Miller and E. C. Bull.

The Osen & Hunter Auto Company, San Jose, Cal., has changed its name to the Osen-McFarland Auto Company. The company which is located at First and James streets, has a branch at San Francisco. O. C. McFarland has succeeded to the interests of A. E. Hunter.

The United Motor Car Accessory Company, a concern organized recently at Sioux City, Ia., will occupy sales and store rooms at Sixth and Nebraska streets. Ernest Shultz will be manager.

The Cunningham Auto Company, Des Moines, Ia., has taken over the state agency for the Clark line, made by the Clark Motor Car Company, Shelbyville, Ind.

The Des Moines Garage Association, organized recently at Des Moines, Ia., elected the following officers at a recent meeting: President, J. C. Bernard; vice president, L. H. Tietge; secretary, V. G. Claiborne; treasurer, S. Johnson. The membership of the organization includes practically all of the automobile, garage and accessory men of the city. The purpose of the association is to establish uniform prices for labor, etc.

The Ford Motor Sales Company, Harrisburg, Penn., has leased the building at 906 Market street, formerly occupied by the Capital City Garage and will remodel the structure.

The Riddell Auto Company, Des Moines, Ia., distributor in central Iowa for the Overland line, has added C. B. Peironnet and R. P. Walston to the selling staff.

The Roberts Garage, Pleasant street, Northampton, Mass., has taken the agency for the line manufactured by the United States Motor Company, New York City, which includes the Brush, Maxwell, Stoddard-Dayton and Columbia, and Sampson trucks.

George T. Butterfield of Medford, Mass., and F. H. Jordan of Boston, have purchased the building and business of the Tudor Garage Company, Chelsea, Mass. The new owners are experienced automobile men. The top floor of the building will be utilized for the manufacture of the Jordan demountable rim.

The Schacht Motor Sales Company is announced as successor to the Siegmund Motor Car Company at Los Angeles, Cal. The new concern will handle the Schacht line, made by the Schacht Motor Car Company, Cincinnati, O.

The Westcott Motor Car Company of Little Rock, Ark., has been organized and will locate on Main street. H. M. Westcott is president, Irving Hirsch vice president and secretary, and Henry Fletcher treasurer. The concern will handle the Westcott line, made by the Westcott Motor Car Company, Indianapolis, Ind., and will

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distribute for the States of Arkansas, Tennessee, Oklahoma, Texas, Alabama, Louisiana, Florida and Mississippi.

Charles E. Riess & Co., New York City, general distributor of the Marion automobiles, received an order recently for 10 Marion cars to be shipped to South Africa.

Harry D. Miller, formerly of the Bridgeport Vehicle Company, has joined the sales force of the Blue Ribbon Garage Company, Bridgeport, Conn.

The Howard Automobile Company, Los Angeles, Cal., has opened its new warehouse at 1701 San Fernando street. The building has 10,000 square feet of floor space, a private driveway and spur track for loading platform, and will be equipped for quick handling of automobiles.

WITH THE MANUFACTURERS.

D. Kirke Moore, formerly of Buffalo, N. Y., has accepted the position of general sales manager of the Western-Mott Company, Flint, Mich., but will retain his interests in the American Distributing Company. He is well known to the automobile industry having been engaged in the manufacture and sale of axles, wheels, transmissions and steering gears.

The Colby Motor Company, Mason City, Ia., will enlarge its factory and increase the number of workmen, according to an announcement made by the officers of the company.

The Stevens-Duryea Company, Chicopee Falls, Mass., has decided to begin the construction of a new plant and has acquired 40 acres of land in East Springfield, Mass., located on the Athol branch of the Boston & Albany railroad and the new Hampden branch of the New York, New Haven & Hartford line. The first building to be erected will be four stories in height, 500 by 80 feet, containing a floor space of 160,000 square feet. This structure will be ready for occupancy about June 1. Other buildings will be completed soon thereafter.

The Cleburne Auto Manufacturing Company, Cleburne, Tex., announced at a meeting of the directors held recently that prospects were bright, as the first machine manufactured had withstood successfully a thorough testing under varying conditions.

The White Company, Cleveland, O., has established a large agency in Buenos Ayres and several sub-agencies in other parts of the Argentine Republic. The company is pleased with the prospects for commercial vehicles in place of the primitive methods now employed on the large coffee and sugar plantations.

The Maxwell-Briscoe Motor Company's immense plant at Tarrytown, N. Y., is located on the Hudson river which body of water froze recently sufficiently to permit the use of ice boats and motor cars. Testers at the factory took advantage of this to try out the Maxwell cars, and in the accompanying illustration is depicted a fleet of 15 machines about to start on a day's testing. The smooth surface of the ice permitted of great speed and the drivers thoroughly enjoyed the novel conditions.

The Cole Motor Car Company, Indianapolis, Ind., subjects each and every Cole chassis to a severe test before the body is fitted and the machine painted. In and around the city the small army of testers may be seen daily driving their automobiles over the worst kind of roads, some of which are soft clay. After being tried out on the roads they are given a speed test. In the accompanying illustration is shown a group of testers about to start for a day's work.

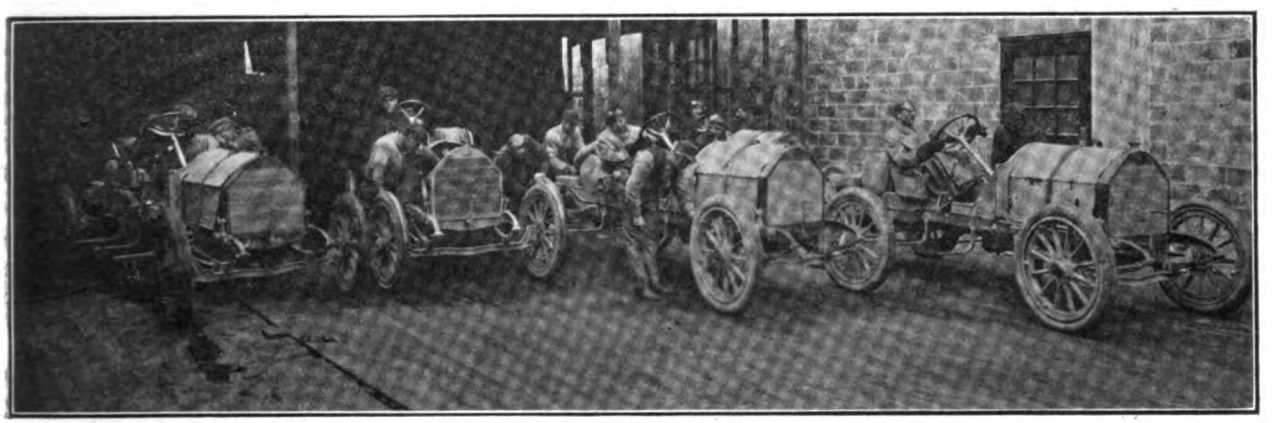
The American-Marion Sales Company, New York City, which handles the Marion and American cars, is established in commodious quarters at Broadway and West 63rd street. In the illustration appended herewith is shown the four-story building which houses the product of the American Motors Company, Indianapolis, Ind., and Marion Sales Company of the same city.

A. R. Rousseau, well known to the automobile industry, has been appointed western sales manager of the Imperial Motor Car Company, Jackson, Mich., with headquarters at 2216 Michigan avenue, Chicago. He was formerly connected with the executive forces of the General Motors Company.

The Maytag-Mason Automobile Company, Waterloo, Ia., has been reorganized and will be known in the future as the Mason Motor Company. The business will be conducted by H. W. Hayden, W. B. Wallace and E. R. Mason.

The Studebaker Corporation, Detroit, announces the appointment of Philip E. Hawley to take charge of the New England business of the concern. Mr. Hawley, who is well known to the automobile trade, will make his headquarters at Boston, where he will have entire charge of the wholesale business for this section.

The Henderson Motor Sales Company, distributor for the Cole Motor Car Company, Indianapolis, Ind., has appointed the following new Cole agencies for the State of New York: Peterman Motor Sales Company, Jamestown; R. L. Cooley, Batavia; William R. Hopkins, Bath; North Avenue Garage, Fiskkill-on-the-Hudson; J. Harry Cook, Cooperstown; Dewar & Diefendorf, Oneonta.



A Group of Testers About to Start from Factory of Cole Motor Car Company, Indianapolis, for a Day's Trip Over All Kinds of Roads and Hills.

The Velie Boston Branch of the Velie Motor Vehicle Company, Moline, Ill., announces that Amos J. Shorey will handle Velie pleasure and commercial vehicles in Waterville, Me. Tucker & Palmer of Tarrifville, Conn., will act as sub-agent for the J. T. Curtiss Company of Simsbury, Conn., Velie representatives in western Connecticut.

The Pacific Coast Borax Company, 100 William street, New York City, is marketing a product for both chauffeur and owner called "Grime-off." It is made in powder form and packed in a convenient can fitted with a sifting top, a sanitary feature which will appeal to users.

The Connecticut Telephone & Electric Company, announces the opening of an office, stock and show room at 231 West 54th street, New York City, where a complete stock of Connecticut ignition devices will be carried.

Ernest L. Gould, superintendent of the service department of the Velie Boston branch, left recently for a visit to the factory at Moline, Ill. He will visit the Chicago branch while en route.

The Ohio Motor Car Company, Cincinnati, O., announces that Breisario E. Diaz of Cartegena, Colombia, South America, who visited the factory recently, will handle the Ohio line in his country.

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MANY ABBOTT-DETROIT SALES.

Evidently the Mississippi valley is to see a large increase in the number of cars sold during the coming season. Among the recent orders reported from that section are those ranging from 35 to 250 cars from the following agents of the Abbott-Detroit line, made by the Abbott Motor Company, Detroit: W. L. Huffman Automobile Company, Omaha, Neb.; Tremain & Rankin Auto Company, Rock Island, Ill.; Tjaden Auto Company, Wellsburg, Ia.; Robertson Motor Car Company, Minneapolis, Minn.; Kaw Valley Auto Company, Kansas City, Mo.; M. M. Baker & Co., Peoria, Ill.; Johnston Motors Company, Des Moines, Ia.; J. W. McKay, Grafton, N. D.; Oskaloosa Vehicle & Auto Company, Oskaloosa, Ia., Burney Bird Auto Company, St. Paul, Minn.; Fischer Motor Car Company, Quincy, Ill.; A. F. Schrup & Co., Dubuque, Ia.; Barclay-Morton Auto Company, Mason City, Ia., and Bates-Odenbrett Auto Company, Milwaukee, Wis.

REO USES GOODYEAR TIRES.

In line with the many other refinements of detail in the equipment of Reo the Fifth, the latest creation of R. E. Olds of the Reo Motor Car Company, Lansing, Mich., R. M. Owen & Co., New York City, general distributor for the Reo line, announces that this car will be fitted with the Goodyear No-Rim-Cut tires, made by the Goodyear Tire & Rubber Company, Akron, O. As is well known these tires are claimed to be 10 per cent. oversize, a feature which is held to add from 20 to 25 per cent. in the mileage obtained.

MANY VELIES SOLD IN MAINE.

What is claimed to be the largest sale of automobiles ever made in the state of Maine was closed during the progress of the Bangor show, according to Harold D. Bornstein of the Velie Boston branch. This contract included Velie pleasure and commercial cars, made by the Velie Motor Vehicle Company, Moline, Ill., and the sale was made through the agency of Amos J. Shorey.

DALLAS WANTS VANDERBILT CUP RACE.

The Dallas Automobile Club, Dallas, Tex., is said to be laying plans to secure the annual Vanderbilt Cup race, although Savannah, Ga., has by no means relinquished its claims to the event. In the near future, the club proposes to lay an official communication before the contest board of the American Automobile Association, asking for a sanction and presenting possible routes over which the race may be run.

TUTO HORNS FOR KING GEORGE.

Six of the automobiles made especially for the use of King George V at the coronation durbar at Delhi, India, were equipped with Tuto horns, made by the Dean Electric Manufacturing Company, Elyria, O. In construction and equipment these cars were most luxuriously appointed, and that the American horn was selected is not only very gratifying to the maker but to all motorists in the United States as well.

HALLADAY AGENTS BANQUET.

During the progress of the pleasure vehicle show in Chicago, the Streator Motor Car Company, Streator, Ill., tendered a banquet to the Halladay agents and distributors throughout the West and Middle West in St. Hubert's English grill. Over 100 persons were present, and speeches were made by the following: John C. Barlow, president of the company; C. A. Bruce, manager; B. F. Anger, engineer; P. W. Suler of the sales department; Charles F. Bates, manager of the Brooklyn branch; H. Earl, Fairfield, Ia.; Charles M. Hayes, manager of the Chicago branch; F. S. Van Verghten, Hastings, Neb., and others.

AUTOMOBILES IN THE YUKON.

Whether or not the recent visit of Dr. C. G. Percival with the Abbott-Detroit "Bull Dog" to the Alaskan and Yukon regions has anything to do with the plan, Consul G. C. Cole of Dawson, Can., reports that a movement is under way looking toward the establishment of a motor car mail line between Dawson and White Horse. About two years ago a large automobile was used successfully in Dawson, and last winter the White Pass & Yukon Route Company, which operates a 330-mile stage line between White Horse and Dawson, tried a motor car, but without success. In order to prove satisfactory the tread of the machine should be such as to conform with the sled track, as between Oct. 1 and April 30 snow usually remains on the ground to a depth of two feet, or more. The time now consumed between White Horse and Dawson is from five to eight days, with relay stations at 20-mile intervals. With an automobile it is estimated that the distance could be covered at any time of the year within two days.

SAVANNAH RACES COST $50,000.

An itemized report of the receipts and expenditures for the Grand Prize, Vanderbilt Cup, Savannah Challenge and Tiedeman Trophy races of last November has been made to the Savannah Automobile Club, showing that the total receipts were $54,120.74, and the expenses about $50,436.80, leaving a balance of $3683.94 to be turned over to the state militia which patrolled the course.

NEW BUILDING FOR REPUBLIC TIRES.

The new Calendar building, now under process of erection for Republic Rubber Company, Youngstown, O., maker of Republic tires, is to be one of the most thoroughly up-to-date structures of its kind in America. It is to be of steel and brick, fireproof, saw tooth construction, and will be 200 by 85 feet, with eight 25-foot bays. Each piece of machinery is to be finished in white enamel. The hardwood floors will be oiled and the walls plastered and painted in oil colors. The hot water system of heating will be employed and every square foot of floor and wall space will be protected by an automatic sprinkler system.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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IMPORTANT NOTICE TO MANUFACTURERS

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TEXACO MOTOR PRODUCTS.

Among the new products displayed at the recent shows were those of the Texas Company, 17 Battery place, New York City and Houston, Tex. These include Texaco motor oils, light, medium and heavy; transmission lubricant, cup grease, etc., for the lubrication of all classes of internal combustion motors, and particularly those used in automobile and motor boat service. Three features are claimed for these lubricants:

First, they have zero cold test, and are guaranteed not to congeal above that temperature. This is held to make them especially adaptable for cold weather use, as they will not freeze in the crankcase or force feed pipes, or interfere with the working of the motor after it has been stopped for some time while exposed to the cold.

Second, they do not deposit any kind of hard, flinty carbon at any time in the cylinders or on the spark plug of the motor. They are claimed to have a somewhat lower flash than the average, and will burn up completely in the combustion chamber, passing out with the exhaust. It is added that in case too much oil is used or, for some reason the entire quantity of oil in the combustion chamber is not entirely burned up, any deposit which is left is of a soft, sooty nature, which can be wiped off readily with a cloth.

Third, being somewhat heavier in body at ordinary temperatures, it is held that there is better lubrication of bearings, and the film around the piston rings in the engine maintains a higher compression.

CONTEST DATES ASSIGNED.

The contest board of the American Automobile Association has issued sanctions for the following events: Feb. 17-19, E. A. Moross, track events, New Orleans, La.; Feb. 22, Kern County Auto Racing Association, road race, Bakersfield, Cal.; May 15-17, Chicago Motor Club, commercial vehicle run, Chicago, Ill.; May 30, Indianapolis Motor Speedway Association, 500-mile race, Indianapolis speedway; June 20, Chicago Motor Club, Algonquin hill climb; Aug. 8-10, Galveston Automobile Club, beach races, Galveston, Tex.; Sept. 2, Indianapolis Motor Speedway Association, race meet, Indianapolis speedway; Oct. 7-11, Chicago Motor Club, reliability tour, Chicago.

Other proposed events, dates for which have not been assigned officially as yet, are: March, track races, Montgomery, Ala.; March 4-8, reliability tour, Houston, Tex.; April 27, speedway meet, Los Angeles, Cal.; May 30, track events, Salem, N. H.; June, reliability run, St. Louis, Mo.; July 4, track events, Petersburg, Ind.; July 4-6, beach races, Old Orchard, Me.; July 4-5, track events, Taylor, Tex.; July, road race, Riverhead, L. I.; July 15, reliability tour, Wisconsin State Automobile Association; Aug. 23-24, Elgin road races; September, track events, St. Louis, Mo.; Oct. 5, Fairmount Park road race.

ANOTHER KNIGHT CAR COMING.

Official announcement of the organization of the Edwards Motor Car Company by C. G. Stoddard and H. J. Edwards was made at the automobile show in Chicago. Mr. Stoddard formerly was vice president of the United States Motor Company, and Mr. Edwards was chief engineer of the same concern. The announcement is followed by a positive statement that the new company will market a new pleasure car fitted with a Knight motor, and a full line of commercial vehicles.

It is definitely known that Mr. Stoddard has an option on an American license to utilize the Knight type of sleeve valve engine. He has great confidence in the skill of Engineer Edwards and believes that the new models to be put out under his direction will be a distinct success, both in the pleasure and commercial fields. Mr. Stoddard's resignation in no way affects his holdings in the United States Motor Company, with which he remains as director, and his withdrawal from the vice presidency does not change the position of the Dayton Motor Car Company, maker of Stoddard-Dayton cars, in the larger organization.

STUTZ SCORED FIRST PLACE.

The Ideal Motor Car Company, Indianapolis, Ind., maker of Stutz cars, points out that two of these cars were the first entered for the 500-mile race on the Indianapolis speedway, Memorial Day, and not those of another make, as previously announced in these columns. The two Stutz machines will be piloted by Leonard Zengle, who was at the wheel of National cars last season, and Gilbert Anderson, who drove the first Stutz made, in the Memorial Day race of the same distance over the same course last year.

ARISTOS COMPANY EXPANDING.

As the first step in its campaign to cover a large portion of the country with its branches, the Aristos Company, 250 West 54th street, New York City, which handles the Disco self-starter, Mondex shock absorber, Mondex muffler, etc., has purchased the business of J. H. Palmer in Chicago. Mr. Palmer formerly handled the Disco product in the Middle Western metropolis, and will continue as manager of the new Aristos branch, which will be located at 1501-05 Michigan avenue.

ELMIRA CLUB ELECTS OFFICERS.

At the recent annual meeting of the Elmira Automobile Club, Elmira, N. Y., the following officers were elected: President, M. Doyle Marks; vice president, Arthur Clinton; secretary, M. R. Ellis; treasurer, F. E. Robbins. Plans were laid for attending the forthcoming show of the Elmira Automobile Dealers' Association in the local armory Feb. 27-March 2.

WOULD LIGHT STATE ROADS.

Senator White of the New York Legislature has introduced a bill asking for an appropriation of $25,000 with which to experiment in the lighting of state roads. It is estimated that it would not cost in excess of $400,000 to illuminate the entire highway between New York and Buffalo, by way of Albany. In addition it is claimed that it would be possible to sell electric lighting to farmers and others on the way, so as to reimburse the state in a measure.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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NEW YORK SHOW A WEEK LATER IN 1913.

The principal business at the annual meeting of the National Association of Automobile Manufacturers in Chicago, aside from the election of officers, was the decision to conduct the only New York show of 1913 a week later than this year. This means that the pleasure vehicle section will open the evening of Jan. 11 and continue until Jan. 18, and that the commercial car division will be held from Jan. 20 to Jan. 27. The Chicago show, also will be pushed ahead a week, the dates being Feb. 1-8 for the pleasure vehicle section and Feb. 10-17 for trucks.

The decision to hold but one show was forecasted some little time since.. It is impossible to tell where the event will be staged, because the present situation does not permit of telling whether the Madison Square Garden will be torn down or the new Grand Central Arena will be constructed at that time. Whatever the result, there will be but one display and that will be under the direction and management of the National Association of Automobile Manufacturers, and the makers of all cars will be invited to make exhibit.

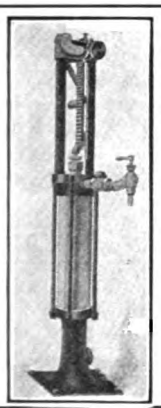
The election of officers resulted as follows: President, William E. Metzger, Metzger Motor Car Company; first vice president, Benjamin Briscoe, United States Motor Company; second vice president, H. O. Smith, Premier Motor Manufacturing Company; third vice president, S. T. Davis, Jr., Locomobile Company of America; secretary, R. D. Chapin, Hudson Motor Car Company; treasurer, H. H. Rice, Waverley Company; general manager, S. A. Miles; assistant manager, J. S. Marvin; counsel, Charles Thaddeus Terry.

MORE CAPITAL FOR NEWTONE HORNS.

In order to meet the increasing demand for Newtone electric horns, the maker, the Automobile Supply Manufacturing Company, Brooklyn, N. Y., has prepared papers for an increase in its capital stock to $500,000. The concern has secured additional floor space, and has equipped its enlarged plant with the most up-to-date machinery, thereby making it possible to employ several hundred workmen, who are now working overtime. It is claimed that this company has the largest plant in America devoted to the production of automobile horns.

"BULL DOG" AT CHICAGO SHOW.

One of the interesting exhibits at the Chicago show was the Abbott-Detroit "Bull Dog," which arrived in that city from New York in charge of Dr. Charles Percival after a three days' trip over the road. The total distance now travelled by the car is 42,115 miles. In spite of heavy snow in New York State the machine came through on scheduled time. From Chicago, Dr. Percival will strike south through Indianapolis, Ind., Columbus, Dayton and Cincinnati, O., attending the shows in these cities, after which he will make his way East to visit the exhibtion at Boston.



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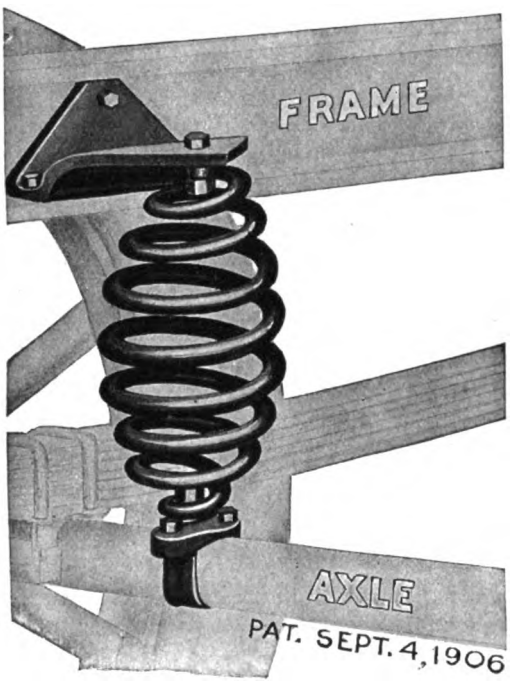
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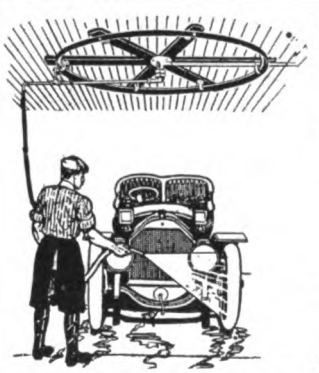
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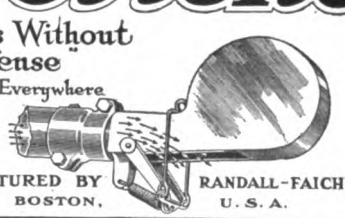
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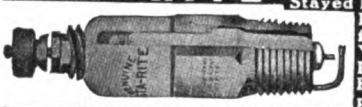
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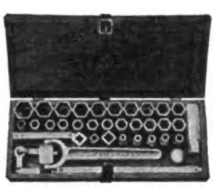
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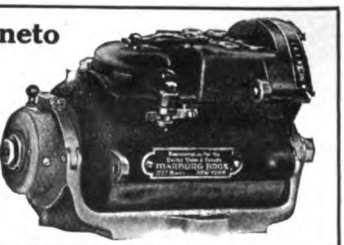
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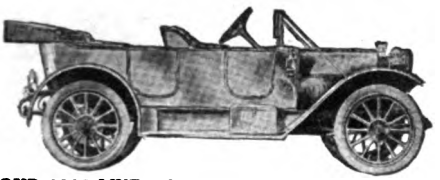
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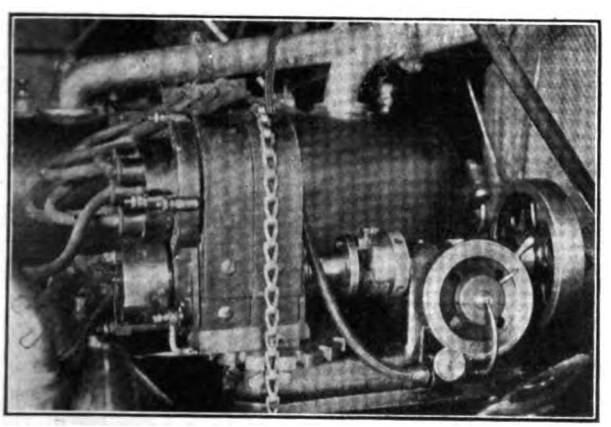
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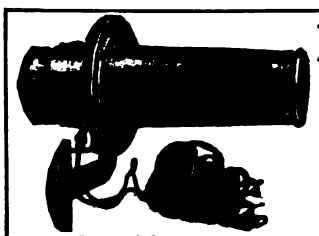
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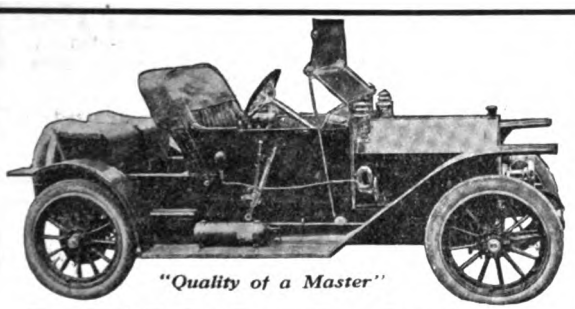
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Hazard Motor Mfg. Co., 122 Coates St., Rochester, N. Y. (Hazard.)

Western Motor Company, Marion, Ind. (Rutenber.)

OILS, GREASES AND OTHER LUBRICANTS.

Berne, Scrymser Co., 30 South St., New York City (Colonial.)
Branches: Boston, Mass.; Fall River, Mass.; Philadelphia, Penn.

Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)

Eagle Oil & Supply Co., 104 Broad St., Boston, (Eagleine No-Karbon.)

Fiske Bros. Refining Co., New York City. (Lubroleine.)
Branch: Pittsburg, Penn.

Harris Oil Co., A. W., 326 South Water St., Providence, R. I. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.

Havoline Oil Co., 123 William St., New York City (Havoline.)

Hawe, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 899 Boylston St., Boston, Mass.

Kellom & Co., Chas. F., 113 Arch St., Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.

Kincaid Oil Co., 219-221 West Exchange St., Providence, R. I. (Kincaid.)

Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York Lubricating Oil Co., 116 Broad St., New York City. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 423 Passaic Ave., East Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.

New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)

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Standard Oil Co., New York City (Polarine.)
Branches: In all cities.
Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston, Mass.; 605 Brown Bros. Bldg., Philadelphia, Penn.; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.
Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)
Wolverine Lubricants Co., 30 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

OIL AND GREASE PUMPS, GUNS, ETC.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.
Randall-Faichney Co., Boston, Mass. (B-Line.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

PUMPS — HAND AND ENGINE OPERATED.

Bridgeport Brass Co., 124 Crescent St., Bridgeport, Conn. (Atlas.)

RIMS — REMOVABLE AND DETACHABLE.

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
Michelin Tire Co., Milltown, N. J.
Branches: Boston, Mass.; Buffalo, N. Y.; New York City; Philadelphia, Penn.; Cleveland, O.; Chicago, Ill.; Detroit, Mich.; Denver, Col.; San Francisco, Cal.; Seattle, Wash.
United States Tire Co., Broadway and 58th St., New York City (Continental and Whittelsey Demontachable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash., London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Connecticut Shock Absorber Co., 10 Britannia St., Meriden, Conn.
Branches: See Magnetos and Magneto Supplies.
Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.
Delta Mfg. Co., Bloomfield, N. J.
Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)
Herz & Co., 295 Lafayette St., New York City (Bougie Mercedes.)
Janney, Steinmetz & Co., Philadelphia, Penn.
Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)
Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.
Walker Machine Co., G. A., 83 Braintree St., Allston Station, Boston, Mass. (Ballite.)

SPARK PLUG TERMINALS.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae Universal.)

SPEEDOMETERS AND RECORDING DEVICES.

Casgrain Speedometer Co., 172 Columbus Ave., Boston, Mass.
Branches: 1919 Broadway, New York City; 2081 Euclid Ave., Cleveland, O.
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.
Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1618 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3928 Olive St., St. Louis, Mo.

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Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

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Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.
Janney, Steinmetz & Co., Philadelphia, Penn.

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Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2329 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York City.

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park square, Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1033 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco,

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CLASSIFIED BUYERS' GUIDE---Concluded

Consolidated Rubber Tire Co., 20 Vesey St., New York City (Kelly-Springfield.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Detroit, Mich.; Cincinnati, O.; San Francisco, Cal.; Los Angeles, Cal.; Akron, O.

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 342 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 143 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Michelin Tire Co., Milltown, N. J.
Branches: See Rims—Removable and Detachable.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRE CHAIN GRIPS.

Atlas Chain Co., 34 35th St., Brooklyn, N. Y. (Atlas.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator). See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

Michelin Tire Co., Milltown, N. J. (Mastic.)
Branches: See Rims, Removable and Detachable.

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder)

TIRE SLEEVES.

Selbach Rubber Co., 404 Atlantic Ave., Boston, Mass. (Selbach Safety.)

TIRE TOOLS AND REMOVING EQUIPMENT.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Consolidated Rubber Tire Co., 20 Vesey St., New York City (Kelly-Springfield.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Michelin Tire Co., Milltown, N. J.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Butler Mfg. Co., The, Carthage, Ind.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing, Mich.
Branches: Factory, Parkin, Ark.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Pitless Auto Turntable Co., Kansas City, Mo.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, Hartford, Conn. (Kant-Break.)

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Crane, F. G., 331 Genesee St., Buffalo, N. Y.

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Auto Parts Co., Motor Ave., Providence, R. I. (Apco.)

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U-Auto-Varnish Co., Cleveland, O.
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Perfect Mfg. Co., Albany, N. Y.

WINDSHIELDS AND WINDSHIELD CLEANERS.

Conover & Robinson, 244-252 W. 54th St., Motor Hall, New York City (Boreas.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

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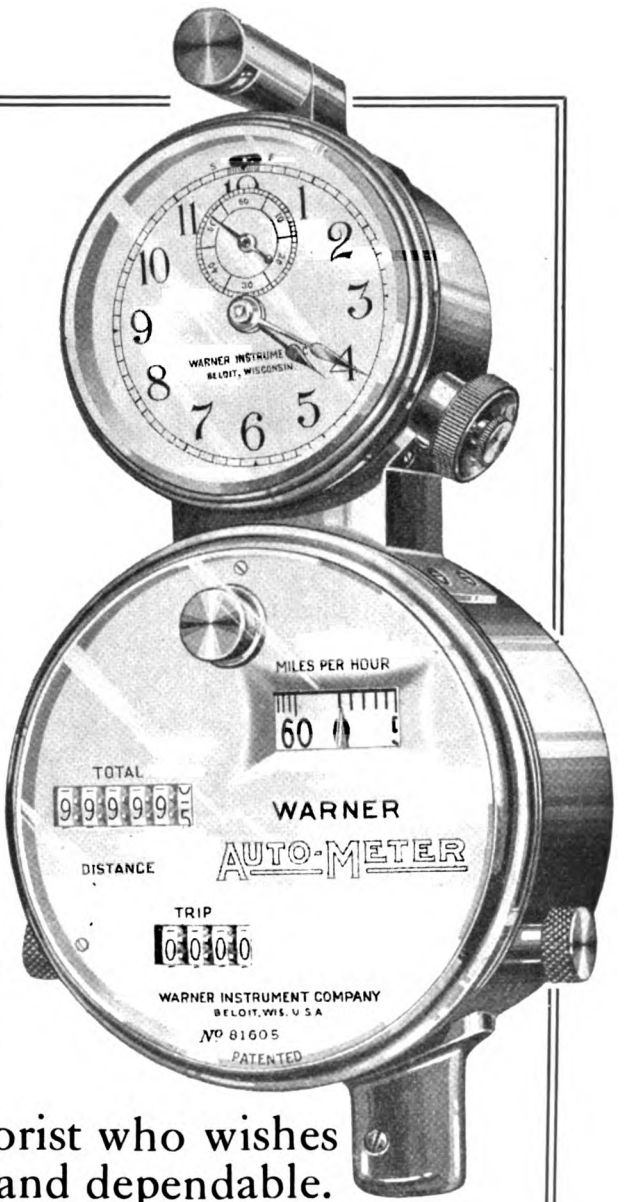
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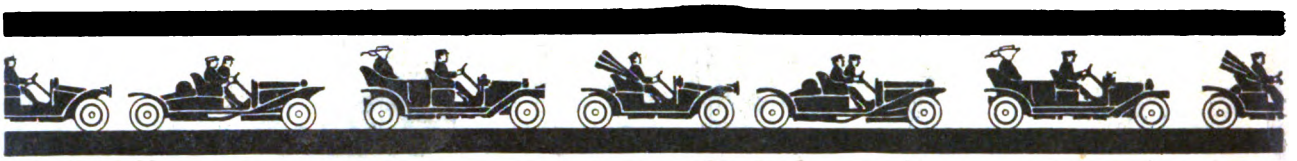
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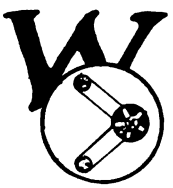
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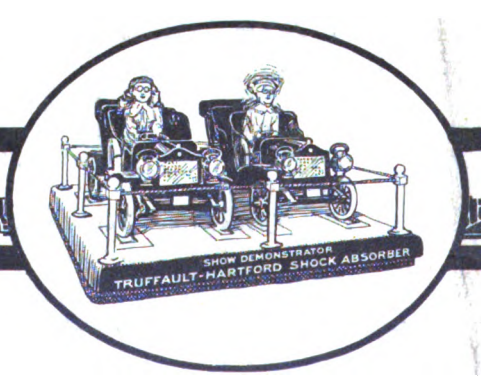
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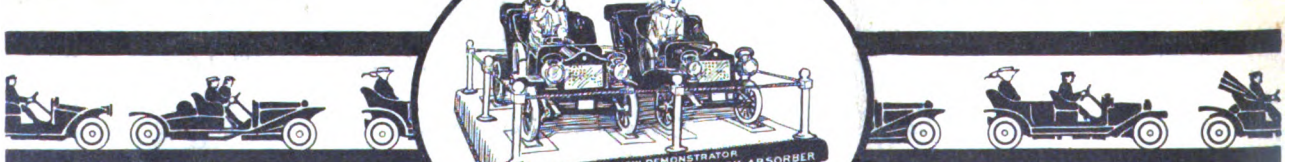
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VOL. XXXIII No. 2

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March 1, 1912

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NEW YORK CITY 2782 Broadway	ALBANY, N. Y. 135 Central Avenue	HARTFORD, CONN. 274 Trumbull St.	PHILADELPHIA, PA. 318 North Broad St.	NEWARK, N. J. 274 Halsey St.

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Supply House In America

ESTABLISHED 1896.

"TRY MILLER"

This Expression Has Developed Into a Trade Term.

"There's a Reason."

The public, which in the past has experienced difficulty in obtaining Automobile Supplies, should give us a trial by mail or a personal visit.

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204 Columbus Avenue
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largest of the kind published
address on request.

Manufacturer, Jobber, Exporter and Importer

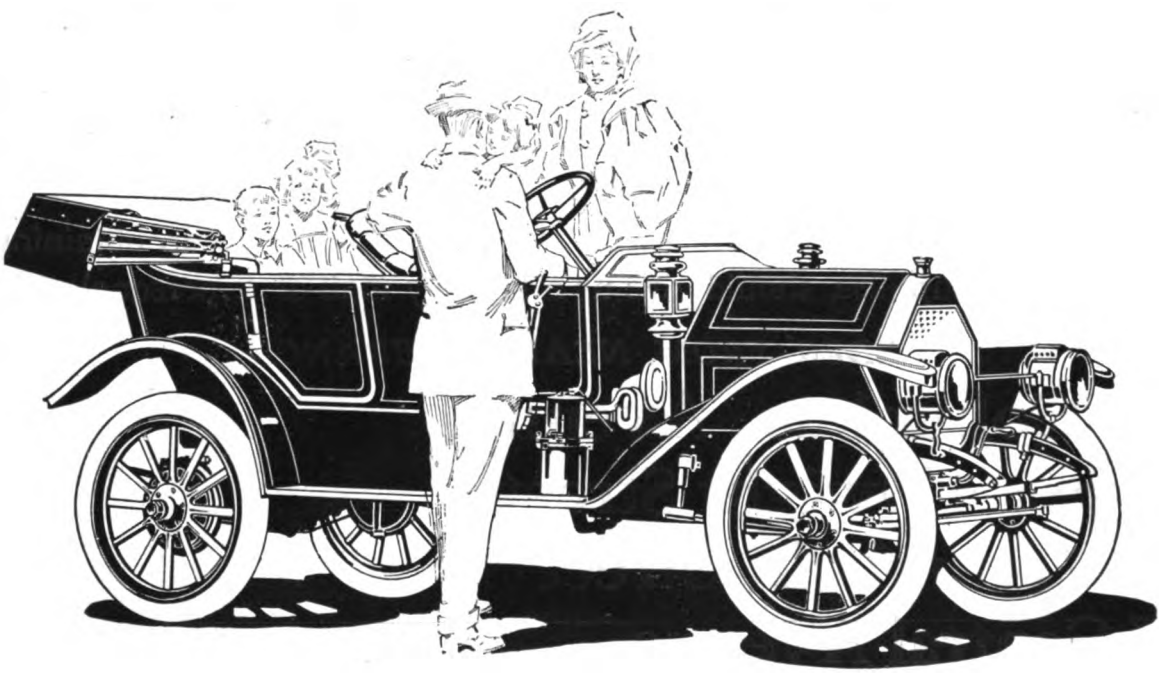
and 121 Chambers Street, New York City

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Maxwell



It pays dividends in Health renewed Energy and added Income

THE conservative thinking man has long recognized the benefits of owning a motor car—but has hesitated to seek them because of the COST. His real bugaboo has been operating and up-keep cost.

Maxwell cars have proved that these costs need not be high. Thousands of Maxwells are today used in businesses where they must pay for themselves to be justified. Now the Maxwell "Mascotte" brings the initial cost of a real FAMILY CAR down below $1000—makes it possible to buy a car—

Big enough to be used by all the family—

Powerful enough to meet every demand made upon it—

Stylish enough to be proudly owned—

And at a price that formerly only bought a runabout and frequently an inferior machine.

We urge your careful investigation of the MAXWELL "MASCOTTE" and consideration whether it will not pay dividends to you.

We would be glad to furnish any information you may wish. Simply say on a postal, "Mail Books."

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"Mascotte"



Reputation and Responsibility guarantee $980

extraordinary value at this exceptionally low price

These facts, easily demonstrated, justify Maxwell reputation—Fifty-one thousand Maxwell cars running! 91% of the cars made seven years ago still in active daily use! Sixteen thousand Maxwells owned by physicians, who require the most exacting service and cannot brook delays! Surprisingly low up-keep and operating cost recorded by all Maxwell owners!

This necessarily means responsibility—Fourteen factories, employing fourteen thousand men! Aggregate annual output, 52,000 cars of five well-known makes—each the recognized leader in its price classification! Forty-five branch houses and dealers everywhere to take care of cars in the hands of owners!

This is the explanation of the Maxwell "Mascotte" at this price—Everything that vast resources and complete organization can do to reduce purchasing, manufacturing and selling expense and so make possible extraordinary value at an exceptionally low price.

Analyze these features — A ventilated, fore-door, flush-side, five-passenger body with lines and proportions that speak for themselves. A 25 horsepower, four cylinder motor. Dual ignition, sliding gear transmission, multiple disc clutch, shaft drive, full-floating rear axle. Irreversible steering gear, double acting brakes, long resilient imported steel springs. 32-inch wheels and 104-inch wheelbase. Finished in blue-black with gray wheels, upholstered and appointed with every provision for comfort. Equipped with magneto, generator, two gas lamps, three oil lamps, horn, tool kit, jack, pump, tire repair kit, tool box, foot and robe rails. Price $980, f.o.b. factory, top extra. The value is apparent.

Compare it with other cars—At the New York and Chicago Automobile Shows—the two national shows at which all makes of cars are represented — the Maxwell "Mascotte" was conceded to be the most striking car exhibited. In beauty and style, in equipment and appointment, in workmanship and in finish, it was generally favorably compared with cars costing almost double its selling price. In design, it followed established Maxwell principles that have proved themselves in the extraordinary Maxwell record. The reputation of the Maxwell and its recent sweeping victory in the Glidden Tour, guarantee its long life and service. What more can you ask in a car?

See it at the Boston Show in Mechanics' Building

UNITED MOTOR BOSTON CO., Boston, Mass.

Maxwell Sales Co., Providence, R. I.
Franklin Square Garage, Worcester, Mass.
Smith & Hubbell, Springfield, Mass.
F. W. Sanborn, Concord, N. H.
Darling Automobile Co., Portland, Me.
Darling Automobile Co., Auburn, Me.
W. C. Landon & Co., Rutland, Vt.
Ford & Lyon, Fitchburg, Mass.

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There are experienced motorists buying new cars every day who have not the slightest misgivings about getting service for every dollar they have invested,

because

They have learned their lubricating lesson and they buy

TRADE MARK REGISTERED IN UNITED STATES PATENT OFFICE

NON-FLUID OIL

for bearings, transmissions and differentials and

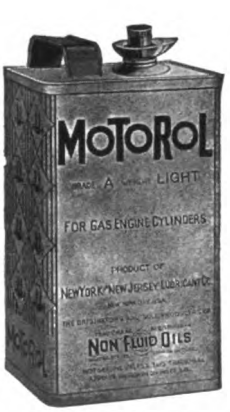
MOTOROL

"It suits because it doesn't soot"

for cylinders---with the same idea of buying recognized standards as in buying gasoline.

Experience will teach you as it has taught these motorists and as it has taught the seventy odd motor car manufacturers who recommend NON-FLUID OIL.

We would like to have you read a book called "Lubrication of the Motor Car," which we believe is the most complete and most helpful of its kind. IT'S FREE.





Non-Fluid Oil, a pure mineral oil lubricant, wasteless, clean, unaffected by temperature. Lasts twice as long as greases and compounds.

Motorol, the cylinder oil with the most lubricating "body" and the least carbon.

Send me "Lubrication of the Motor Car"

Name.....

Address.....

Dealer.....

Address.....

Car.....

N. E. A. J. 2-25

NEW YORK & NEW JERSEY LUBRICANT CO.

165 Broadway, New York

CHICAGO, 1430 Michigan Ave., PHILADELPHIA, 1416 Vine St., SAN FRANCISCO, 544 Van Ness Ave., LOS ANGELES, 1038 So. Main St.

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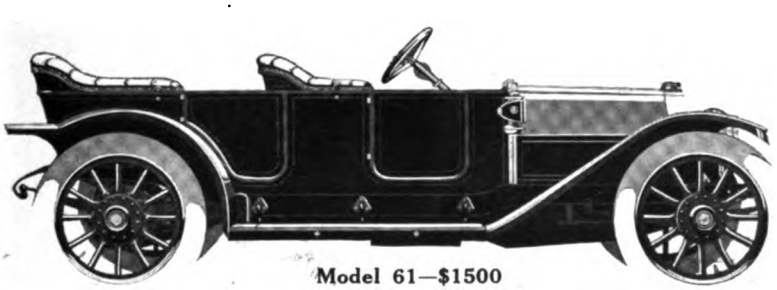
Overland

ALL of the standard popular priced cars are represented in this issue. This gives you a splendid opportunity to make a few comparisons of motor car values and to verify our claims, that in an Overland car you get more real car for less money than in any other machine on the market.

¶ For example—take our Model 61. This car has a big 45 horsepower motor. Is a five-passenger touring car. The wheel base is one hundred and fifteen inches. The axles are fitted with the finest Timken bearings. The transmission is fitted with F & S annular bearings. The pressed steel frame has a double drop. The handsome body is finished in rich Brewster green trimmed with heavy nickel plate. The lamps are dead black and nickel plated. The magneto is a Bosch. This car is priced at $1500. Have you ever seen its equal for less than $2000?

¶ Our interesting factory book explains why the greatest organization in the business can make these fine cars to sell at such remarkably low prices. Write for a copy. Please ask for copy K42.

The Willys-Overland Company, Toledo, Ohio.



Model 61—$1500

Wheel base, 115 inches; body, 5-passenger fore door touring; motor 4 3-8 x 4 1-2; horsepower, 45; Bosch magneto; tires, 34x4 inch, Q. D.

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THE sound, healthy growth of appreciation of Speedwell Motor Cars denotes the enduring goodness of these cars.

Sensational mechanical innovations which catch popular attention and then die the death of the impracticable have never found place on Speedwell Cars.

Every Speedwell is rational through and through.

Riding comfort, power, good looks, long life— these are factors that count.

Literature upon request.

The Speedwell Motor Car Company

80 Essex Avenue, Dayton, O.

*STANDARD EQUIPMENT

Self Starter,
Full cape top and boot,
Glass front,
Demountable rims,
Gas tank and full lamp equipment,
Tool kit,
Tire kit,
Etc., etc.
One standard chassis---4 cylinder, 50 H. P.; 123 inch wheelbase; 36 inch wheels.

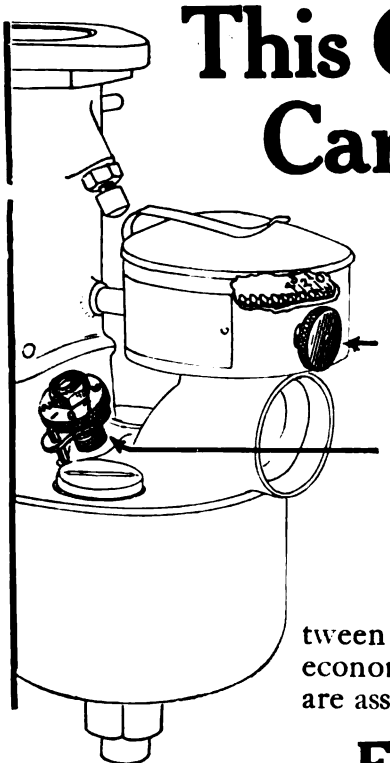
*Equipment as given applies to all models except roadsters and limousine, which vary slightly in their standard equipment.



Model F-Special, 7 passenger
$2900, with full equipment

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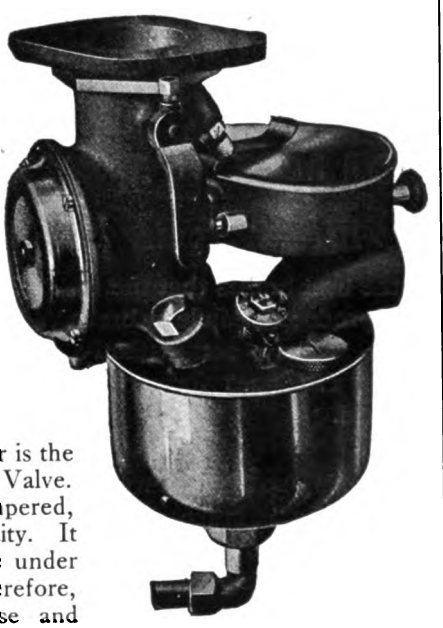
This Carburetor is Worth Careful Investigation



ONLY TWO ADJUSTMENTS

Simple as setting an alarm clock—and as easy. The table insures absolute correctness.

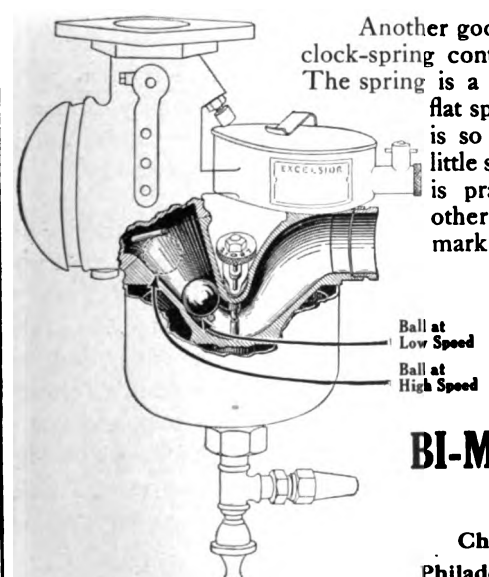
The great advance in The Excelsior Carburetor over others is due to one fact. Simplicity—and with it efficiency—have been developed in the Excelsior to a point no other carburetor has ever attempted. Only two adjustments are used and these are fitted with numbered dials and a printed table, which makes adjustment as simple—**for anyone**—as the setting of an alarm clock. Once adjusted, "the ball in the tube" takes care of the mixture, automatically giving the proper proportion of gas and air at all speeds between high and low. Thus economy and motor-efficiency are assured at all times.



EXCELSIOR CARBURETOR

"The ball in the tube does it."

Another good feature of the Excelsior is the clock-spring control of the Auxiliary Air Valve. The spring is a hardened, uniformly tempered, flat spring of an expensive quality. It is so placed and used as to be under little strain and its durability, therefore, is practically limitless. These and other points of superiority have enabled The Excelsior to set a new mark both in efficiency and economy.



"THE BALL IN THE TUBE DOES THE REST."

After adjustment the ball regulates mixture at all intermediate speeds.

Send for our booklet No. 6. and get the whole story about The Excelsior.

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Philadelphia: Manufacturers' Supplies Co., Juniper and Cherry Sts.

EXCELSIOR NEEDLE CO., TORRINGTON, CONNECTICUT.

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See This Excellent Line
At The Boston Show



DUPLEX EXTERNAL BRAKES

Are the best brakes that the industry produce. Made by brake experts. They act instantly, whether car goes forward or backward.

Nothing is so necessary as "quick-acting" brakes. You often need them in an emergency. The DUPLEX never fails.

Get DUPLEX brakes for your car. If you're having brake troubles, install them. See what it feels like to have a set of brakes that work when you want 'em to work.

We make special brakes to order. Send us your specifications. Ask for prices.



TRADE MARK Raybestos REG. U. S. PAT. OFF.

This famous brake lining is used everywhere. It has the highest co-efficient of friction. It is practically oil and waterproof. As for wear! Well, it wears and wears and wears. It's made of the finest asbestos specially treated, woven with copper wire.

Dont buy the imitation. Every foot of RAYBESTOS is stamped with our trade-mark. This protects you and your car. See that it appears in the RAYBESTOS lining the dealer sells you.

It makes brakes "grip" with the grip of a bulldog. Line your brakes with RAYBESTOS and they won't slip. You find it on all the good cars. Ask your dealer, manufacturer or supply man.

Send for particulars. Get some of this lining for your brakes. Your dealer has it in all sizes.



GYREX · THE MIXER ·

Is a little gasolene mixer that fits the intake pipe. It spins around as the gasolene and air is drawn through and thoroughly "mixes the mixture."

It does what the best carburetors can't do. It delivers a perfect mixture, thoroughly diffused, to the cylinders — that's what is needed in cold weather.

We will send it on trial. Send us $3.00 and we will mail you a GYREX, and if it does not PROVE its worth you can return it within ten days and your money is cheerfully refunded. Send name, model and year of your car, or inside diameter of intake pipe at carburetor flange. Get a GYREX when you visit the shows.

THE ROYAL EQUIPMENT COMPANY

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The Proof of a Battery is in Its Lighting Service and Its Life

OVER 80% OF THE LEADING MAKERS
OF CARS PROVED THAT THE



LIGHTING BATTERY

(CLASS A)

Was the Only Battery Good Enough for Their Cars. The Finding of These Manufacturers Should Be Good Enough For You.

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Agencies in all Principal Cities in the United States and Canada

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COES

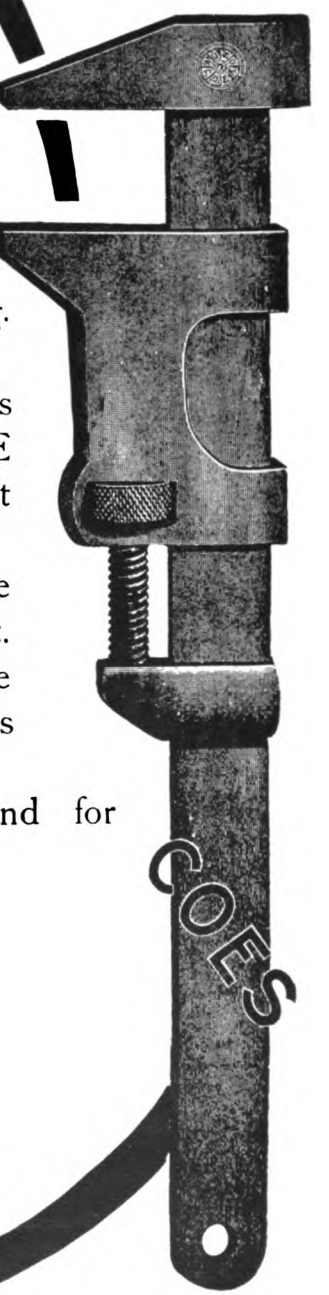
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

SEE US AT THE SHOW and send for literature now.



Coes Wrench Co.

WORCESTER, MASS.

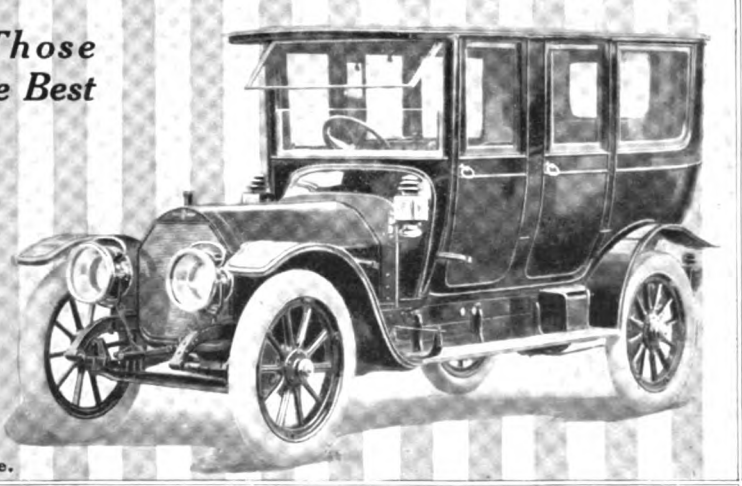
J. C. McCARTY & CO.,
21 Murray St., New York City
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113 Chambers St., New York City

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Matheson
"Silent Six."

Luxurious closed bodies of the latest designs by Quinby and Brewster. A tried and proven chassis of remarkable workmanship.

Built for Those Who Use the Best



Matheson Automobile Company
Wilkes-Barré, Penn.

New York Salesrooms
B'way at 62nd St.

Boston Salesrooms
664 Commonwealth Ave.

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Atlas-Knight

Proven by the most exhaustive test to be the Best Type of Automobile Engine.

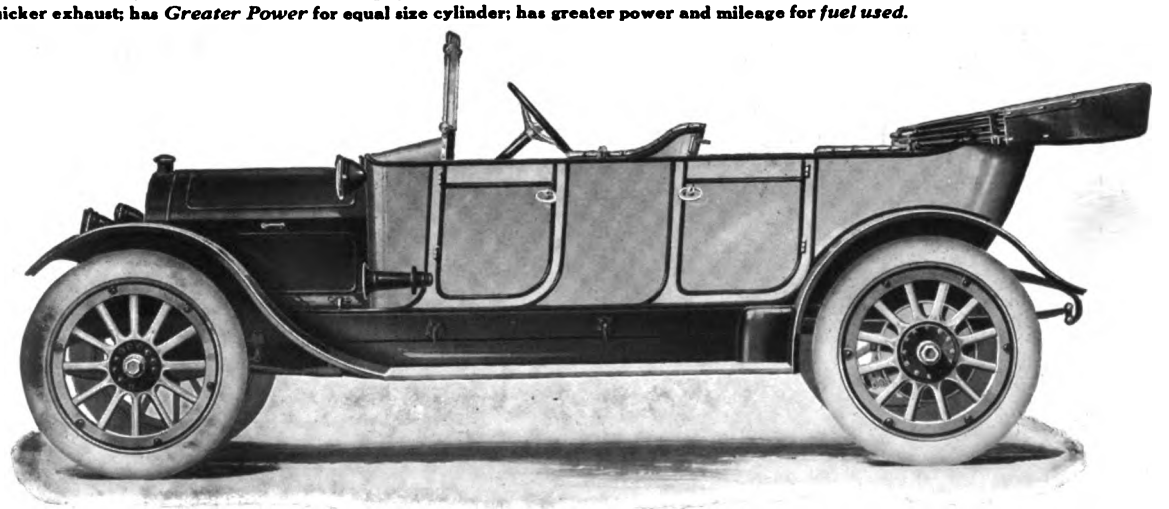
Adopted by the Atlas Company because of its wonderful record and remarkable success with the leading European manufacturers, the Daimler in England, the Mercedes in Germany, the Minerva in Belgium, the Panhard in France, and many others.

THE KNIGHT ENGINE IS THE ENGINE USED BY THE ROYALTY AND NOBILITY OF EUROPE

Including the King and Queen of England, the Czar of Russia, the Empress of Russia, the King of Spain, the King of Belgium, the Crown Princess of Sweden, etc. More than ten thousand Knight engines now in use giving new pleasure and delight to motoring.

ADVANTAGES OF THE Atlas-Knight OVER THE BEST TYPE OF POPPET-VALVE ENGINES

SILENCE under all running conditions; greater *smoothness* in running and absence of vibration; *positive* action of working parts; loses none of its power, silence or smooth running qualities with *years of continuous* service; admits *Larger Charge* and has freer and quicker exhaust; has *Greater Power* for equal size cylinder; has greater power and mileage for *fuel used.*



Atlas-Knight Five-Passenger Touring Car.

SPECIFICATIONS

ENGINE—Atlas-Knight, four-cycle, four-cylinder, cast in pairs, 4½" bore, 5½" stroke. Equipped with electric seat-starter.
HORSEPOWER: Fifty at twelve hundred revolutions.
CARBURETER—New Multiple Jet Stromberg with adjustment on steering wheel.
CLUTCH—Three-plate, faced with raybestos.
TRANSMISSION—The transmission case is part of the rear axle housing. Three speed selective.
REAR AXLE—Full-Floating flange-type; the differential gears are chrome vanadium steel.
WORM-DRIVE—The worm-drive is used to eliminate the continuous grind and noise of the bevel gear drive: it is constructed according to the latest European practice where the worm-drive is now accepted as the best.
FRONT AXLE—Timken, drop-forge, with Timken adjustable roller bearings in the wheel hubs and in the steering head.
BRAKES—Two sets double-acting internal and external, mounted on rear wheel hubs.
SPRINGS—Rear: very long, flexible, three-quarter elliptic, 2½-inches wide.
WHEELBASE and TREAD—Five-passenger 130-inch. Seven-passenger 140-inch. Tread 56 inches.
TIRES and RIMS—Demountable rims, 37"x5" tires.
STANDARD EQUIPMENT—One extra universal demountable rim, imported silk mohair top with dust cover, adjustable glass wind-shield, Stewart speedometer, trunk-rack, tire holder, coat and footrails, cocoa matting, complete tool and tire outfit, complete electric light equipment, including headlights and lights in rear tonneau and on dash.
LIST PRICE—$3500.00, five-passenger, completely equipped. $3700.00, seven-passenger, completely equipped.
F. O. B. Springfield, Guaranteed for one year.

ATLAS MOTOR CAR COMPANY

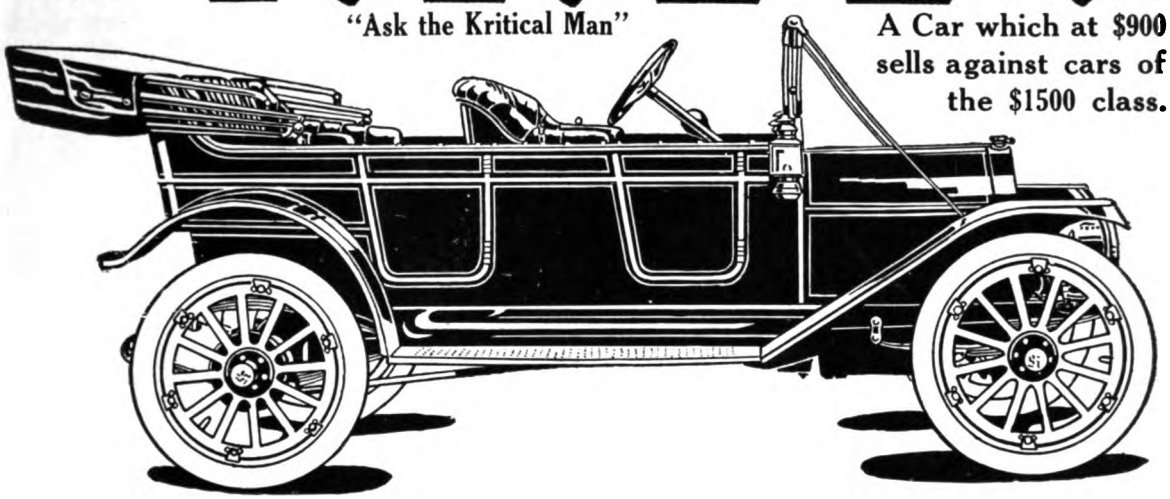
SPRINGFIELD, MASSACHUSETTS

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K-R-I-T

"Ask the Kritical Man"

A Car which at $900 sells against cars of the $1500 class.



Model "K" Five-Passenger Touring Car—$900 F.O.B. Detroit. Seats five with comfort. 106-inch wheelbase. Tires 32 x 3½ inches, front and rear. Equipped with top, complete with side curtains and top cover, windshield, three oil lamps, two gas lamps and generator, demountable rims with spare rim, horn, tool kit with jack and tire repair outfit with pump.

The K-R-I-T possesses features, and a high degree of serviceability and staunchness that justify the dealer in comparing it with cars of higher price.

Cars of lower price you will find in plenty—but not cars of the class and type to which the K-R-I-T justly belongs.

Shown side by side with some of the admirable little cars of approximate price, the K-R-I-T immediately leaps forward into a larger and better class.

The discrepancy in their comparative proportions so immensely favors the K-R-I-T that you can discern the difference at a single glance.

Again—shown side by side with representative cars of the $1500 class it does not drop an inch in your esteem and approval.

It has much that the former has not and all that the latter possesses.

In place of the 12 to 15 horsepower of the low-priced cars, it gives you the horsepower of the $1500 cars.

Instead of the cramped and narrow seats of the former, it gives you the wide and roomy seats of the latter.

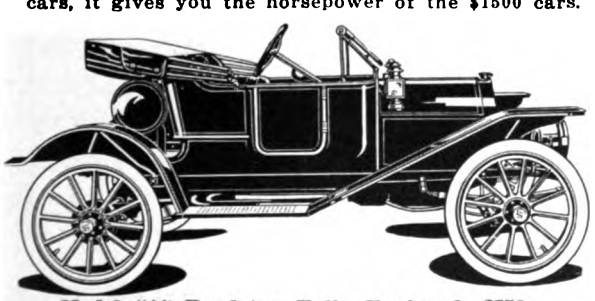
It is a graceful car; it is a good looking car; it has dash and style, and individuality.

The $1500 car cannot outdo the zealous service which the K-R-I-T will render continuously from one year's end to the other.

Neither in appearance nor in performance do you ask a man to be satisfied with a lesser degree of efficiency and excellence because of the lower price of the K-R-I-T.

Its right to rivalry with cars of a higher price you can appreciate only when you have viewed its generous proportions and tested the splendid possibilities of the K-R-I-T ball-bearing unit power plant.

The dealer who realizes the splendid opportunity offered by a car that he can sell in competition with the $1500 class will lose no time in getting in touch with us.

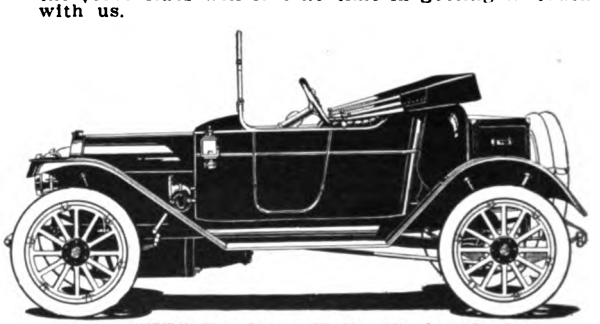


Model "A" Roadster, Fully Equipped—$750.

Equipment includes three Oil Lamps, two Gas Lamps, Generator, Top with Side Curtains and Top Cover, Brass Bound Windshield, Horn, Tool Kit with Jack and Tire Repair Outfit with Pump.

This model is equipped with Clincher Rims and 32 x 3" tires.

Rumble Seat furnished with Model "A" Roadster $15 additional.



Model "KR" Roadster, Fully Equipped—$900.

Equipment includes three Oil Lamps, two Gas Lamps, Generator, Top with Side Curtains and Top Cover, Brass Bound Windshield, Horn, Demountable Rims with spare Rim, Rear Tire Holders (adjustable for one or two tires), Trunk with capacity for two suit cases. Tool Kit with Jack and Tire Repair Outfit with Pump.

"The Easiest Riding Car in the World."

THE K-R-I-T MOTOR CAR COMPANY, Detroit, Michigan.

BOSTON DISTRIBUTORS: WM. JENKINS & CO., 288 Columbus Ave.

See the K-R-I-T line at the Boston Show. Space 29, Dept. A.

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TENTH ANNUAL

AUTO SHOW

Mechanics Building, Boston.

First Section

Pleasure Cars

AUSPICES

Boston Automobile Dealers' Association (Inc.)

March 2nd to 9th

Opens Saturday Evening, March 2, at 8.
Thereafter, 10 A. M. to 10:30 P. M.

Second Section

Motor Trucks

AUSPICES

Boston Commercial Motor Vehicle Association (Inc.)

March 13th to 20th

Opens Wednesday Evening, March 13, at 8.
Thereafter 10 A. M. to 10:30 P. M.

General Admission 50c. Except Society Day, Wednesday, March 6, **$1.00**

The Acknowledged Shows of the Year

Exhibits More Complete—Decorations More Superb.

Personal Direction CHESTER I. CAMPBELL.

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Used All Over the Country

GRAY & DAVIS

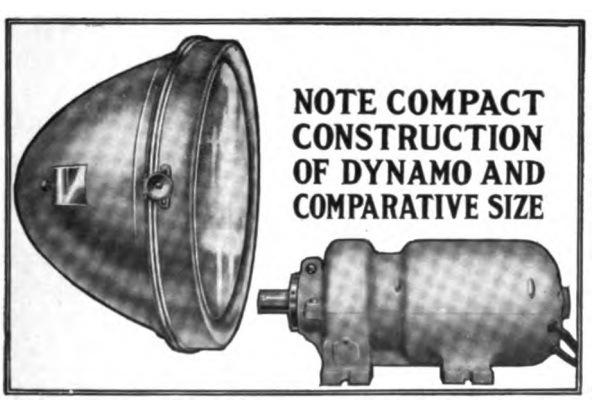
LIGHTING DYNAMO SYSTEM.

The world's greatest automobile lighting system is the GRAY & DAVIS Dynamo. It lights lamps, charges batteries and furnishes all necessary auxiliary current— yet it is not a mere battery charger like the "ordinary" electric system.

SEE THIS DYNAMO AT THE SHOW

Don't miss it. As usual it was the "shining light" at the New York and Chicago shows. It is Standard Equipment in all Peerless and Columbia-Knight cars—and optional on most good cars.

Tell your dealer you want this system on your new car. Do not accept a substitute or an imitation. Get the best—get GRAY & DAVIS and insist upon having it —just say "I want the GRAY & DAVIS Dynamo." Your dealer will get it for you.

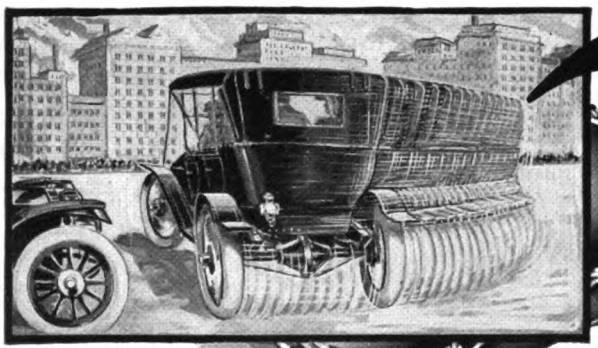


Write for Catalog.

GRAY & DAVIS, Manufacturers of AUTOMOBILE LAMPS **BOSTON, MASS.**

55 LANSDOWNE STREET

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Skid

Timely Warning

No matter how careful a driver you may be, you **cannot prevent** skidding and slipping on wet, muddy, snow-covered roads or on icy, slippery, greasy, pavements **unless** you equip your car with

Weed Chains

Easily put on—attached in a moment without the use of a jack or other tools—are **free to creep**—continually shift their position on the tire—**cannot injure tires** because they **do creep.**

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them **on the Front Wheels too.**

Insurance Companies, for their own protection, strongly advise the use of Weed Chains on every car they insure.

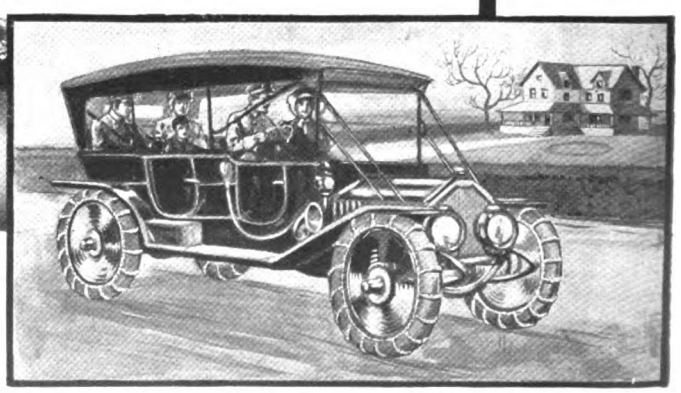
The greatest seller in the Automobile Accessory line—used all the year 'round. No dull seasons—no dead stocks.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
28 Moore St. New York

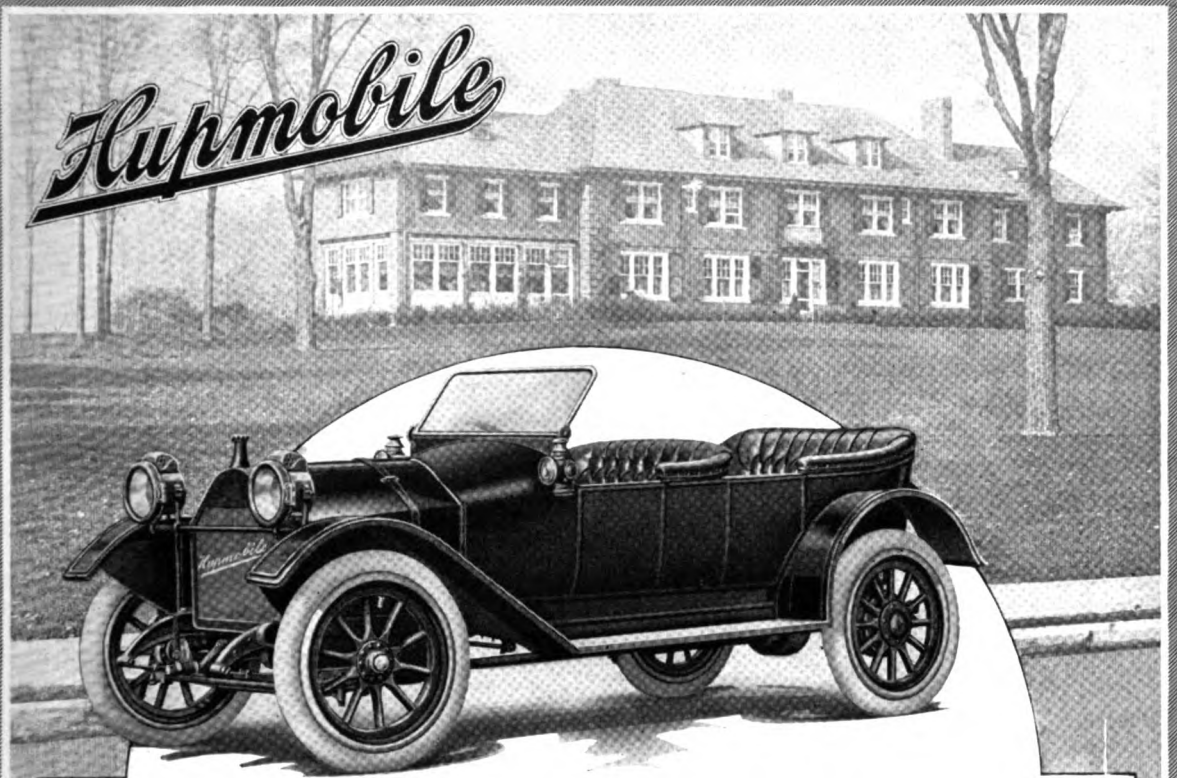
and

Anti Skid



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Hupmobile



Hupmobile Long-Stroke "32" Touring Car—$900

F. O. B. Detroit, including equipment of windshield, gas lamps and generator, oil lamps, tools and horn. Three speeds forward and reverse; sliding gears. Four cylinder motor. 3 1-4 inch bore and 5 1-2 inch stroke. Bosch magneto. 106-inch wheel base. 30 x 3 1-2 inch tires. Color—Standard Hupmobile blue.

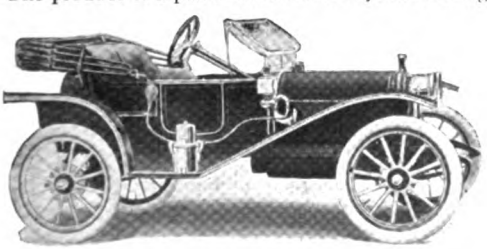
NOT AN ORDINARY $900 CAR BUT A $900 HUPMOBILE

Not an ordinary $900 car either outwardly or inwardly, as the picture and summary of special features will quickly disclose.

A car of infinite refinement, which proves conclusively that a low price need not be accompanied by crudity of construction.

The product of a plant which has always looked higher than its own price for inspiration---which has always sought to give the most in merit; not merely the least in price.

A result made possible by a skilled organization held intact since its inception under the leadership of E. A. Nelson, who designed the original Hupmobile; by shop-generalship of the highest order, striving continually to surpass its own previous ideals.



HUPMOBILE RUNABOUT---$750 F. O. B. Detroit. Including top, windshield, gas lamps and generator, three oil lamps, tools and horn. Four cylinders, 20 H. P., sliding gears, Bosch magneto.

HUPMOBILE ROADSTER—Chassis same as World-Touring Car—**$850** f. o. b. Detroit.

HUPMOBILE COUPE—Chassis same as Runabout, **$1100** f. o. b. Detroit.

HUPP MOTOR CAR COMPANY,
1268 Jefferson Ave. Detroit, Mich.

$2500 Features in the $900 HUPMOBILE

Small-bore, long-stroke motor; cylinders cast en bloc; valves enclosed; three-bearing crankshaft; bronze bearings lined with Babbitt; transmission gears large enough for a 40 H. P. car; full-floating rear axle of extreme strength; multiple disc clutch with 13-inch plates; imported Coventry chain to drive cam shaft and magneto; Hyatt and F & S imported annular high-duty roller bearings in the transmission; Bower high-duty roller bearings on the wheels; standard imported Bosch magneto.

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Best For Your Car

HARRIS

TRADE MARK-REG. U. S. PAT. OFF.

OILS



In 1 gallon and 5 gallon cans. If your dealer don't sell HARRIS OILS, send 80 cents (1 gallon) or $3.75 (5 gallon) and we will send same prepaid.



In barrels. When you buy oil at the garage—be sure it's HARRIS OIL.

The Reasons Why!

We pay a premium---in order to secure Premium quality---the highest grade of Pennsylvania Crude which is the basis of HARRIS OILS.

Right at the start we have the proper foundation for our product. Every process of manufacture is carefully watched and inspected.

The soot-deposit forming ingredients are removed to the greatest possible extent---therefore it is impossible to secure higher quality.

HARRIS OILS are ALL lubrication. Our customers tell us that they get more mileage and better service for less expense with HARRIS OILS.

We know there is nothing better. We want you to use HARRIS OILS---they are a revelation to motorists who have been using ordinary lubricants.

See Us at the Boston Show

Let us tell you more about HARRIS OILS. See our engine in motion and the gears running in HARRIS Trans-Compound, a practical illustration of the remarkable quality of HARRIS Products. Dealers please drop in. We've an interesting proposition. HARRIS OILS are sweeping the field. Motorists everywhere are alive to their superior quality. If you don't handle HARRIS OILS you're overlooking America's leading brand.

A. W. HARRIS OIL CO.
326 So. Water St., PROVIDENCE, R. I.
143 No. Wabash Ave., CHICAGO, ILL.

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Your Car

Should be
Equipped With
DORIAN
"On Again-Gone Again"-DORIAN
REMOUNTABLE
RIMS



—then you can
forget the annoyance of road tire repairs

The quick-changing simplicity of DORIAN REMOUNTABLE RIMS makes an instant appeal to your common-sense. Severe tests have proved DORIANS to be just what they were invented for,—the simple, quick, efficient, sensible REMOUNTABLE RIM.



HERE'S how to apply the DORIAN cure for delays from tire troubles on the road
—Just loosen four nuts
(with only a brace wrench and your hands as tools)
—OFF with the damaged tire and rim
—ON with the Spare
—Tighten the four nuts
—And you're *gone* again

SEE what a difference and a pleasure DORIANS make in motoring—We will arrange to give you a DORIAN demonstration at your own convenience *anywhere* you say—if you will send us the name of the supply dealer in your locality—NO OBLIGATION ON YOUR PART—The time you take to SEE this evidence will be well spent—you'll admit it AFTER—Your car can be easily equipped with DORIANS by any wheelwright or—Your NEW car will be fitted with DORIANS by the manufacturer—If you *Insist.*

—TO SEE a DORIAN Demonstration —is to *Believe* in DORIANS—and to REALIZE your *Need* for them.

Sign away your *road tire troubles*—Mail the coupon NOW—before you let it slip your memory.

F. SHIRLEY BOYD,
903 Boylston Street, Boston, Mass.
Gentlemen---Send book about Dorian Rims and Complete Information to

Name _____

Address _____

Supply Dealer _____



F. SHIRLEY BOYD, DISTRIBUTOR, 903 BOYLSTON STREET, **BOSTON, MASS.**

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Your Protection

against poor lubrication is in insisting on having an oil with an established reputation. That is why you should insist on having Colonial, because it is made by a firm with a reputation of over thirty years standing for high-class products.



Use COLONIAL and NOTE the DIFFERENCE

We also make

COLO GREASE

A real transmission grease.

Will make your gears run smoothly and quietly because it is made especially for gear lubrication.

COLONIAL Timing Gear Oil

overcomes all trouble with your timing gear. Use it and NOTE the DIFFERENCE

SILEX GREASE

The greasiest grease made.

The real test of a grease is not its looks or the feeling but its lubricating properties. SILEX is made to lubricate and last.

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Still More Evidence of the Big Possibilities in

THE Marquette

THE Automobile Shows have clinched the standing of the Marquette. No car could arouse so much interest, with both dealer and consumer, unless it possessed that unusual merit which becomes most conspicuous when subjected to the critical inspection of Show visitors.

We believe it has been proved that the Marquette stands without a rival; for, price and car considered, this machine has created a new class in the high-grade automobile field.

The Marquette is the product of improved factory facilities and scientifically applied construction experience. These are expressed with unmistakable accuracy in every line and principle, with many touches of refinement which lift it to a par with the world's highest-priced cars. The Marquette is at once a car of strong artistic appeal and absolute dependability of performance.

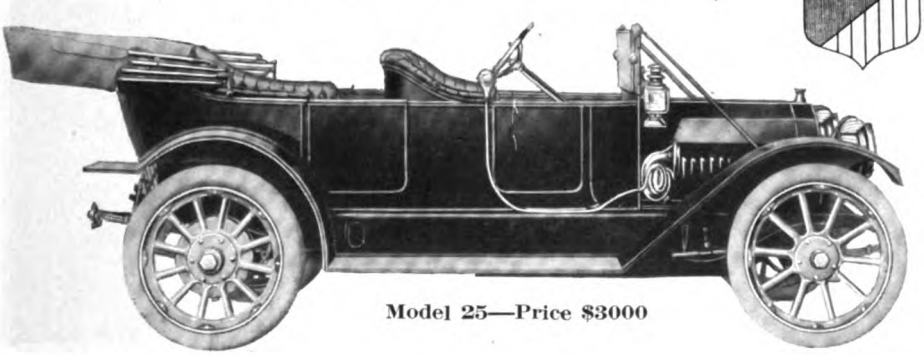
The big, up-to-date Marquette plant is operated under the direct supervision of General Motors Company—a fact which insures the backing and support of a large, permanent organization, planned and equipped to co-operate with dealers to the utmost in prompt, efficient service to customers.

The line comprises five handsome models, from the smart, speedy, two-passenger "Challenger" to the magnificent seven-passenger type; prices, $3000 and $4000; complete equipment, including electric light generator.

A few high-class agencies still open.

See the Marquette at the Boston Show

All Models also on display at the Marquette Boston Showrooms, 733 Boylston Street.



Model 25—Price $3000

THE MARQUETTE COMPANY, Detroit, Michigan

Branches: New York Boston Chicago

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Mr. Dealer, You know

You know that all oils are **not** alike. You know that there is as much difference between oils as there is between cigars.

Surely, **you** know the value of a perfect lubricant. Why not impress the need of it upon the car-owner? Most owners will gladly pay a little **more** for oil—when they understand **why** they are paying it.

PANHARD OIL

It is refined from the best oil in the world—Pennsylvania Crude. Will not carbonize unless fed too freely. Always keeps its body at high temperatures.

It's a profit-producer for the dealer. The uniform quality of Panhard Oil sends the user back for more—and assures you of sales and re-sales—today, tomorrow, next month and next year.

Wherever there are automobiles there is a latent demand for Panhard. There's money for you in stirring it up. We are advertising Panhard in the best general and trade papers of the country. Our list includes:

Saturday Evening Post
Collier's
Literary Digest
Life
Review of Reviews
Motor
Cycle and Auto Trade Journal
Motor Print
The Automobile Journal
Auto Dealer and Repairer
Motor Boat

Why not reap the benefit of this advertising? Stock Panhard oil. Display Panhard signs. Best of all, **tell** your customers you have it.

Write today for our special proposition.

George A. Haws

77 Pine Street, New York City
BOSTON BRANCH—899 Boylston Street
DISTRIBUTING POINTS
Boston, Chicago, San Francisco, Omaha, Columbus, O., Minneapolis, Dallas, St. Louis, Los Angeles, Portland, Ore.

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THE REFINED KISSELKAR

30 H. P.....$1500
40 H. P.....$1850
50 H. P.....$2350
60 H. P. "Six".....$3000
Fully Equipped.
1½ to 2 Ton, 3, 4, 5 Ton Trucks, Delivery Wagons, etc.

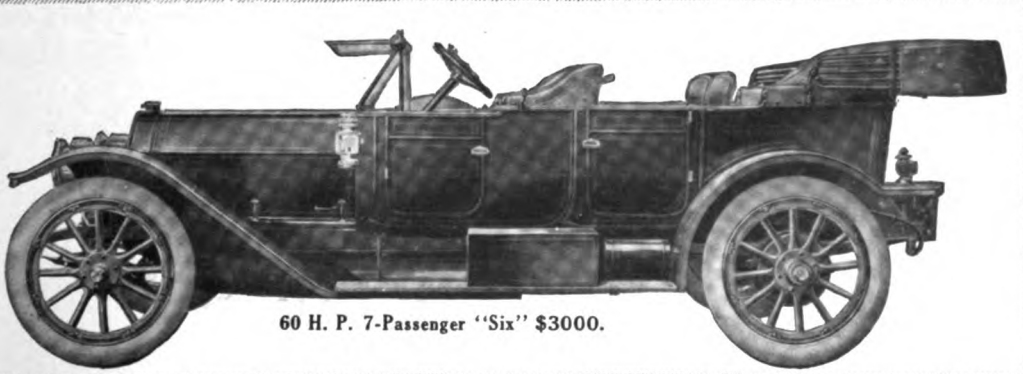
In design, construction, finish—the KisselKar is refined to every last detail. Multiplied inspection of parts in every process of making precludes possibility of slighted workmanship or compromised quality. This thoroughness of manufacturing, this uniform perfection of every part, adds a tangible quality to the KisselKar that is not listed in the specifications, but plainly evident in the smooth running and low maintenance.

"Every inch a car" is more than a KisselKar slogan. It expresses the KisselKar standard---the KisselKar ideal completely realized in every product of the KisselKar factories. No car is built better than the KisselKar.

KisselKar Trucks---A complete line of heavy duty trucks, light delivery and public utility wagons---1 1-2, 2, 3, 4, 5 ton capacity.

KisselKar Portfolio Free On Request— As comprehensive an automobile book as has ever been published. Tells the story of how comfort and low maintenance are built into the KisselKar, and pictures and describes the entire KisselKar line.

KISSEL MOTOR CAR COMPANY, 174 KISSEL AVENUE HARTFORD, WIS.



60 H. P. 7-Passenger "Six" $3000.

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The Gilbert Tire Case

Made in all standard sizes, styles and colors from high grade materials.

Furnished with Teel patent water-shed construction which makes case absolutely waterproof.



Can be easily and quickly put on and removed. Occupies small storage space. Fastened with snap buttons.

We manufacture tire cases, inner tube bags and cases, lamp covers, dunnage bags, storm aprons, dust covers, spark-plug cases, pocket tool cases, racing bonnets, tool kits, robe rail boots, carburetors, rolls for tire irons, tire sleeves and patches, magneto covers and many other articles of everyday use to motorists.

We are the oldest firm manufacturing the above-mentioned specialties in the United States; we also have the largest factory in the world devoted to this line of work. We originated such articles as spare tire covers, spare tire brackets, etc., long before other manufacturers followed our lead.

Remember we *can* and *do* sell better goods at lower prices—all this on account of our superior manufacturing facilities and knowledge of the business.

When ordering these accessories be sure to specify Gilbert. Do not allow the dealer to substitute.

If your dealer will not supply you, then order from us direct. Catalogue on request.

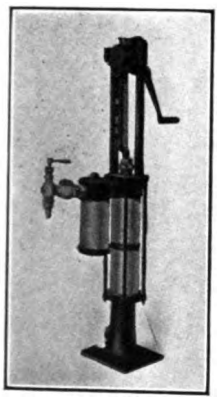
THE GILBERT MFG. CO.

NEW HAVEN, CONN.

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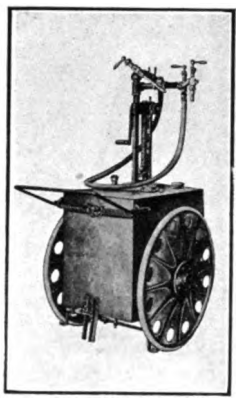
ATTENTION!

Public Garage and Private Automobile Owners

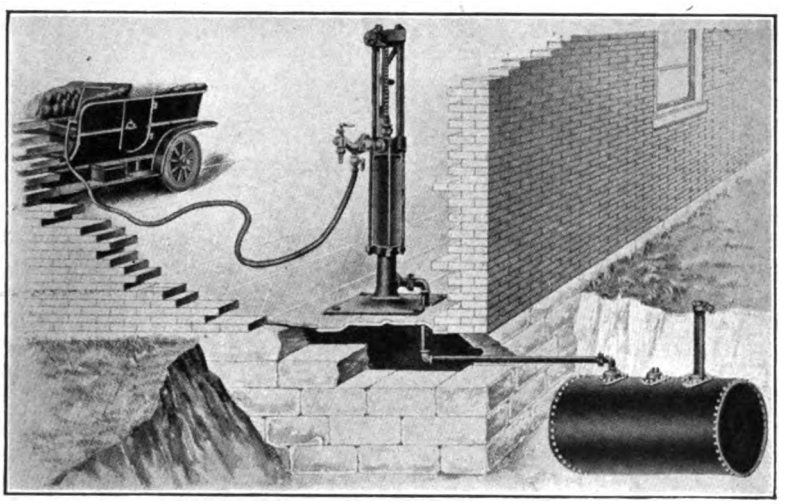


IDEAL OIL HANDLING EQUIPMENTS

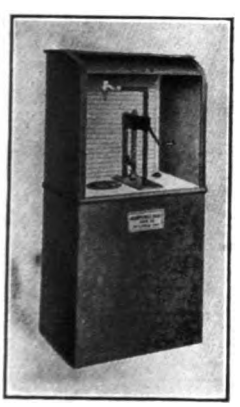
Will Positively Solve Your Storage Problems and Earn You 100 Per Cent. on the Investment.



They Are Fire-Proof, Evaporation Proof, and Absolutely Safe.



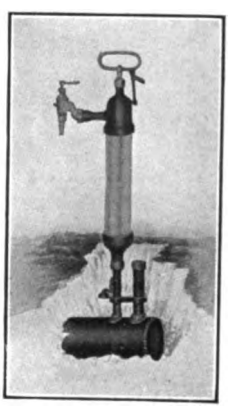
They Will Reduce Your Cost in Handling, Eliminate Waste, and Filter Your Oils



BEFORE PLACING YOUR ORDER

Let Us Quote You

We Will Positively Save You Money.

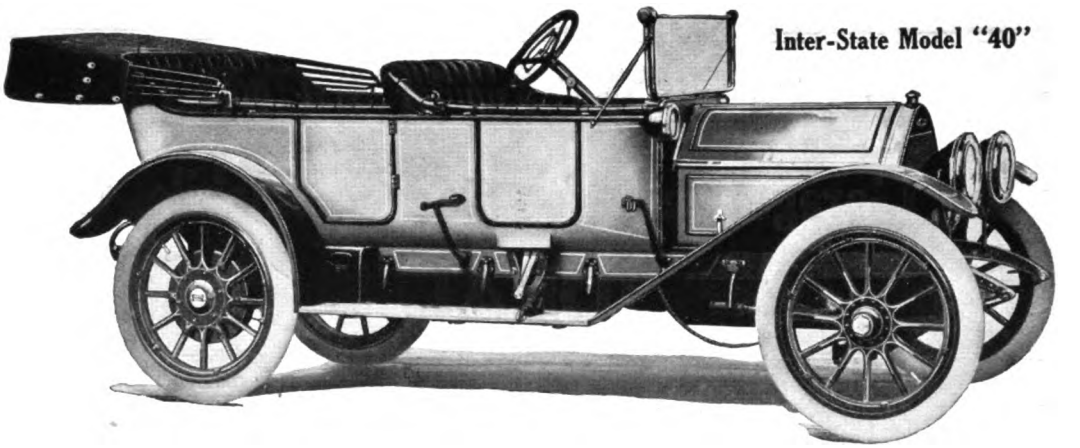


IDEAL OIL PUMP and TANK CO.

146 Summer Street, - - - Boston, Mass.

See us at Space No. 602A, Dept. F.—Boston Auto Show.

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* MASSACHUSETTS * CALIFORNIA * WASHINGTON * CONNECTICUT *

* IDAHO * OREGON * VIRGINIA * COLORADO * ILLINOIS * DAKOTA * TEXAS *

* PENNSYLVANIA * OKLAHOMA * WISCONSIN * DELAWARE * CAROLINAS *

The Only Car Built with a Faultless and Complete Electric System for Starting, Ignition and Lighting

Inter-State

THE Inter-State Electric System, on Models 40 and 50, performs all the hard work of starting, regulating and lighting the car, leaving the driver free for enjoyment and making motoring a pleasure instead of work, a satisfaction instead of worry, and a comfort instead of inconvenience.

The Inter-State Electric System doubles the use of the car. A woman can drive the powerful Inter-State as easily as she can handle an electric coupe. Without moving from the driver's seat or shifting gears she starts the engine with a turn of the switch; regulates the mixture by a simple movement of the lever on the steering column; lights any or all of the lights—front, side, rear—by merely turning a small button. It is not even necessary to bend over to get the Inter-State under way and under perfect and absolute control. This entire mechanism is automatic and so simple that it can be called fool proof.

The Inter-State has the greatest improvements, the greatest conveniences, the greatest luxuries in features and equipment ever brought together and built into a magnificent, powerful and reliable car. It is truly the ***only*** complete car.

Models 40, 41, 42—40 H. P. Long Stroke Motor, **$2400.** Models 50, 51, 52—50 H. P. Long Stroke Motor, **$3400.**
The equipment consists of ***every*** accessory needed for luxurious motoring—in other words the ***first*** cost is the only cost.

Also two moderate priced cars with self starter and of Inter-State quality

Model 31-A—40 H. P. Long Stroke Motor, - - **$1750.** Model 32-B—40 H. P. Long Stroke Motor, - - **$1700**

Write today for Art Catalog—which describes the famous Inter-State Models, giving all details of their wonderful construction and perfect equipment.

DEALERS: **The Inter-State line gives unequalled value to the buyer who wants a moderate or a high-priced car—write or wire (our expense) for agency.**

Inter-State Automobile Co., Dept. N, Muncie, Ind.

BOSTON BRANCH: 153 Massachusetts Avenue. OMAHA BRANCH: 310 So. Eighteenth Street.

* NEW YORK * INDIANA * IOWA * NEBRASKA * OHIO * MONTANA * FLORIDA *

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Fisk



The Tires That Make Good
Every Day---Everywhere

¶THE UNIFORMLY STRONG TIRES THAT HAVE MAINTAINED THE consistently high average mileage for the past year.

¶THE TIRES that are offered with an urgent request to investigate their record for service and economy.

¶THE TIRES that are backed with direct factory representation in 35 cities and a personal interest in every casing and tube sold.

¶THE TIRES for ANY RIM in the famous FISK HEAVY CAR TYPE construction.

THE TIRES For Your 1912 Car.

Exhibiting at Boston Show, March 2-9.

THE FISK RUBBER CO.

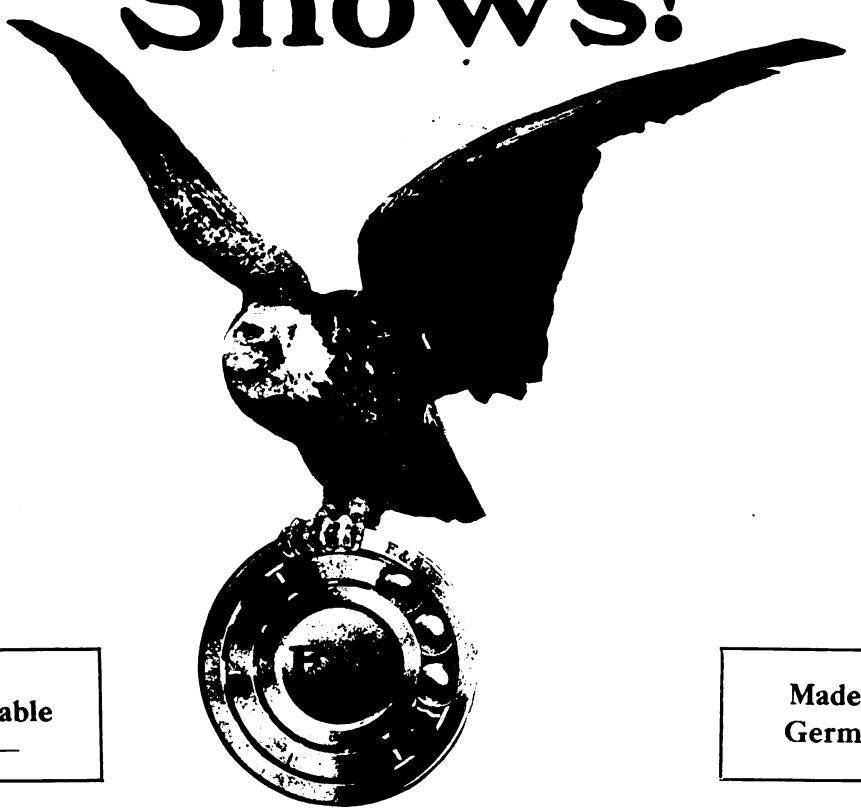
811-813 Boylston Street, Boston.
17 1-2 Dorrance Street, Providence.

Factory---CHICOPEE FALLS, MASS.

Tires

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Supreme at the Shows!



The Dependable Kind—

Made in Germany

F & S

Annular Ball Bearings

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No hill too steep
No sand too deep.

Jackson

In power, size, equipment—
The Jackson gives you more

Where, save in the Jackson "42," will you get full 40 horsepower, 118 inch wheelbase, 34x4 inch tires, full elliptic springs, windshield, top, gas tank, etc.---all for **$1500 ?**

Compare the Jackson "42," part for part, with any other car at $1500.

See if you can buy in any other car of moderate price all the elements that make for efficiency, comfort, safety and satisfaction.

Make the comparison actual, if you can.

It will convince you that in power, size, equipment---the Jackson "42" gives you an extraordinary $1500 worth of value.

In the Jackson "52"---a full fifty horsepower motor, 124 inch wheelbase, 36x4 inch tires and full elliptic springs---for **$1800.**

In the Jackson "32"---a full thirty horsepower motor, 32 inch wheels, 110 inch wheelbase and full elliptic springs---for **$1100.**

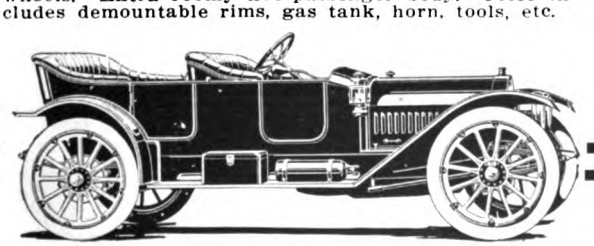
The Jackson always gives you more.

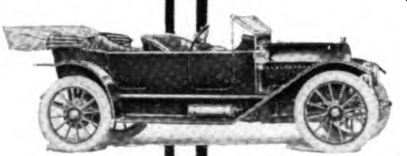
Send a postal for illustrated catalog and nearest dealer's name.

Jackson Automobile Company

1203 E. Main Street, Jackson, Mich.

Model 52—$1800.
Fifty horsepower, four cylinder motor; 124 inch wheelbase; full elliptic springs, front and rear; 36 inch wheels. Extra roomy five-passenger body. Price includes demountable rims, gas tank, horn, tools, etc.





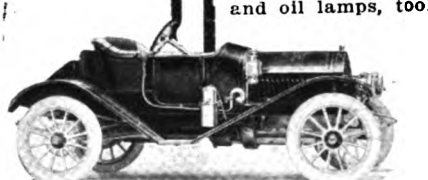
Model Forty-two—$1500.
Forty horsepower, four cylinder motor; 118 inch wheelbase; full elliptic springs, front and rear; 34 x 4 tires. Roomy five-passenger body. Price includes full equipment of top, windshield, gas tank, etc.



Model Thirty-two—$1100.
Thirty horsepower, four cylinder motor; 110 inch wheelbase; 32 x 4 inch tires; five-passenger torpedo type. Gas lamps, and oil lamps, tools, etc.



Model Twenty-eight—$1000.
Two-passenger roadster. Gasoline tank and luggage box at rear. Four cylinders, 30 H. P., 100 inch wheelbase. Gas lamps and oil lamps, tools, etc.



Model Twenty-six—$1100.
Two-passenger torpedo roadster. Gasoline tank and luggage box at rear. Four cylinders, 30 H. P., 110 inch wheelbase. Gas lamps and oil lamps, tools, etc.

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"Firestone"

Tires hold the world's record for durability and speed.



FIRESTONE'S WAY of getting extra mileage out of a tire, is to build extra mileage into it.

That is why "Firestone" Tires cost considerably more to build than others—stouter construction, more durable rubber, more rigid inspection—and why they have never had an off-year.

The small price difference commanded by "Firestone" Tires over tires made the ordinary way is paid back, many times over, in extra miles of service.—the Most Miles per Dollar of cost.

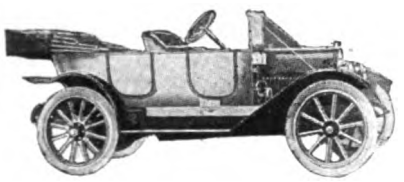
THE FIRESTONE TIRE & RUBBER CO.

"America's Largest Exclusive Tire and Rim Makers"

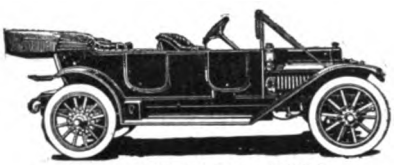
AKRON, OHIO AND ALL PRINCIPAL CITIES

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Friction Transmission Cartercar Self Starter, Certainly



Five passengers—$1600.
Completely equipped.



Seven passengers—$2100.
Completely equipped.

The big feature of the Cartercar—in winter and summer—is perfect service

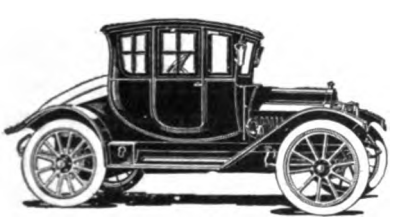
No matter how bad the weather or how far you wish to go—your Cartercar will give just as good service as under the most perfect conditions.

The patented Friction Transmission gives a pulling power amply sufficient to take the car through bad, muddy and sandy roads and even up 50 per cent. hills. For many years this transmission has given great satisfaction to thousands of Cartercar drivers.

The self starter eliminates all bother in starting. It makes winter driving especially delightful. You have any number of speeds with the Cartercar, easily and noiselessly controlled with one lever.

This easy control, with three strong brakes, makes the car extremely safe for anyone to drive. The patented Chain-In-Oil Drive is another excellent feature. It is absolutely noiseless—is the most economical means of transferring power—and requires no attention except an annual replenishing of the oil. Grit and sand being kept out, there is practically no wear on the chain.

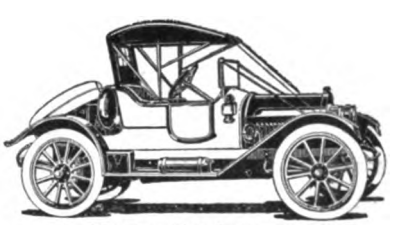
The full floating rear axle is another great improvement. The axle shafts can be taken out without bothering the differential—or even jacking up the car.



Colonial Coupe—$1700.
Completely equipped.

Three quarter elliptic rear springs — Prest-O-Lite tank — and many other excellent features. Five good models, touring cars, roadsters, and coupes at from $1200 to $2100.

LET US SEND YOU COMPLETE INFORMATION REGARDING THIS EXCELLENT CAR.



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Six Big Features

Imperial

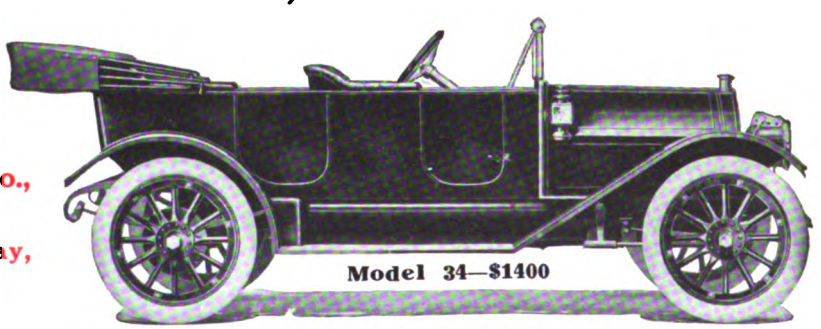
Everything that is best in modern automobile construction is incorporated in **Imperial** Cars for 1912. Almost every make of car boasts **some** of these—**Imperial** Cars have them **all.**

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Center Control

Silent, Enclosed
Power Plant

Specifications are not everything, yet point for point every **Imperial** Model is the head of its class when actual value is set beside price. **Measure them up.** We challenge comparison. Style and graceful lines are not everything—speed and power are not everything---comfort and easy riding qualities alone do not make a car, yet you will find no more handsome design, no greater motor efficiency, no more luxurious upholstering and big, roomy bodies in cars costing **one-third more,** than you will find in **Imperial** cars at these astonishing prices. Behind this sterling worth, as judged by figures, lie the **actual accomplishments** and the wonderful victories of the **Imperial** cars in endurance contests. These public tests have time and time again proved the **Imperial** the best for **reliability** and **dependability,** when compared with a score of other cars—some costing three times as much. Five **first** awards in the past **five** months have strengthened the record of the **Imperial** as the car for **use,**---for **wear**—the car for **economical investment.**



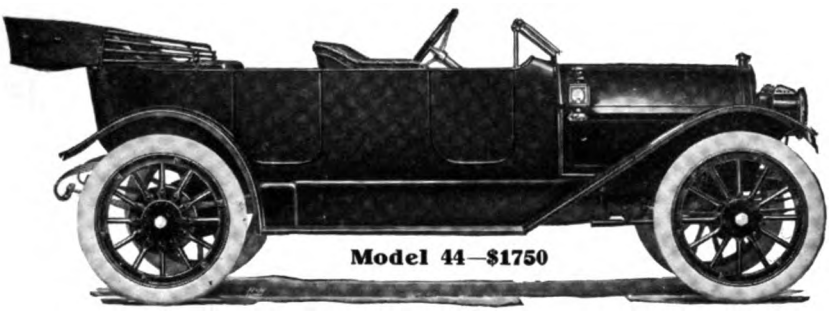
Model 34—$1400

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Distributors,
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Big Tires

Long Wheel-base

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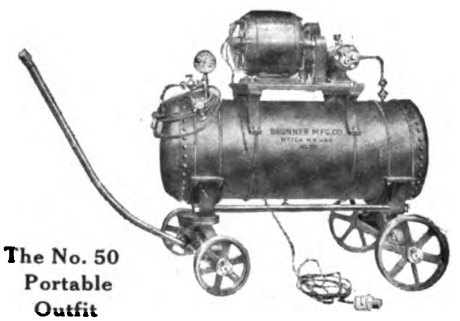
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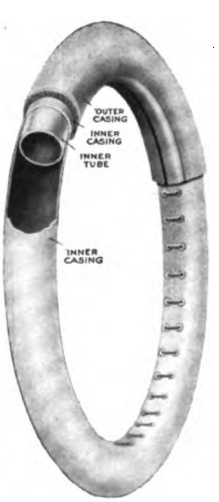
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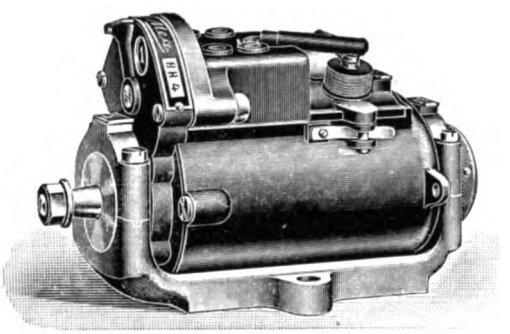
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February, 1912

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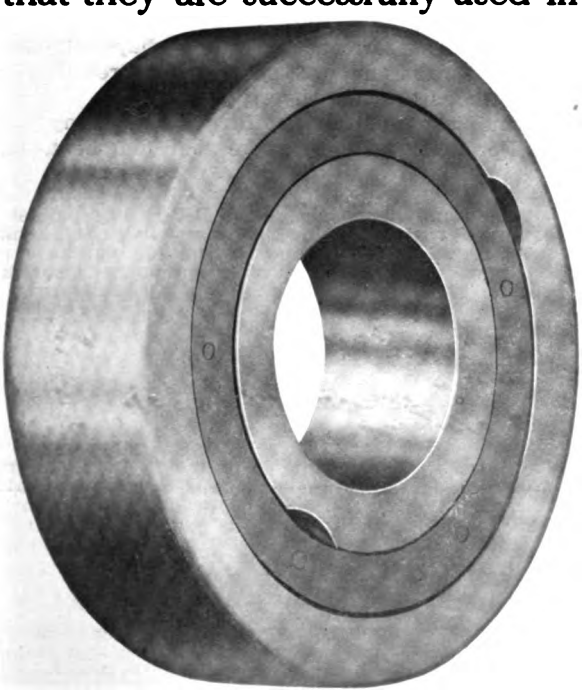
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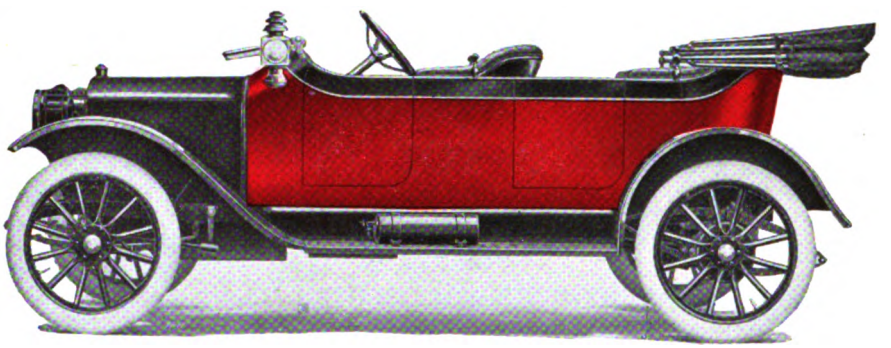
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MODEL SS

5-Passenger Touring Car—110-inch Wheelbase

$950 F.O.B. DETROIT

Equipped with HANNA SELF-STARTER, 32x3 1-2 tires, dual ignition, demountable and quick detachable rims, gas tank, extra rim, top, windshield, 5 lamps, horn, tools and tire repair kit, LONG STROKE MOTOR, 3 SPEEDS, ENCLOSED VALVES, MAGNETO.

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It tells better than anything we could say what a wonderful car-value the R-C-H really is. For these 11,000 orders didn't come from people who bought without looking to see what they were getting—you can bank on that. The cars were ordered after the people had compared the R-C-H with every other car at anywhere near its price—after they'd found that you can pay a thousand dollars more, but you can't get a better car.

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So, if you'll just compare the R-C-H construction, equipment and special features with any other car you have in mind up to $2,000, we'll be satisfied. For we're willing to take your judgment.

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For certain sections, where we have not yet gotten in touch with the right dealer, we are reserving a few hundred cars. Dealers are urged to write us promptly—if the territory is open and you're the right man a good proposition waits you.

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5-Passenger Touring Car	$ 850
Touring Roadster	800
Roadster	700
(Equipped for 4 Passengers)	750
Colonial Coupe	1050

GENERAL R-C-H SPECIFICATIONS—Motor—4 cylinders, cast en bloc, 3¼ inch bore, 5 inch stroke, two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. Drive—**Left side.** Irreversible worm gear. 16 inch wheel. Control—**Center lever** operated through H plate, integral with universal joint housing just below. Springs—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. Frame—Pressed steel channel. Axles—Front, I-beam, drop-forged; rear, semi-floating type. Body—English type, extra wide front seats. Full equipment quoted above.

R-C-H Corporation 107 LYCASTE STREET Detroit, Michigan

BRANCHES: Boston, 563 Boylston St.; Buffalo, 1225 Main St.; Cleveland, 2122 Euclid Ave.; Chicago, 2021 Michigan Ave.; Denver, 1520 Broadway; Detroit, Woodward and Warren Aves.; Kansas City, 3501 Main St.; Los Angeles, 1242 So. Flower St.; Minneapolis, 1206 Hennepin Ave.; New York, 1989 Broadway; Philadelphia, 330 No. Broad St.; Atlanta, 548 Peachtree St.

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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 2 MARCH 1, 1912 Price $1.00 the Year

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Industry's Largest and Best Exhibition in the Centre of the World's Greatest Motor Vehicle and Accessory Market—Pleasure Cars and Industrial Transports to Be Displayed Separately Amid Artistic Surroundings.

CAREFUL study of automobile history in the United States leads to the conclusion that Boston and New England have played a part as important therein as has this section in the history of the country itself. There is little question that spasmodic attempts were made to invent a horseless carriage in various parts of the country, long before Kenneth A. Skinner of Boston imported the first De Dion tricycle, with which he made the memorable run from Boston to New York in 1897. But there is no doubt that the real stimulus to American motor vehicle building dates from the arrival of that machine and the opening of the first automobile salesrooms by Mr. Skinner at 122 Massachusetts avenue, Boston.

New England people may be regarded as conservative, but it is certain that long before the practicability of the automobile had been demonstrated to the satisfaction of others, this section had become the greatest motor vehicle market in the world. This is no idle boast. For years the registration figures in these six states showed conclusively that more machines in proportion to the number of inhabitants were owned and operated here than in any other portion of the world. It is only within the past two years that other sections of this country have begun to present figures worthy of comparison therewith. It still retains its position, despite the fact that some of these other sections show a large percentage of increase in those two years.



Chester I. Campbell, Manager Boston Automobile Show.

It will not be denied that the automobile show has done its full share in exploiting the motor car, and it cannot be forgotten that the first venture of this nature was held in conjunction with the Mechanics' Fair in Boston in the fall of 1898. Automobile shows have been held in that city practically every year since that time; and four had passed into history before other cities began to realize their importance.

In the beginning, motor vehicles were displayed in connection with bicycles and later with motor boats. The first exhibition, under what may be regarded as the present management of the Boston show, was in March, 1903. The Boston Automobile Dealers' Association was not organized until the following year, but the management of the 1903 display was in the hands of Chester I. Campbell, who has acted in the same capacity at every show since that time.

In 1907, the importance of automobiles had so far overshadowed the motor boats, that it was neces-

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sary to utilize a second building. Naturally, the two classes of exhibits were separated the following year, and since that time there has been increasing demand for space. Last year it was again necessary to house some of the exhibitors in a second structure, and another separation is noted this year, in the holding of a special exhibit of commercial vehicles during a second week.

So located that it becomes the logical commercial centre of New England, Boston is the logical place in which to hold an important display. Every portion of these six states is within easy riding distance of Mechanics' Building, in which the shows are held. With the exceptional interest in motor vehicles, manifested by their adoption and use, it does not appear unreasonable that the annual Boston show should become the largest in the country, from the standpoint of attendance, number of exhibits and amount of business transacted.

Coming as it does at the close of the really big show season and at the very opening of the active motoring season, it has long been regarded by the manufacturers and others in the industry as the biggest and best of them all. This is true despite the fact that the local dealers arrange the details and supply the exhibits, and the display is in no sense regarded by the manufacturers as national in character. It is only necessary to cite figures to bear out the assertion that this is correctly regarded as the largest in point of number of exhibits.

First, it must be remembered that the Boston display has been held all under one roof, with the exception of the two years mentioned. No other city in the country is able to supply a building large enough to house so many exhibitors. Chicago employs two structures, and New York always has had two shows, each under separate and distinct management, in order to accommodate those who desired to make display.



Officials of the Boston Automobile Dealers' Association.

At the Madison Square Garden show in New York City this year there were 60 makes of pleasure cars represented, and this was the largest display ever held in that city. There were 37 makes on display at the Grand Central Palace during the 1912 show. At Chicago there were 98 different companies represented in the Coliseum and First Regiment Armory. The accompanying list of exhibitors, furnished by the Boston show management, indicates there will be at least 93 makes of pleasure cars on view in the Mechanics' Building during the week of March 2-9. It must be remembered in this connection, that there always are a few late comers who must be provided for at the last moment, and it is not unreasonable to presume that before the doors open the evening of March 2 the record of Chicago, with its two buildings, may be equalled if not exceeded in Boston's one.

Reference has been made to the separate display, for motor trucks this year. This section of the Boston show will be held during the week of March 13-20. It is still some time before the opening date, but it will prove of interest to compare the number of exhibitors listed to appear with those who were represented at New York and Chicago.

At Madison Square Garden there were 37 makes; at Grand Central Palace 33; and at Chicago, in the Coliseum and First Regiment Armory 82. Already there are 65 names on the list, and it must be remembered that not only is this Boston's first commercial vehicle show, but the display is to be housed in one structure. Last year was the first in which New York and Chicago decided to hold separate industrial transport exhibits, and there were only 35 different makes in the former city, and 57 in the western metropolis.

In most instances, vehicles and accessories are displayed at the Boston show by local dealers. Only a few manufacturers, who have not yet arranged for New England representatives, are able to secure space.

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Last year's Boston show found 83 makes of pleasure vehicles and 41 of commercial cars on display. This means an increase of more than 50 per cent. in truck exhibitors alone.

Considering the matter of accessories: The Boston show fails to impress with numbers, since many local agents present lines produced by numerous manufacturers. The list includes over 200 separate stands for accessories as against 184 for Chicago, where the manufacturers displayed direct. Were it possible to segregate the different makers represented, the list would reach a figure much in excess of double its present proportions.

It follows that many pleasure and commercial cars will be seen for the first time in the East at the Boston show. The same thing applies to the accessory exhibits. At least one new motor will be displayed, the product of woman's inventive genius. Miss Margaret E. Knight of South Framingham, Mass., presents this feature, and while nothing has been made public concerning it, it is expected to create as much interest in the industry as that other Knight motor which first made its appearance at a Chicago show a few years ago and has proved so successful in America and Europe.



Officials of the Boston Commercial Motor Vehicle Association.

In still another respect the Boston show always has been distinctive, reference being made to the decorations. Manager Campbell has been particularly fortunate in associating with himself artists of refined ability, who have been able to so transform the interior of the Mechanics' Building, that the decorative scheme has harmonized with the beauty of the cars and accessories on display. At times, this transformation has been with a view to creating a springlike floral bower, and at others to bring about fascinating architectural creations.

This year, Mr. Campbell paid a visit to Europe during the progress of some of the more notable shows in England and on the Continent, and the result will be reflected in the decorations for the forthcoming exhibition. The same setting will serve for both sections, and the arrangement has been with this idea in view.

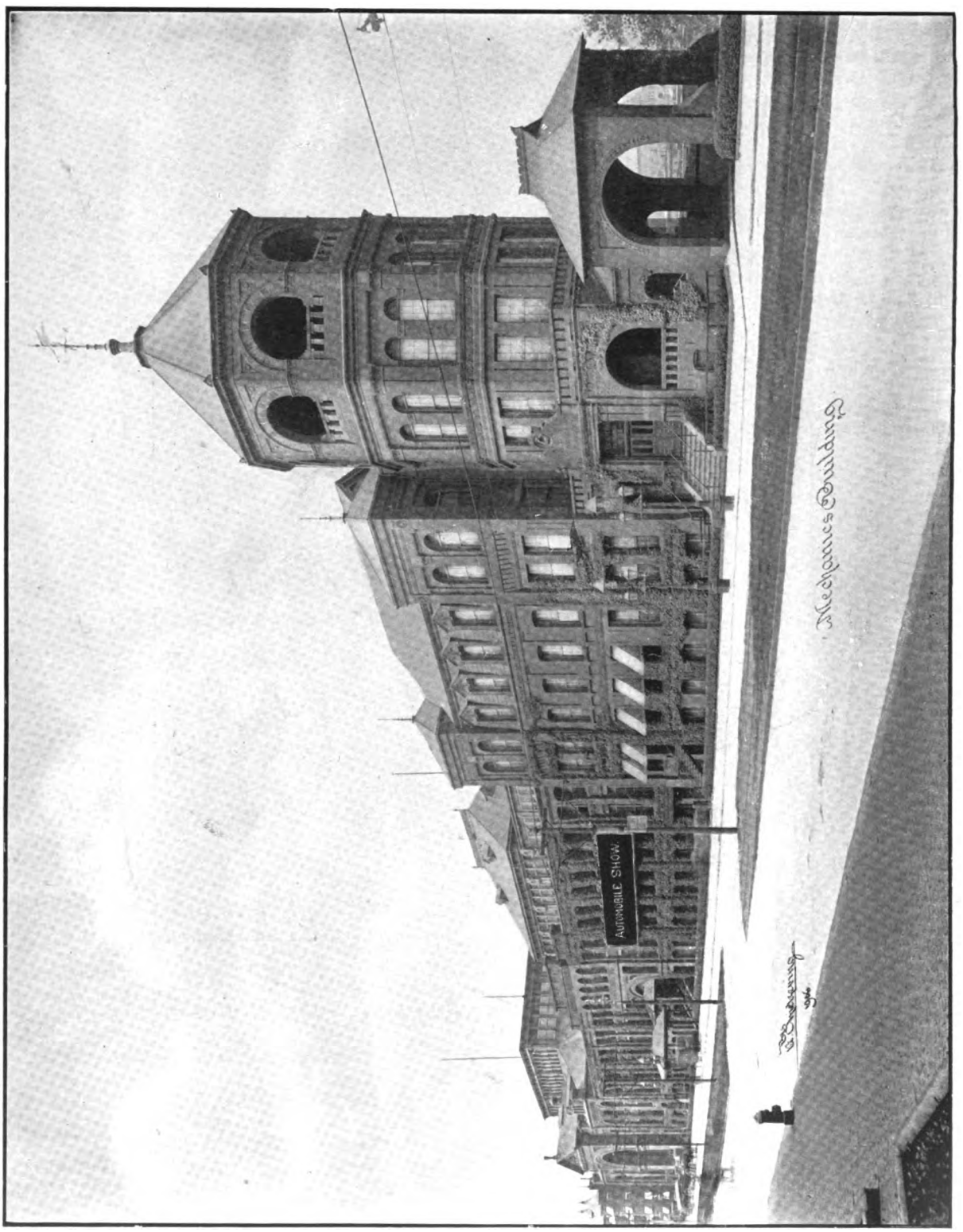
The Garrison street entrance will be treated in a light tracery in steel, with three illuminated domes in colors. Foliated bands, extending from these to the sides of the building, will form a most spectacular arch leading to the main entrance.

Exhibition Hall will typify an old English garden fete. Real box hedges, imported for the purpose and specially prepared by a process which preserves them, will serve to divide the various exhibition spaces. The beauty of the dark green of these hedges will be intensified by thousands of rose vines climbing from between these and running up along old English beams and plastic work, which will conceal completely every one of the many posts and girders for which this hall is noted.

Nearly 15,000 square feet of scenic work will be necessary to to give the beam effect alone. The main aisle will present a strikingly beautiful avenue of rose trees, illuminnated with festoons of colored lamps across the ceiling. The side wall treatment will consist of the hedge, beyond which a distant scene will be rendered in perspective. Arches of box hedge and springlike foliage will surround the open light well space, and even the floor covering will be in perfect harmony, as to the coloring.

Grand Hall, which lends itself much more easily to treatment from an artistic standpoint, will present an entirely new transformation. Under a canopy composed of a painted sky, which will contain over 25,000 square feet, the exhibits will be placed in a scene founded upon the Spanish mission style. Every piece of composition here will be found in complete accord with the main principle of the design.

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Quaint structures erected along the balcony fronts, with illuminated bells in their towers, will serve to bring out the effect sought. Around the entire hall, escutcheons and groupings of illuminated foliage will serve as decorative features. All columns are to be covered to harmonize with the Spanish mission treatment, while probably one of the most unique features will be the sign posts with their tile caps and buttresses, and the central dividing lines, all designed to correspond with the balcony scheme. Sunbursts of electric lights will be suspended over the main floor, illuminating the entire interior.

The basement will be treated in white panels with brilliant red background, every post being enclosed and all connected with triangular arches of white bars and foliage. Strands of varied colored lights will be used to the best advantage. All balconies will be covered in with gilded panels, azure blue and white ceilings and side walls, draperies, artistic signs, and every feature necessary to complete the entire design.

The pleasure vehicle section will be under the auspices of the Boston Automobile Dealers' Association, of which J. H. MacAlman, agent for Columbia and Stearns cars, is president; J. S. Hathaway, manager of the White Company's Boston branch, is vice president, and F. A. Hinchcliffe, manager of the local branch of the Winton Motor Carriage Company, is treasurer. In addition to the officers, the directors are: E. A. Gilmore of the Whitten-Gilmore Company, agent for Chalmers cars; C. E. Fay, local manager for the Ford Motor Company; F. E. Wing, of the F. E. Wing Motor Car Company, agent for Marmon cars; C. F. Whitney, of the Whitney-Barney Company, agent for the Selden; A. P. Underhill, of the Underhill Company, Knox agent, and J. W. Maguire, of the J. W. Maguire Company, Pierce-Arrow representative.

The commercial car section is under the auspices of the Boston Commercial Motor Vehicle Association, of which C. F. Whitney is president; Alvan T. Fuller, Packard agent, is vice president, and E. Day Baker, manager of the General Vehicle Company's Boston branch, is treasurer. The directors, in addition to the officers, are: J. H. MacAlman, J. S. Hathaway, J. W. Maguire, A. P. Underhill, A. B. Henley and L. B. Butler.

Chester I. Campbell, who acts as general manager of both sections, is secretary of both associations. In addition to managing successfully all of the Boston automobile shows since 1903, Mr. Campbell has been in charge of all the motor boat and aerial craft displays held in that city. He is recognized as the dean of all automobile show managers in the country and is consulted frequently by those who desire to learn the best methods to pursue in securing success.

CLASSIFIED EXHIBITORS AT BOSTON AUTOMOBILE SHOW.

GASOLINE PLEASURE CARS.
(First Week.)

Space	Make	Exhibitor
20	Abbott-Detroit	W. M. Jenkins & Co., 228 Columbus avenue, Boston.
33	Alco	American Locomotive Company, 591 Boylston street, Boston.
140AA	American	Essex Automobile Company, 887 Boylston street, Boston.
38	Apperson	W. L. Russell & Co., 11-12 Park square, Boston.
28	Atlas-Knight	Atlas Motor Car Company, Springfield, Mass.
32	Auburn	Rawles-Cobb Company, 74 Pearl street, Boston.
34	Bergdoll	White, Ware & Leatherbee, 574 Commonwealth avenue, Boston.
133	Brush	United Motor Boston Company, 100 Massachusetts avenue, Boston.
136-140	Buick	Buick Motor Company, Motor Mart, Boston.
2	Cadillac	Cadillac Automobile Company of Boston, 372 Boylston street, Boston.
316-317	Cartercar	Cartercar Company, Pontiac, Mich.
205-206	Case	J. I. Case Threshing Machine Company, 1860 Broadway, New York City.
107-109	Chalmers	Whitton-Gilmore Company, 907 Boylston street, Boston.
35	Cole	G. E. & H. J. Habich Company, 117 Massachusetts avenue, Boston.
15, 19	Columbia-Knight	J. H. MacAlman, 96 Massachusetts avenue, Boston.
151-152	Cunningham	Chauncey Thomas & Co., 101 Chestnut street, Boston.
332-335	Cutting	Clarke-Carter Automobile Company, Jackson, Mich.
315	DeTamble	Lunt-Moss Company, 43 South Market street, Boston.
223-224	Elmore	Clyde H. Smith Auto Company, Skowhegan, Me.
26	E-M-F	E-M-F Boston Company, 889 Boylston street, Boston.
148	Empire	Empire Motor Car Agency, 94 Massachusetts avenue, Boston.
312-313	Everitt	J. S. Harrington & Co., 589 Boylston street, Boston.
113-114	Fiat	Fiat Automobile Company, 839 Boylston street, Boston.
226	Firestone-Columbus	Columbus Buggy Company, 889 Boylston street, Boston.
27	Flanders	E-M-F Boston Company, 889 Boylston street, Boston.
117-118, 331	Ford	Ford Motor Company, 147 Columbus avenue, Boston.
127-128	Franklin	Franklin Automobile Company, 671 Boylston street, Boston.
326	Great Western	Great Western Automobile Company, Peru, Ind.
211	Havers	Havers Motor Car Company, Port Huron, Mich.
38	Haynes	W. L. Russell & Co., 11-12 Park square, Boston.
24-25	Hudson	Henley-Kimball Company, 893 Boylston street, Boston.
229, 234	Hupmobile	H. J. Koehler Sporting Goods Company, 1074 Boylston street, Boston.
150**	Imperial	Imperial Automobile Company, Jackson, Mich.
135, 141	Inter-State	Inter-State Automobile Company, 153 Massachusetts avenue, Boston.
104, 311	Jackson	Jackson Motor Car Company, 821 Boylston street, Boston.
220	King	Charles A. Malley, 208 Warren street, Boston.
146-147	KisselKar	KisselKar New England Branch, Motor Mart, Boston.
8, 12	Knox	Underhill Company, 885 Boylston street, Boston.
29	K-R-I-T	W. M. Jenkins & Co., 288 Columbus avenue, Boston.
134	Lenox	Lenox Motor Car Company, 3368 Washington street, Boston.
218-219	Lexington	Lexington Company of New England, Inc., 1020 Boylston street, Boston.
110-111	Locomobile	Locomobile Company of America, 700 Commonwealth avenue, Boston.
36-37	Lozier	Lozier Motor Company, 646 Beacon street, Boston.
121-122	Marmon	F. E. Wing Motor Car Company, Motor Mart, Boston.
22-23	Marquette	Marquette Com-

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pany, 733 Boylston street, Boston.

102-103 Matheson — Roy A. Faye Company, 664 Commonwealth avenue, Boston.

123-124 Maxwell—United Motor Boston Company, 100 Massachusetts avenue, Boston.

17 Mercer—Fred S. Smith, 38 Columbus avenue, Boston.

100-101 Metallurgique — Alfred Cutler Morse & Co., Motor Mart, Boston.

154, 314 Metz — Hollander Motor Company, 169 Huntington avenue, Boston.

254-256 Mitchell—Lawrence & Stanley, 555 Columbus avenue, Boston.

318, 322 Moon — Andrews-Dykeman Company, 18 Columbus avenue, Boston.

327-328 National—W. H. Stevens, 642 Beacon street, Boston.

338, 347 Oakland—Massachusetts Motor Company, 591 Boylston street, Boston.

214-217 Ohio—Ohio Motor Car Company, Cincinnati, O.

221-222 Oldsmobile — Oldsmobile Company of Massachusetts, 94 Massachusetts avenue, Boston.

330 OttoMobile — OttoMobile Company, Philadelphia.

129-130 Overland — Connell & McKone Company, 555 Boylston street, Boston.

1 Packard—Alvan T. Fuller, 1089 Commonwealth avenue, Boston.

209-210 Paige-Detroit — Paige-Detroit Motor Car Company, Detroit.

14, 18 Peerless—Peerless Motor Car Company of New England, 660 Beacon street, Boston.

237 Penn—Penn Motor Car Company of New England, 224 Columbus avenue, Boston.

16, 20, 200-208 Pierce-Arrow—J. W. Maguire Company, 745 Boylston street, Boston.

13, 153 Pope-Hartford—Dodge Motor Vehicle Company, Lansdowne street, Cambridge, Mass.

112 Premier—Premier Motor Car Company of New England, 1008 Boylston street, Boston.

105-106 Rambler—Thomas B. Jeffery Company of New England, 93 Massachusetts avenue, Boston.

240-241 R, C. H.—R. C. H. Corporation, 563 Boylston street, Boston.

250-251 Regal—Regal Motor Car Company, Detroit.

100-101 Renault—Alfred Cutler Morse & Co., Motor Mart, Boston.

119-120 Reo—Linscott Motor Company, 163 Columbus avenue, Boston.

133 Sampson—United Motor Boston Company, 100 Massachusetts avenue, Boston.

125-126 Selden — Whitney-Barney Company, 823 Boylston street, Boston.

142-144 Speedwell — Curtis-Hawkins Company, 162 Columbus avenue, Boston.

19 Stearns-Knight—J. H. MacAlman, 96 Massachusetts avenue, Boston.

5, 9 Stevens-Duryea—J. W. Bowman & Co., 911 Boylston street, Boston.

115-116 Stoddard-Dayton-Knight — Stoddard-Dayton Sales Company, 94 Massachuetts avenue, Boston.

149 Stutz—Empire Motor Car Agency, 94 Massachusetts avenue, Boston.

131-132 Thomas—Thomas Motor Car Company of Boston, 915 Boylston street, Boston.

145 Velie—Velie Boston Branch, 92 Massachusetts avenue, Boston.

248, 253 Warren—Malley Motor Vehicle Company, 903 Boylston street, Boston.

227-228 Westcott — Westcott Motor Car Company, Richmond, Ind.

7, 11, 230-233 White—White Company, 320 Newbury street, Boston.

6, 10 Winton—Winton Motor Carriage Company, 574 Commonwealth avenue, Boston.

ELECTRIC PLEASURE CARS.
(First Week.)

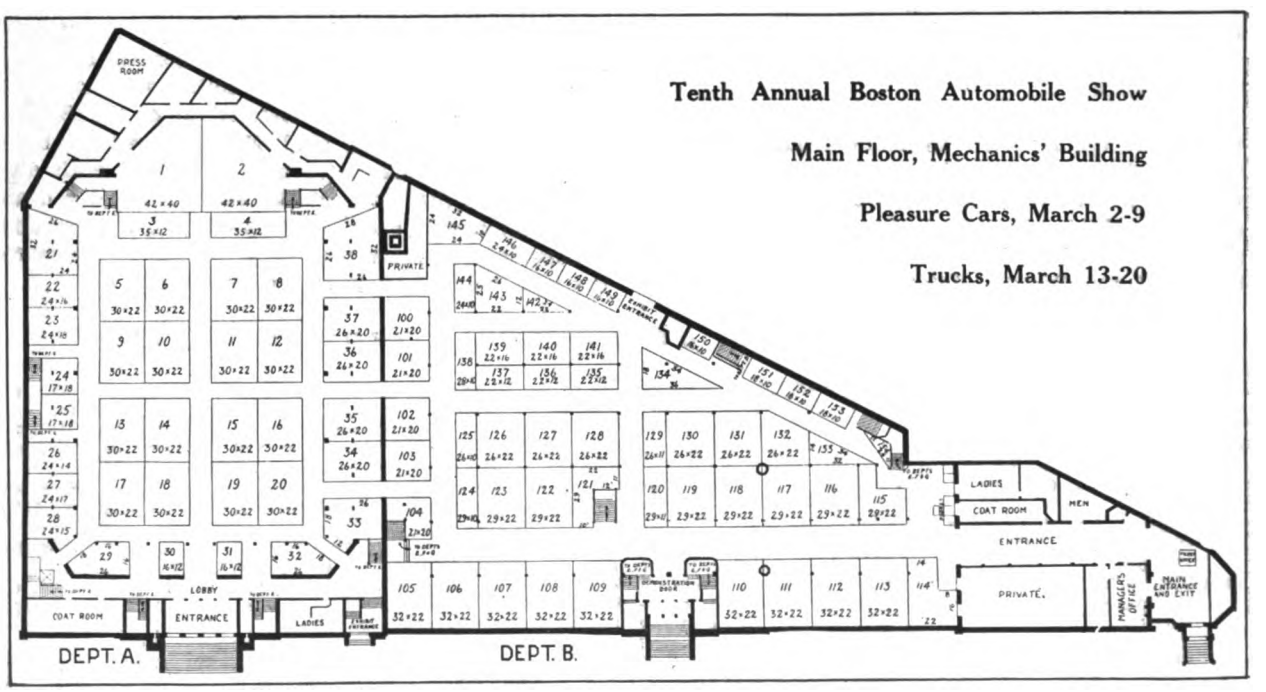
324 Babcock — Babcock Electric Carriage Company, 643 Washington street, Boston.

3 Bailey—S. R. Bailey & Co., Amesbury, Mass.

2AA Baker—A. F. Neal, Motor Mart, Boston.

30-31 Detroit—Boston Electric Garage Company, 321 Columbus avenue, Boston.

245—Ohio—Ohio Electric Car Company, Toledo, O.



231-232 Rauch & Lang—D. C. Tiffany Company, 136 Chestnut street, Boston.

STEAM PLEASURE CARS.
(First Week.)

21 Stanley—Stanley Motor Carriage Company, Newton, Mass.

GASOLINE COMMERCIAL CARS.
(Second Week.)

110-111 Alco—American Locomotive Company, 591 Boylston street, Boston.

132-133 Atterbury—Atterbury Motor Truck Company, Buffalo, N. Y.

34-37 Autocar — Autocar Company, 642 Beacon street, Boston.

38 Buick—Buick Motor Company, Motor Mart, Boston.

148 Cameron — Standard Motor Truck Company, 9 Harcourt street, Boston.

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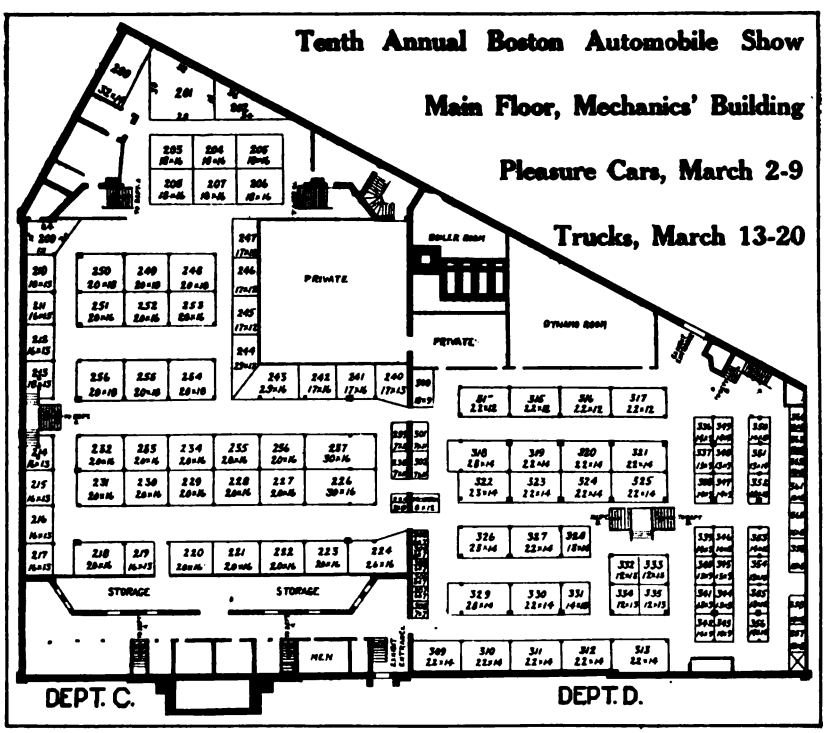
339, 346 Chase—Chase Motor Truck Company, Syracuse, N. Y.
141 Clark—Edward S. Clark, 242 Freeport street, Dorchester, Mass.
222-224 Commer—Dodge Motor Vehicle Company, Lansdowne street, Cambridge, Mass.
149 Commerce — Curtis - Hawkins Company, 162 Columbus avenue, Boston.
17 Dayton—Whitten-Gilmore Company, 907 Boylston street, Boston.
102-103 Decatur—Decatur Motor Car Company, 20 Green street, Cambridge, Mass.
134, 150 De Dion—Boston Motor Company, 1002 Boylston street, Boston.
13 Federal — Whitten - Gilmore Company, 907 Boylston street, Boston.
124 Ford—Ford Motor Company, 147 Columbus avenue, Boston.
26-27 Garford — Garford Company, Elyria, O.
105-109 G. M. C.—General Motors Truck Co., 944 Massachusetts avenue, Boston, and Butler Motor Truck Company, 1022 Commonwealth avenue, Boston.
226-227 Grabowsky—Lewis S. McCreary, 183 Pleasant street, Boston.
15 Gramm—Whitney-Barney Company, 823 Boylston street, Boston.
114 International — International Harvester Company of America, 43 Somerville avenue, Somerville, Mass.
100-101 Kelly—Eastern Motor Truck Company, Shoe & Leather building, Cambridge, Mass.
129-130 KisselKar—KisselKar New England Branch, Motor Mart, Boston.
8, 12 Knox—Underhill Company, 885 Boylston street, Boston.
151-152 Koehler—L. E. Schlotterback Manufacturing Company, East Orange, N. J.
135 Lauth-Juergens — Lauth-Juergens Motor Car Company, Lima, O.
15 Lippard - Stewart — Whitney-Barney Company, 823 Boylston street, Boston.
5 Locomobile—Locomobile Company of America, 700 Commonwealth avenue, Boston.
19 Lozier—Lozier Motor Company, 646 Beacon street, Boston.
228-235 Mack—Mack Motor Truck Company, 201 Pleasant street, Boston.
329-330 Mais—R. L. & H. H. Smith, 1008 Commonwealth avenue, Boston.
147 McIntyre — Standard Motor Truck Company, 9 Harcourt street, Boston.
32 Mercury—Mercury Manufacturing Company, Chicago, Ill.
21 Morgan—Morgan Motor Truck Company, Worcester, Mass.
24-25, 28-29 Motor Wagon—Boston Motor Wagon Company, Motor Mart, Boston.
1-2 Packard—Alvan T. Fuller, 1089 Commonwealth avenue, Boston.
14, 18 Peerless—Peerless Motor Car Company of New England, 660 Beacon street, Boston.
30 P. H. P.—P. H. P. Motor Truck Company, Westfield, Mass.
312-313 Philadelphia — Philadelphia Truck Company, Philadelphia.
16, 20 Pierce-Arrow — Pierce-Arrow Motor Car Company, Buffalo, N. Y.
318-320 Pope-Hartford—Dodge Motor Vehicle Company, Lansdowne street, Cambridge, Mass.
31 Poss — Poss Motor Company, Detroit.
118-120 Reo—Linscott Motor Company, 163 Columbus avenue, Boston.
332-335 Sandusky — Sandusky Auto Parts & Motor Truck Company, Sandusky, O.
22 Sanford—Sanford-Herbert Company, Syracuse, N. Y.
115-117 Sampson — United Motor Boston Company, 100 Massachusetts avenue, Boston.

ELECTRIC COMMERCIAL CARS.
(Second Week.)

137-139 Baker—Frank N. Phelps, 17 Harvard street, Boston.
121 Couple-Gear—W. E. Eldridge, 178 Devonshire street, Boston.
136 Detroit—Anderson Electric Car Company, Detroit.
122-123 General Vehicle — General Vehicle Company, 84 State street, Boston.
105-109 G. M. C.—General Motors Truck Company, 944 Massachusetts avenue, Boston.
127 Lansden — Lansden Company, Newark, N. J.
126 Walker—Walker Vehicle Company, 131 State street, Boston.

STEAM COMMERCIAL CARS.
(Second Week.)

23 Stanley — Stanley Motor Carriage Company, Newton, Mass.



254-256 Saurer—Mack Motor Truck Company, 201 Pleasant street, Boston.
142-144 Speedwell — Curtis-Hawkins Company, 162 Columbus avenue, Boston.
6 Stearns—J. H. MacAlman, 96 Massachusetts avenue, Boston.
237 Sternberg—Hanson Bros., 95 Commercial street, Boston.
112 Teel-Woodworth — Teel Manufacturing Company, Main street, Medford, Mass.
113 Universal — Universal Motor Truck Company, Detroit.
145-146 Velie—Velie Boston Branch, 92 Massachusetts avenue, Boston.
326-327 Victor—Victor Motor Car Company, 75 Haverhill street, Boston.
4, 7, 11 White—White Company, 320 Newbury street, Boston.

IGNITION EQUIPMENT.

614* American Storage Battery Company, Albro street, Cambridge, Mass., batteries.
514* Apple Electric Company, Dayton, O., batteries.
616-617* Bi-Motor Equipment Company, 177 Portland street, Boston, Salom batteries.
242* G. C. Blickensderfer Company, Stamford, Conn., spark plugs.
408-409* Burn - Boston Battery & Manufacturing Company, 9 Doane street, Boston, batteries.
414* Champion Ignition Company, Flint, Mich., magnetos, plugs.
504* Connecticut Telephone & Electric Company, Meriden, Conn., Connecticut magnetos, etc.
619* Smalley Daniels, Motor Mart,

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Boston, Kingston magnetos, etc.

415* **Detroit Electric Appliance Company,** Detroit, batteries.

500* **Edison Storage Battery Company,** 895 Boylston street, Boston, batteries.

546-547 **Electric Storage Battery Company,** Philadelphia, batteries.

620* **Walter J. Forbes,** 243 Columbus avenue, Boston, magnetos, plugs, etc.

531* **Heinze Electric Company,** Lowell, Mass., Heinze magnetos.

...* **Holt & Beebee,** 40 Sudbury street, Boston, electric supplies.

618 **Holtzer-Cabot Electric Company,** Brookline, Mass., magnetos, etc.

...* **C. S. Knowles,** 7 Arch street, Boston, spark plugs.

417* **W. H. Leland & Co.,** Worcester, Mass., coils, etc.

553* **Mac-Kae Manufacturing Company,** 185 Armory street, Jamaica Plain, Boston, Mac-Kae spark plugs.

508 **Marburg Bros., Inc.,** New York City, Mea magnetos.

441-442* **Chas. E. Miller,** 202-204 Columbus avenue, Boston, magnetos, plugs, etc.

438 **A. R. Mosler & Co.,** New York City, spark plugs.

336* **Narragansett Chemical Company,** Providence, R. I., batteries.

540* **National Carbon Company,** Cleveland, O., batteries.

509* **National Coil Company,** Lansing, Mich., National magnetos, etc.

421* **Pittsfield Spark Coil Company,** Dalton, Mass., Pittsfield magnetos, etc.

543 **Remy Electric Company,** Anderson, Ind., Remy magnetos, etc.

601* **T. F. Russell & Co.,** 176 Federal street, Boston, magnetos, etc.

548-549 **C. F. Splitdorf, Inc.,** Motor Mart, Boston, Splitdorf magnetos, etc.

521 **U. S. Light & Heating Company,** New York City, batteries.

560* **Vesta Accumulator Company,** Chicago, batteries.

TIRES, RIMS, ETC.

519-520 **Ajax-Grieb Rubber Company,** 15 Park square, Boston, Ajax tires.

516* **Allen Auto Specialty Company,** New York City, cases, pressure gauges, etc.

355 **Atlas Chain Company,** Brooklyn N. Y., chains.

513* **Auburn Auto Pump Company,** 537 Tremont street, Boston, pumps, compressors.

561* **Batavia Rubber Company,** Batavia, N. Y., Batavia tires.

429A* **Booth Demountable Rim Company,** Detroit, Booth rims.

610* **Boston Auto Gauge Company,** 8 Waltham street, Boston, gauges.

609* **Boston Tire & Rubber Company,** 182 Friend street, Boston, tires.

449* **F. Shirley Boyd,** 903 Boylston street, Boston, Dorian rims.

625* **Century Tire Company,** 817 Boylston street, Boston, tires.

350 **Clayton Air Compressor Works,** 200 Devonshire street, Boston, compressors.

619* **Smalley Daniels,** Motor Mart, Boston, Detroit rims.

433 **Diamond Rubber Company,** 867 Boylston street, Boston, Diamond tires.

562* **Dorian Remountable Rim Company,** New York City, Dorian rims.

431 **Empire Tire Company,** 119 Summer street, Boston, Empire tires.

410* **Endurance Tire & Rubber Company,** New York City, Endurance tubes.

550-551 **Federal Rubber Manufacturing Company,** Milwaukee, Wis., Federal tires.

506, 527 **Firestone Tire & Rubber Company,** 145 Columbus avenue, Boston, Firestone tires and rims.

538 **Fisk Rubber Company,** 811 Boylston street, Boston, Fisk tires and rims.

606* **Jas. L. Gibney & Bro.,** Philadelphia, Gibney tires, etc.

541-542 **B. F. Goodrich Company,** 581 Boylston street, Boston, Goodrich tires.

544-545 **Goodyear Tire & Rubber Company,** 669 Boylston street, Boston, Goodyear tires, etc.

446* **Hopewell Bros.,** 29 Chapel street, Newton, Mass., cases.

526-527 **Kelly-Springfield Tire Company,** 683 Boylston street, Boston, Kelly-Springfield tires.

517 **Leather Tire Goods Company,** Niagara Falls, N. Y., Woodworth treads, etc.

602-603 **Lee Tire & Rubber Company,** Conshohocken, Penn., Lee tires.

418* **Michelin Tire Company,** 901 Boylston street, Boston, Michelin tires and rims.

407* **John Lewis Morse,** Franklin, Mass., Brown inner tubes.

535-536 **Motz Tire & Rubber Company,** Akron, O., Motz tires.

552* **National Rubber Company,** St. Louis, Mo., Tirenew preservative.

439 **Pennsylvania Rubber Company,** Jeannette, Penn., Pennsylvania tires.

424* **Republic Rubber Company,** 735 Boylston street, Boston, Republic tires.

503* **C. A. Shaler & Co.,** Waupun, Wis., Shaler vulcanizers.

452* **Shawmut Tire Company,** 103 Bedford street, Boston, Shawmut tires.

343* **Standard Tire Protector Company,** Akron, O., tire protectors.

402-403* **Standard Tire & Rubber Company,** 104 Portland street, Boston, tires.

523-524 **Swinehart Tire & Rubber Company,** Akron, O., Swinehart tires.

304* **William L. Tobey,** 9 Lewis street, East Boston, Mass., tire tools.

532-533 **United Rim Company,** Akron, O., Standard Universal rims.

436-437 **United States Tire Company,** 863 Boylston street, Boston, United States, Hartford, Continental, G & J and Morgan & Wright tires.

430* **Voorhees Rubber Manufacturing Company,** 34 Columbus avenue, Boston, tires, etc.

501* **Weed Chain Tire Grip Company,** New York City, Weed chains.

LUBRICANTS, POLISHES, ETC.

300* **Baume's Castorine Company,** Rome, N. Y., soaps and polishes.

423 **Borne, Scrymser Company,** 36 Central wharf, Boston, Colonial oils.

440 **Columbia Lubricants Company of New York,** 116 Broad street, New York City, Monogram oils.

515* **Adam Cook's Sons,** 709 Washington street, Boston, Albany grease.

500AA** **L. M. Crane & Co.,** 91 Oliver street, Boston, oils.

308* **Crowell Chemical Company,** Beverly, Mass., Oxford polishes.

518* **Joseph Dixon Crucible Company,** John Hancock building, Boston, Dixon's graphite lubricants.

443 **Eagle Oil & Supply Company,** 104 Broad street, Boston, Eagleine No-Karbon oils.

510 **A. W. Harris Oil Company,** Providence, R. I., Harris oils.

512* **Havoline Oil Company,** 35 Central wharf, Boston, Havoline oils.

502* **George A. Haws,** 889 Boylston street, Boston, Panhard oils.

247* **R. M. Hollingshead Company,** Camden, N. J., Whiz polishes.

446* **Hopewell Bros.,** 29 Chapel street, Newton, Mass., Paos soap.

300 **Ideal Oil Tank & Pump Company,** 146 Summer street, Boston, Ideal storage systems.

534 **International Acheson Graphite Company,** Niagara Falls, N. Y., Acheson graphite lubricants.

613* **International Metal Polish Company,** Indianapolis, Ind., Blue Ribbon polishes.

427* **Chas. F. Kellom & Co.,** 284 Columbus avenue, Boston, Invader oils.

413 **Keystone Lubricating Company,** 184 Franklin street, Boston, Keystone oils.

441-442* **Chas. E. Miller,** 202-204 Columbus avenue, Boston, Miller's Pan-American oils.

336* **Narragansett Chemical Company,** Providence, R. I., Meteor oils, etc.

354 **National Pump Company,** Dayton, O., storage systems.

554 **New York & New Jersey Lubricant Company,** New York City, Non-Fluid oils and Motorol.

360A* **Nugget Polish Company of New York,** New York City, polish.

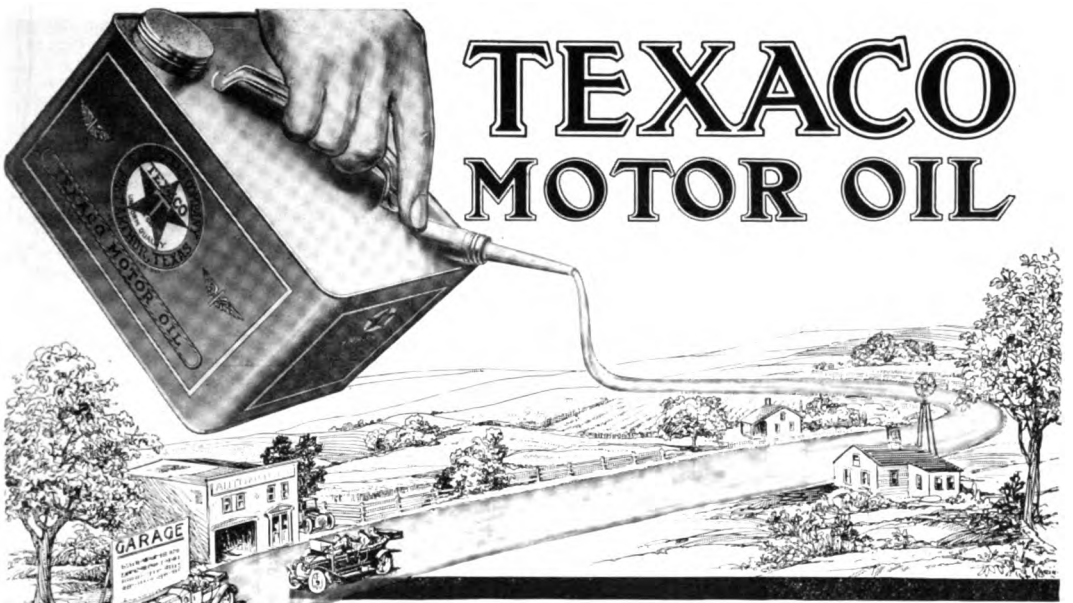
553* **Randall-Faichney Company,** 251 Causeway street, Boston, B-line grease guns.

534 **Wm. C. Robinson & Sons Company,** Baltimore, Md., special oils.

239* **Rome Soap Company,** Rome, N. Y., soaps and polishes.

225 **Howard B. Sawyer Oil Company,** 65 Long wharf, Boston, Sawyer oils.

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The Road to Motor Pleasure

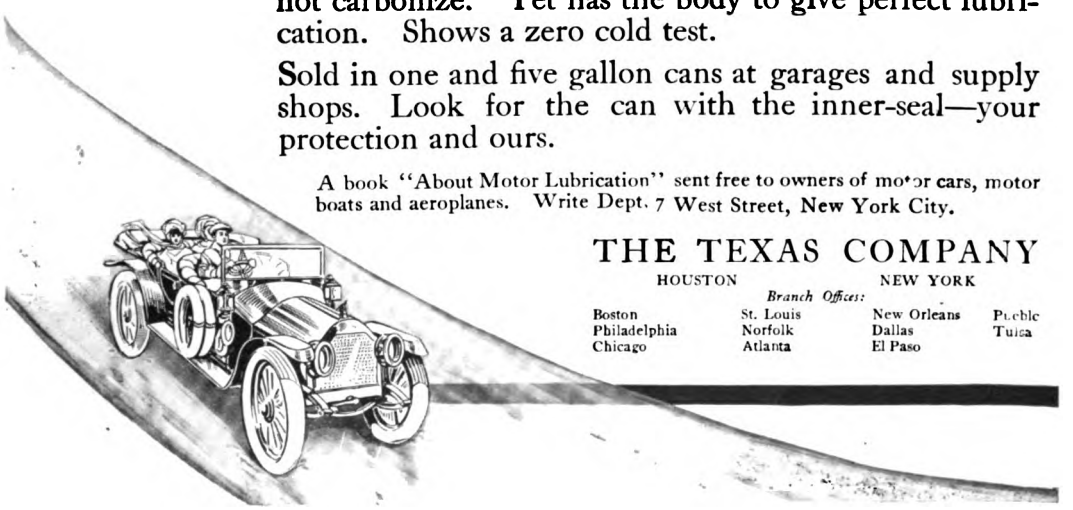
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412* **T. R. Shannon,** 19 Loraine street, Hartford, Conn., Rapid polishes.
321 **Standard Oil Company,** 50 Congress street, Boston, Polarine oils.
426A* **Texas Company,** New York City, Texaco oils.
323 **Underhay Oil Company,** 74 Batterymarch street, Boston, Underhay oils.
556 **Vacuum Oil Company,** 49 Federal street, Boston, Vacuum Mobiloils.
301-302 **Valvoline Oil Company,** 27 State street, Boston, Valvoline oils.
353* **Wayne Oil Tank & Pump Company,** Fort Wayne, Ind., Wayne storage systems.
419* **White & Bagley Company,** Worcester, Mass., Oilzum, etc.
429B* **Wolverine Lubricants Company,** 80 Broad street, New York City, Wolf's head oils.

SELF-STARTING DEVICES.

514* **Apple Electric Company,** Dayton, O., Aplco.
621-622 **Aristos Company,** 250 West 54th street, New York City, Disco.
600* **Boston Safety Crank Company,** 585 Boylston street, Boston, safety cranking device.
405-406* **Cox Brass Manufacturing Company,** Albany, N. Y., Cox.
525 **Dean Electric Company,** Elyria, O., Titanic.
415* **Detroit Electric Appliance Company,** Detroit, electric starter.
505 **Hartford Suspension Company,** Jersey City, N. J., electric starter.
337* **John W. Tudor,** 35 Congress street, Boston, Tudor.

SPEED INDICATORS.

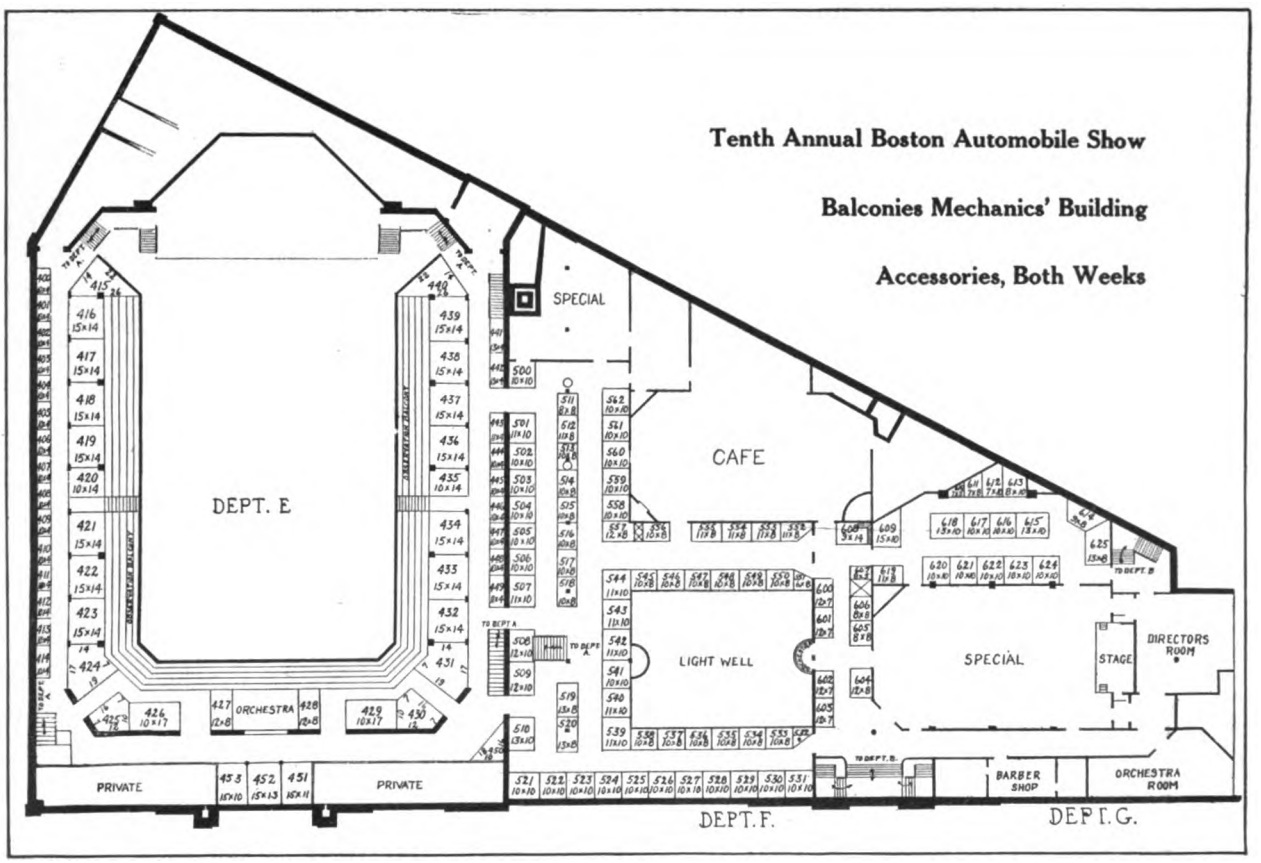
522 **Hoffecker Company,** 222 Eliot street, Boston, Hoffecker.
555 **Jones Speedometer Company,** New York City, Jones.
453* **Reliance Speedometer Company,** 134 Eliot street, Boston, Reliance.
607* **Stewart & Clark Manufacturing Company,** 174 Columbus avenue, Boston, Stewart.
624* **Stover-Lang Company,** 219 Columbus avenue, Boston, Stover-Lang.
557-558 **Veeder Manufacturing Company,** Hartford, Conn., Veeder.
420* **Warner Instrument Company,** 925 Boylston street, Boston, Warner Auto-Meter.

LAMPS AND LIGHTING.

514* **Apple Electric Company,** Dayton, O., Aplco dynamos.
621-622 **Aristos Company,** New York City, Frary lighting system.
411* **Auto Parts Company,** 50 Exchange place, Providence, R. I., Ford attachments.
525 **Dean Electric Company,** Elyria, O., Dynalux dynamos.
415* **Detroit Electric Appliance Company,** Detroit, dynamos.
500* **Edison Storage Battery Company,** 895 Boylston street, Boston, batteries.
546-547 **Electric Storage Battery Company,** Philadelphia, batteries.
426B* **Esterline Company,** Lafayette, Ind., Matchless lighting system.
434 **Gray & Davis,** Amesbury, Mass., Gray & Davis dynamos.
604* **Motor Specialties Company,** Motor Mart, Boston, flash lighters.
336* **Narragansett Chemical Company,** Providence, R. I., lamps and lighting systems.
543 **Remy Electric Company,** Anderson, Ind., Remy magneto lighting system.

SIGNALLING DEVICES.

405-406* **Cox Brass Manufacturing Company,** Albany, N. Y., horns.
619* **Smalley Daniels,** Motor Mart, Boston, Waymaker.
525 **Dean Electric Company,** Elyria, O., Tuto.
447-448* **Gabriel Horn Manufacturing Company,** Cleveland, O., Gabriel.
416* **Lovell-McConnell Manufacturing Company,** Newark, N. J., Klaxon.
428* **G. Piel Company,** Long Island City, N. Y., Long horn.
553* **Randall-Faichney Company,** 251 Causeway street, Boston, Jericho and Jubilee.



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THE ACCESSORY AND GARAGE JOURNAL

TIMES BUILDING PAWTUCKET, R. I.

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TOPS AND WINDSHIELDS.

325* **Columbia Tire & Top Company,** 1014 Commonwealth avenue, Boston, windshields.
405-406* **Cox Brass Manufacturing Company,** Albany, N. Y., windshields.
619* **Smalley Daniels,** Motor Mart, Boston, Boreas windshields.
447-448* **Gabriel Horn Manufacturing Company,** Cleveland, O., windshield cleaner.
550* **Pantasote Company,** 11 Broadway, New York City, top materials.

CARBURETORS, ETC.

432 **S. F. Bowser Company, Inc.,** 141 Milk street, Boston, Bowser storage systems.
445 **C. R. G. Manufacturing Company,** Saugus, Mass., C. R. G. carburetors.
511* **Dover Stamping & Manufacturing Company,** Cambridge, Mass., cans, funnels, etc.
618 **Holtzer-Cabot Electric Company,** Brookline, Mass., Newcomb carburetors.
300 **Ideal Oil Pump & Tank Company,** 146 Summer street, Boston, Ideal storage systems.
354 **National Pump Company,** Dayton, O., storage systems.
422* **Stromberg Motor Devices Company,** Motor Mart, Boston, Stromberg carburetors.
353* **Wayne Oil Tank & Pump Company,** Fort Wayne, Ind., Wayne storage systems.

SHOCK ABSORBERS, ETC.

342* **Acme Torsion Spring Company,** 21 Cambridge street, Boston, Acme torsion springs.
621-622 **Aristos Company,** New York City, Mondex shock absorber.
504* **Connecticut Telephone & Electric Company,** Meriden, Conn., Connecticut shock absorber.
608* **Ernst Flentje,** 1613 Cambridge street, Cambridge, Mass., Flentje shock absorber.
447-448* **Gabriel Horn Manufacturing Company,** Cleveland, O., Foster shock absorber and Gabriel rebound snubber.
505 **Hartford Suspension Company,** Jersey City, N. J., Truffault-Hartford shock absorber.
303* **Modern Auto Appliance Company,** Chatham, N. Y., Little Steersman spiral springs.

JACKS, WRENCHES, ETC.

513* **Auburn Auto Pump Company,** 537 Tremont street, Boston, jacks.
411* **Auto Parts Company,** 50 Exchange place, Providence, R. I., special Ford tools.
243-244* **Chandler-Farquhar Company,** 34 Federal street, Boston, machine tools.
435 **Coes Wrench Company,** Worcester, Mass., Coes wrenches.
357* **Detroit Tool Sales Company,** 60 State street, Boston, 6-in-1 tool chests.
505 **Hartford Suspension Company,** Jersey City, N. J., Hartford auto-jacks.
416* **Lovell-McConnell Manufacturing Company,** Newark, N. J., Raiswell jacks.
348* **Frank Mossberg Company,** Attleboro, Mass., socket wrenches.
604* **Motor Specialties Company,** Motor Mart, Boston, jacks.
246* **Standard Wrench & Tool Company,** Providence, R. I., Fitzall wrenches.
304* **William L. Tobey,** 9 Lewis street, Boston, tire tools.

GENERAL ACCESSORIES.

616-617* **Bi-Motor Equipment Company,** 177 Portland street, Boston.
449 **F. Shirley Boyd,** 903 Boylston street, Boston.
615* **Coward Auto Supply Company,** Motor Mart, Boston.
619* **Smalley Daniels,** 23 Motor Mart, Boston.
612* **C. J. Downing,** 1777 Broadway, New York City.
620* **Walter J. Forbes,** 243 Columbus avenue, Boston.
349, 404* **Hub Cycle Company,** 40 Portland street, Boston.
315 **Lunt, Moss Company,** 43 Market street, Boston.
441-442* **Chas. E. Miller,** 202-204 Columbus avenue, Boston.
611* **Motor Accessories, Inc.,** 749 A Boylston street, Boston.
425* **Post & Lester Company,** 223 Columbus avenue, Boston.
601* **T. F. Russell & Co.,** 176 Federal street, Boston.
400-401 **Standard Auto Supply Company,** 104 Portland street, Boston.

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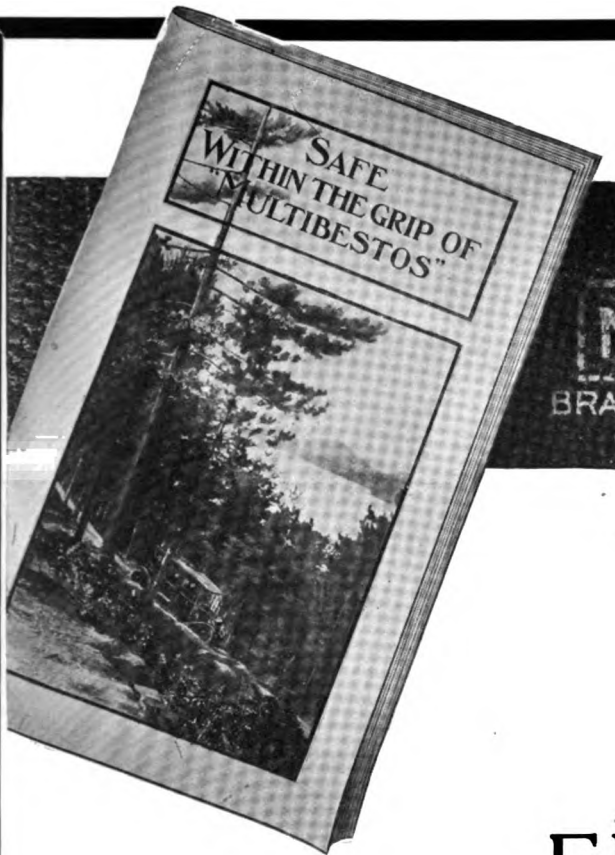
... **J. Q. Adams & Co.,** 120 Boylston street, Boston, dictionaries.
604AA* **Aetna Life Insurance Company,** 4 Liberty street, Boston.
364 **American Brass Company,** 99 John street, New York City.
356AA* **American Technical Society,** 144 High street, Boston.
440AA* **Aluminum Solder Company,** 199 Berkeley street, Boston, aluminum solder.
305-306* **Autogenous Welding Company,** 41 Bay street, Springfield, Mass., welding equipment.
518** **Baldwin Chain & Manufacturing Company,** Worcester, Mass., transmission chains, etc.
356* **Boyd Motor Company,** 27 Stanhope street, Boston.
508AA **Walter S. Bucklin,** 30 Kilby street, Boston.
341 **Clark Foundry Company,** Rumford Falls, Me., castings.
537 **Wm. Cramp & Sons Ship Building & Engineering Works,** Philadelphia, special metals.
351 **Deane Steam Pump Company,** Holyoke, Mass., power pumps.
339-340,345-346* **Fairbanks Company,** 34 Pearl street, Boston, motors.
212* **Frontier Iron Works,** Buffalo, N. Y., Frontier aerial motors.
562AA* **Hillman Auto Supply Company,** 98 Massachusetts avenue, Boston, lacquer work.
319* **George N. Holden,** 141 Massachusetts avenue, Boston, Indian motorcycles.
...* **International Automobile Association,** Old South building, Boston, membership campaign.
...* **Jackson & Co.,** 126 Tremont street, Boston, fur clothing.
360B* **J. J. Kelleher,** 610 Columbus avenue, Boston.
362* **Margaret E. Knight,** Charles and Hollis streets, South Framingham, Mass., new motor.
450AA **Millbury Steel Foundry,** Millbury, Mass., steel castings.
... **Moore-Smith Company,** 250 Devonshire street, Boston, clothing.
...* **Morrison Ricker Manufacturing Company,** Grinnell, Ia., Grinnell gloves.
528* **National Tube Company,** Pittsburg, Penn., tubing.
356BB* **N. E. Casualty Company,** 40 Kilby street, Boston, insurance.
235-236* **Norton Company,** Worcester, Mass., grinding wheels, etc.
307 **Pyrene Company of New England,** 176 Federal street, Boston, fire extinguishers.
344 **Raymond Engineering Company,** 53 State street, Boston.
338, 347 **Milton E. Rogers,** 420 Tremont building, Boston.
...* **P. R. Rose,** 62 St. Germain street, Boston.
605* **John A. Salman,** 17 Bromfield street, Boston, name plates and monograms.
358 **Sheldon Axle Company,** Wilkesbarre, Penn., axles and parts.
446-447** **Sewell Cushion Wheel Company,** Detroit, spring wheel.
213* **S. K. F. Ball Bearing Company,** 50 Church street, New York City, ball bearings.
530-531** **Standard Roller Bearing Company,** Philadelphia, Penn.
443** **Steel Specialties Company,** 101 Tremont street, Boston.
559* **Valentine & Co.,** 74 Pearl street, Boston, varnishes.
451* **Waltham Watch Company,** 200 Devonshire street, Boston.
516** **Whitney Manufacturing Company,** Hartford, Conn., transmission chains, etc.
450* **Edgar T. Ward & Sons,** 25 Purchase street, Boston, tubing.

LATE CLASSIFICATIONS.

249, 252 **McFarlan**—Middleboro Auto Exchange, Middleboro, Mass., pleasure.
320 **Moyer**—A. J. Furbush, Brighton, Mass., pleasure.
338, 347 **Norwalk**—Milton E. Rogers, 420 Tremont building, Boston, pleasure.
10 **Eckhart**—Eckhart Motor Truck Company, 116 Milk street, Boston, truck.
361 **G. C. A. Manufacturing Company,** Pittsfield, Mass., lighting equipment.
363 **S. P. Townsend & Co.,** Orange, N. J., grease guns.
359 **Ames Auto Jack Truck Company,** Franklin, Penn., jacks.
444 **Air Shock Absorber Company,** 585 Boylston street, Boston, shock absorbers.
328 **P. G. H. Bennett & Co.,** 27 Lansdowne street, Boston, machinery.
239, 352 **Duren & Kendall,** 34 Summer street, Boston, vacuum cleaners.

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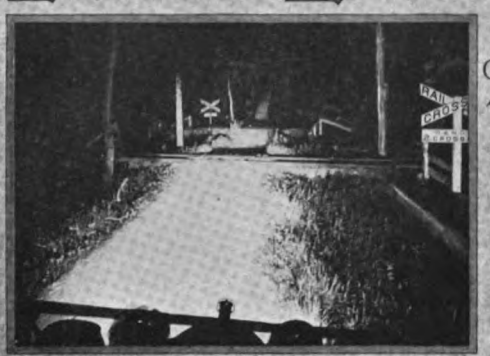
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Electric Lighting of Motor Cars



Outlining Various Systems Employed and Methods of Operation.



By C. P. Shattuck



Part II—Lamp Designs and Wiring.

IRRESPECTIVE of the source of electricity utilized for lighting the motor car, whether it be derived from the storage battery or mechanical generator, the lamp equipment should receive careful consideration. The most important member of the group is the headlight, inasmuch as railroad crossings, bridges, dangerous turns and the unstable conditions of country roads, demand lights of the highest efficiency to make night driving safe.

The units not only should project a powerful almost parallel beam sufficiently far ahead to permit reasonably fast driving, but also a quickly diverging beam to illuminate the sides of the highway near enough to the front of the car for safety in passing other vehicles. The divergent beam should provide ample light for a distance of about 100 feet, and other users of the highway in meeting this light should not experience any dazzle except when they are a long way in front of, or directly in the path of the automobile; and as they emerge out of the parallel into the diverging beam there should be light enough for them to see clearly the sides of the road almost up to the car itself. All these conditions are fulfilled with the properly designed electric headlight which provides a greater lateral range, throwing as it does, a steadier, brighter and more far reaching light than any other form utilized in connection with the motor car.

Photometric tests recently conducted by the engineering department of the National Electric Lamp Association showed that two 16 candlepower tungsten lamps focused properly in eight-inch silvered parabolic reflectors threw twice as much light on a 10-foot circle 50 feet ahead as did two .75-inch acetylene burners in ordinary gas headlights. Further experiments were conducted with acetylene burners rated at .625 cubic foot an hour and these gave an average maximum horizontal candlepower of 29.8. The electric lights were of the parabolic type, the actual diameter of the reflectors being 8.25 inches and the bulbs used were "Mazda" 21.4 candlepower consuming 21 watts. Both types of lamps were mounted 30 inches between centres and readings were taken from them across the plane of the axis of the beams and at intervals of one foot. Determinations in foot-candles were made and the candlepower computed.

"Although the acetylene burner is rated at not

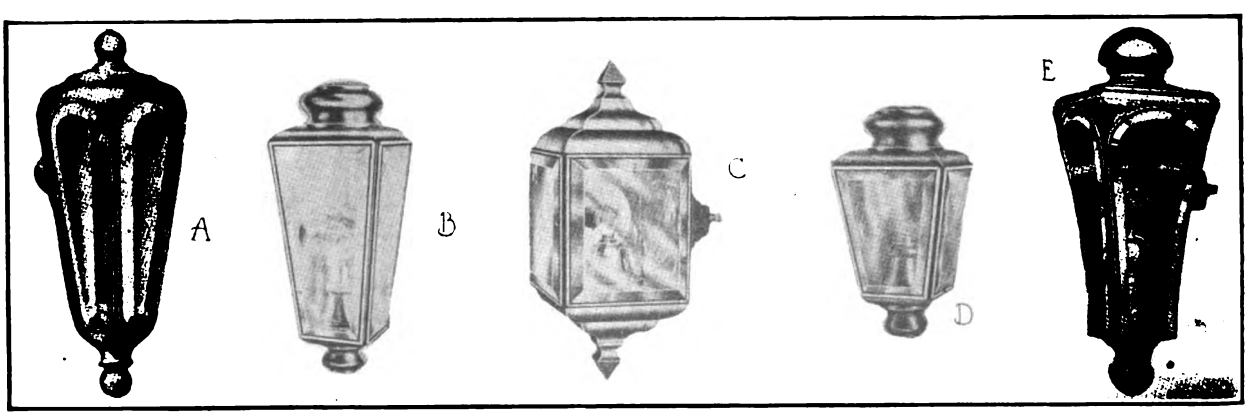


Fig. 9—Types of Pillar Lamps Adapted to the Limousine: A, B and C, Vesta; D, Solar; E, Gray & Davis.

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less than double the candlepower of the electric lamp, the illumination curves show that the apparent candlepower of the latter is nearly 10 times that of the acetylene," states the report, "and that the curves of the electric give a much closer distribution and do not project light where it is not necessary. With the electric about 75 per cent. of the total light is turned to useful account while only 24 per cent. of that of the gas flame strikes the reflector, and about 61 per cent. illuminates only the black interior of the lamp." This difference is due to the construction of the parabolic reflector, as previously explained.

Focal Adjustment.

Another advantage of the electric is the ease with which the position of the bulb relative to that of the reflector may be adjusted by means of various devices, which may be termed sliding focuses. The majority of headlights are thus equipped and may be changed readily, without disturbing the lamp, so as to throw a nearly parallel beam several hundred feet ahead, or if desired, may be adjusted to give a broader distribution. This is an important factor as correct focal adjustment is very necessary for the proper operation of electric headlights equipped with parabolic reflectors.

Considering reflector design, relations between the focal length and the various dimensions of a parabola should be taken into account. One of short focal length is deeper for a given diameter than one of greater length, and it is claimed that the reflector of a shorter focal length is the more efficient inasmuch as a larger proportion of the light is redirected in a useful direction. In general practise the focal length is between .875 and 1.25 inches. Shorter than the former is prohibited because of certain mechanical requirements in the bulbs utilized.

Assuming that the maximum is 1.25 inches and the bulb is set in the centre, the geometrical focus of the paraboloid: Under these conditions, the reflecting rays are parallel and a far reaching beam is obtained. When the location of the bulb is to the rear of this point, and at its maximum, the beams diverge, providing more light at the sides. If moved to the extreme forward point of the focal length, the rays will diverge but cross. Generally speaking, it may be said that a one-inch focal length reflector is considered most satisfactory for the motor car headlight.

Adjusting Devices.

Considerable ingenuity is displayed by the manufacturer in fitting the adjusting devices, these being arranged in various ways. Some lamps are designed to prevent tampering with the adjustments or stealing the bulbs, and a novel arrangement is the device fitted to the Gray & Davis product. A small knurled nut attached to a lever, which in turn is connected with focusing mechanism, is located at the top of the reflector inside the door. By simply turning the nut the bulb may be moved backward or forward easily. The door locking device consists of a substantial screw fitted over the bar of the door fastener, to remove which the use of a screw driver is required.

The Vesta lamp is equipped with a small button located at the back of the member and the focus is regulated by turning the device. Various methods are employed for changing the focus and adjustable attachments are not confined alone to the lamps de-

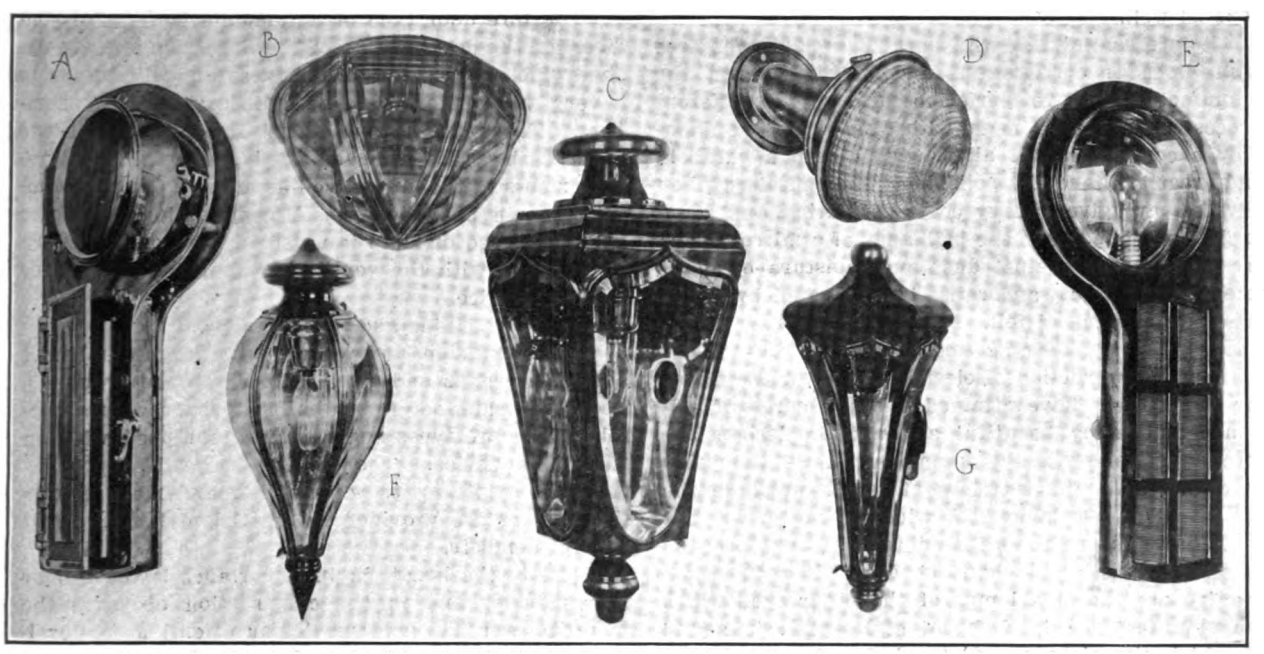


Fig. 10—Some Lamps Designed for the Limousine; B, Cowles Dome; D, Vesta Dome; C, F and G, Cowles Pillar—A, Cowles Flush Combination Side and Ventilator, Open; E, Same Design, Closed.

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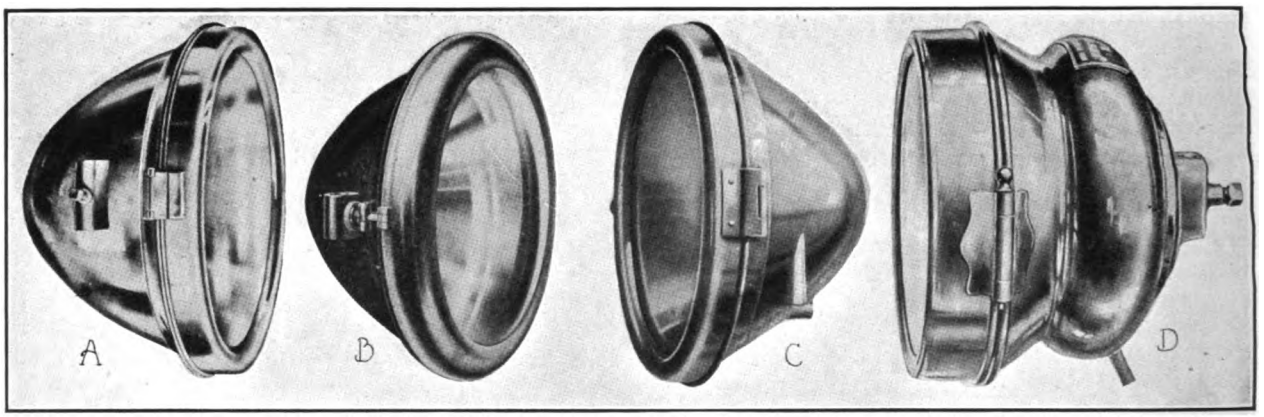


Fig. 11—Electric Headlights of Advanced Design: A and B, Gray & Davis, Equipped with Focus Adjusting Device and Locked Door; C, Rushmore; D, Guide Coupe.

signed for electricity but to those of the convertible type as well.

It is essential that the parabolas should be free from lines or corrugations and in this respect the manufacturers have perfected designs by different processes. Some are made with dies while others employ a combination of alloys, and obtain a parabola and great brilliancy by polishing. The reflectors when silvered, are given heavy coats of plating and when finally completed have the brilliancy of a mirror. They are made proof against dust and moisture by accurately fitting doors, and rattle is eliminated by utilizing an interlining of felt.

Lamp Designs.

In the construction of electric lamps for the motor car the makers have attained a high degree of efficiency and many beautiful and artistic designs are noted, particularly in the equipment for the limousine or closed cars, the interiors of which preclude the use of oil or gas lamps. A wide variety of interior dome lights is produced, including flush members and those fitted with holophane shades. Even more attractive are the side lamps of the pillar type which are manufactured in different styles and sizes, and in which the richness of the design is accentuated by the use of heavy plate glass, dark finish, etc.

The fore door type of automobile body is responsible for the development of the flash side lamp, a design which makes for compactness and eliminates to a very great extent, danger of injury to these members. These are manufactured for both metal and wood dashes, are attached easily, and fulfill all requirements of the law as well as making for more simple lines in body design. A combination ventilator and flush type of lamp is noted in the Cowles, which is produced with the ventilating door for exterior or interior service.

Side and Other Lamps.

Regarding side lamps, there are a large number of different designs and sizes to meet all requirements. These are manufactured in bullet, torpedo, acorn, barrel and square types and some are equipped with an adjustable device. The bullet form will appeal to those of simple tastes while richer and more attractive designs are provided in the Colonial, Alpha and square members.

Next to the headlight in importance is the tail or rear member and in the construction of these the manufacturer has paid particular attention to developing a device that is durable and efficient, some in-

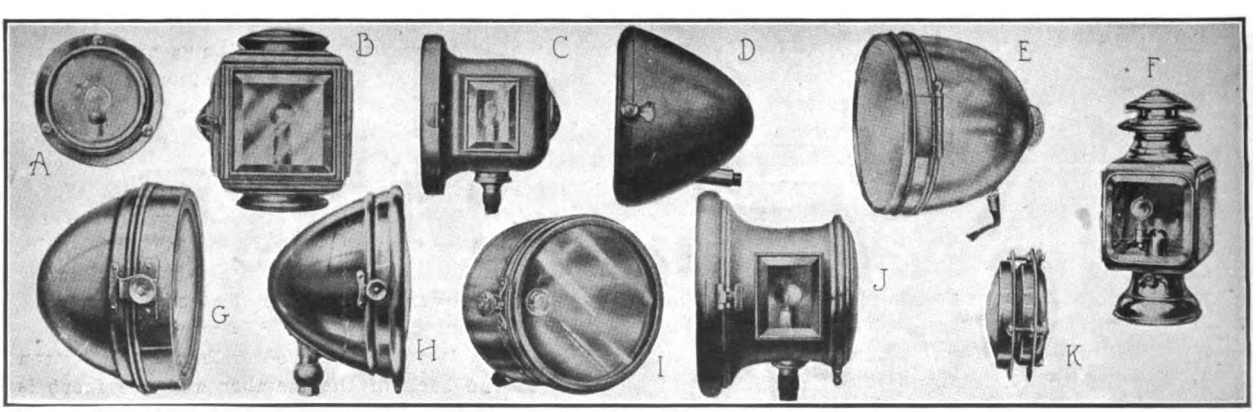


Fig. 12—Side Lamps Include Many Designs: A and K, Guide Flush; B, Solar Square; C, Solar Coupe; D, Solar Bullet; E, Vesta with Adjustable Focus; F, Gray & Davis Square; G, Guide Torpedo; H, Gray & Davis; I, Guide Cylinder; J, Solar Alpha.

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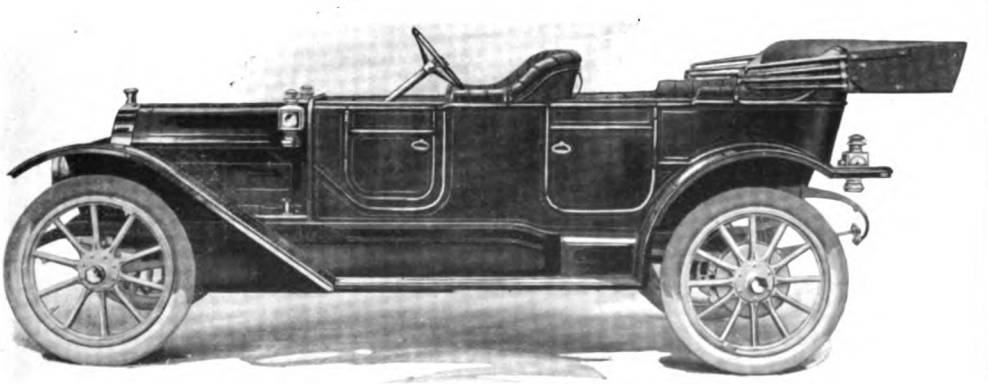
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Master Model self-starting, magnificently appointed, completely equipped (except top) $1975.

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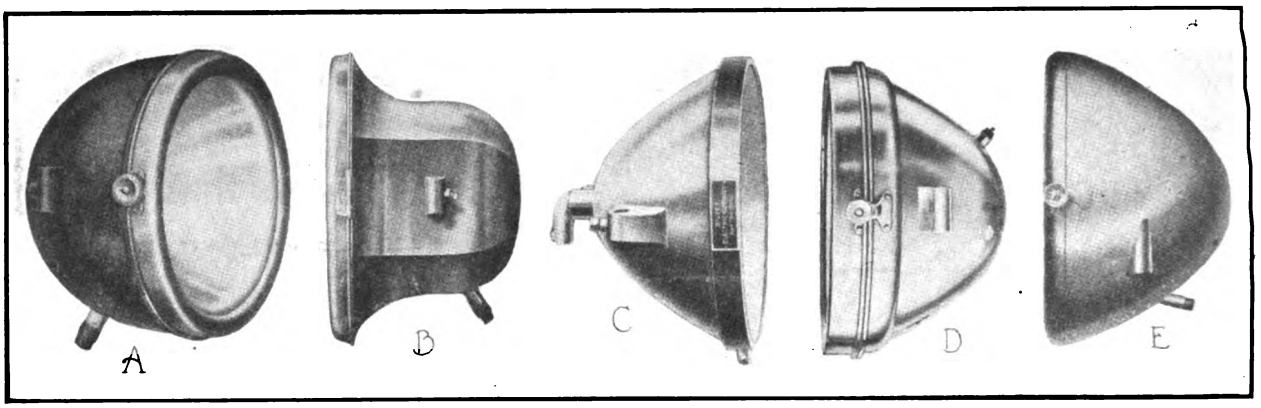


Fig. 13—Other Forms of Headlights: A, Solar Acorn; B, Solar Colonial; C, Silvey, Turned from Casting; D, K-W; E, Solar Bullet.

cluding an arrangement for attaching the license plate. The use of electricity is not confined alone to head, side and tail members, as incandescents are employed for lighting the dial of the speedometer, oil gauge or interior of the touring car.

Selecting the Equipment.

In selecting the equipment to be utilized in connection with the straight storage battery system the design of the car and the service required of the light should be considered. It is obvious that a large touring car or roadster will need larger and more powerful headlights than a small runabout because of the higher power and speed of the former, although some owners of small machines utilize large lamps.

For city driving an equipment consisting of two side and one tail light may be sufficient, the usual acetylene headlights being retained for use in traversing unlighted roads. Some may prefer electricity for the headlights alone, relying upon the oil for the side and rear lamps. Others may desire an entire electric equipment consisting of a group of five lamps or additional circuits being employed for the speedometer or trouble lamp and for operating the signal device.

Converting Oil Lamps.

Dealing first with converting the oil and gas members into electrical units, an arrangement which provides for the use of either system, it may be said that they are inexpensive. Several concerns which make a specialty of electric lighting devices for the motor car, offer complete outfits, these ranging in price from about $6 upward, the equipment depending upon the number of lights, etc. The lower priced apparatus consists of converters for the side and tail lamps or headlights alone, and the prices are graduated, as well as the equipment. One large electrical concern offers an outfit for $10, this consisting of two six-inch headlight converters, a two-gang flush tumbler switch, two cable connectors, two 15 candlepower bayonet base "Mazda" lamps, 10 brass cleats, 20 brass screws and 20 feet of suitable wire. A number of various combinations are obtainable and complete instructions for installation accompany these.

Although many will desire to purchase a complete equipment it is interesting to note that a large number of owners prefer to select and install the components of a lighting system, and there is a growing tendency in this direction, especially among motorists who make it a practise to overhaul their own car. Many are desirous of utilizing electric lighting, although not familiar with its application, and for the

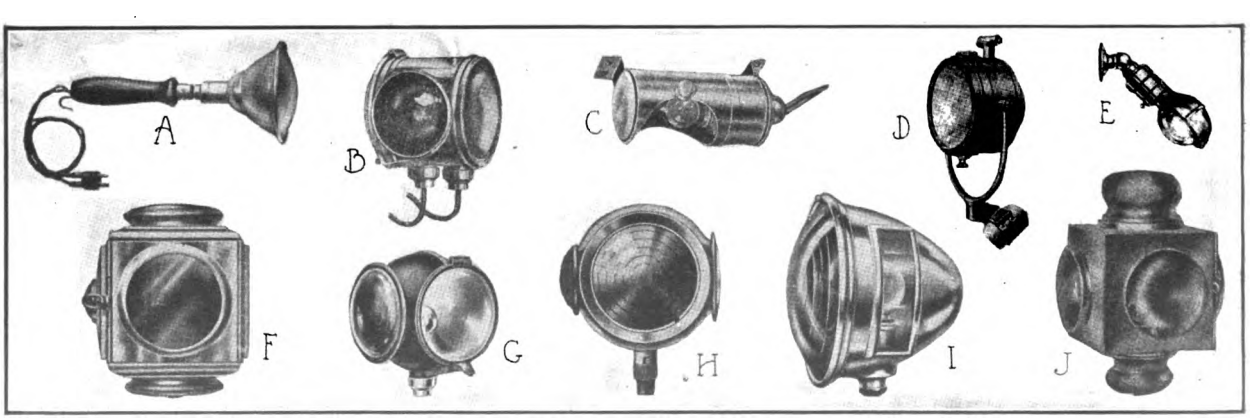


Fig. 14—Tail and Other Forms of Lamps: A, Guide Inspection; B, K-W, Fitted with Double Bulb; C, Vesta Canopy; D, Solar Searchlight, Designed for Steering Column; E, Guide Speedometer; F, Solar Square; G, Guide Torpedo; H, Solar Ball; I, Gray & Davis; J, Vesta Square.

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benefit of these the suggestions herein are made.

Assume that the oil lamps of the car are to be converted into electrical units. This would require three fittings and these may be complete including a connector which allows the removal of the lamps without cutting the wires. Although there are several forms of these members the use of the bayonet lock joint is recommended as the contacts are solid and will not jar loose. Irrespective of which type is utilized the connections should be positive and admit of the passage of the necessary current without causing a material drop in the voltage. In addition to possessing these essentials the connector should be such as not to be affected by moisture and oil.

Besides serving to connect the wires from the battery to those of the lamp socket, certain types of these may be utilized for connecting the leads of the trouble or inspection lamp by simply disconnecting, or breaking the coupling and inserting the attachment plug. At Fig. 15 is depicted several types of connectors, that at F being of the bayonet type and fitted with an attachment plug which when removed permits of the insertion of the trouble lamp member. At H is shown a cable connector devised to withstand all the severe conditions peculiar to motor car lighting service. Each half of the device is covered with a protective brass sleeve, one end of which fits snugly over the cable. The two halves are held together by means of a standard Ediswan bayonet joint.

Where the leads from the battery pass through the dash or body of the car flangeless connectors may be employed and these are utilized when the lamp device is not equipped with a connector. In addition the leads of the trouble lamp may be fitted with a plug for insertion in the dash member. These are made both for metal and wood dashes or bodies and at B is shown one of the former type, this being attached by boring a hole, inserting and fastening with screws. That at C is a metal dash device and is secured by means of a locking nut. Another form is outlined at G and is attached by screws. That depicted at D is of the wood type, designed for use in connection with the side lamps. It will be noted that the connector is of the double type and provided with two attachment plugs. The connector proper is inserted and fastened to the dash just above the frame while one plug leads to the lamp socket and the other to the battery. This is a simple form and attached easily.

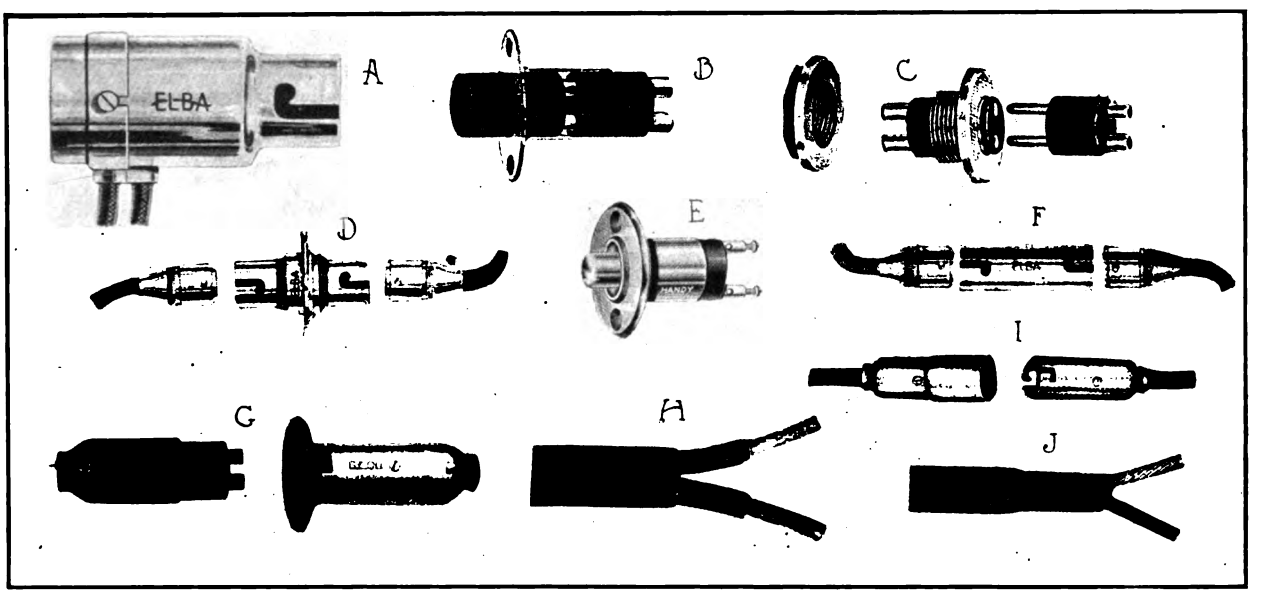


Fig. 15—Devices Utilized in Wiring Car: A, Elba Bayonet Metal Dash Connector; D, Elba Double Dash Connec tor Depicting Attaching Plugs; E, Guide Flush Floor Switch; F, Elba Double Connector; G, General Elec tric Flush Receptacle and Plug; H, General Electric Cable; I, General Electric Cable Connector; J, General Electric Brass Armored Cable.

Wires.

Upon well constructed wiring depends the success or failure of the system as a thorough insulation of all lighting apparatus is most essential on account of the fact that the majority of the ignition systems have one side of the circuit grounded to the metal of the chassis, and should an accidental ground occur through the lighting system, both the ignition and lighting would become affected. Thus it is obvious that circuits should be separate, although exceptions are noted, for instance with the Ford automobile in which ignition system it is possible to use one side of the ignition circuit in the lighting apparatus. This system, and others, will be outlined in logical sequence.

Referring again to the three-lamp equipment in which a six-volt battery is to be employed: As this has a relatively low voltage there is a minimum line drop in the circuit, that is, electrical pressure, and in considering this factor the size of wire is important.

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All wires should be of the copper strand type and sufficiently flexible to permit of manipulation in the installation. The coverings of the metal strands should be water and oil proof and constructed to withstand the hard usages encountered in motor car service. As previously outlined, the protection from abrasion or wear is important both in the insulation itself and in fitting.

Regarding the sizes, No. 14 B. & S. gauge is suitable for ordinary work, but where greater current carrying capacity is required, No. 12 or 10 is recommended. The overall diameter dimensions of these wires are: No. 14, .25 inch; No. 12, .28125; No. 10, .375. Twin conductor cables are favored and these are not expensive. Fig. 15 H depicts the No. 10 wire with outer insulation removed, also that from the copper strands.

At J is shown the brass armored cable, which has desirable features, inasmuch as its construction elimi-

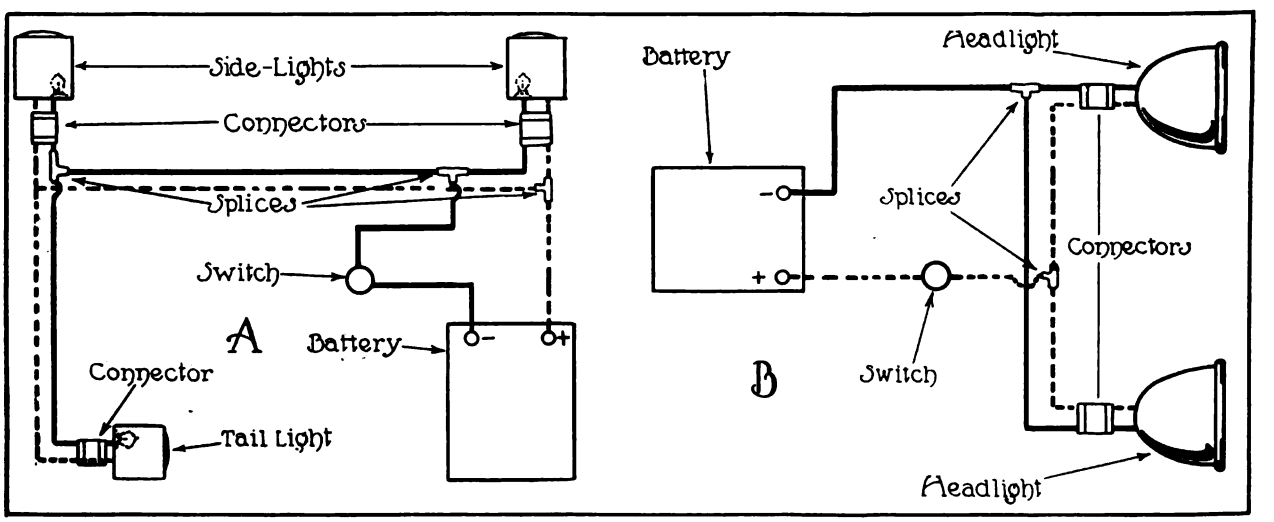


Fig. 16—Wiring Diagrams for Straight Battery System: A, Plan for Two Side and Tail Lights; B, Method of Installing Headlights.

nates danger of short circuits, although its cost is approximately two cents a foot more than the ordinary twin conductor cable. A feature of the former is that it may be employed where the wiring plan calls for exposed leads and its appearance does not detract from that of the car. Regarding switches for a three-lamp system, an ordinary lever member may be employed or one of the push button type. There is a large variety of designs and they are inexpensive and easily fitted.

Battery Location.

In selecting the location for the battery, which should be of the lighting type, it preferably is mounted on the running board, where the jarring and jolting is the least. The use of a steel box is recommended as it is stronger and presents a neater appearance than one constructed of wood. The interior should be lined with a paraffin or chemically treated wood to prevent the leads or terminals touching the metal of the container. The box should be deep enough to prevent the cover coming in contact with the battery and the latter should be secured firmly in the container. Where a large battery is employed and it is desired to keep the running board free from accessories, the current container may be suspended by straps on the frame as outlined in the previous installment.

Wiring Diagrams.

In a three-lamp system, such as two side and a tail, the following material will be required: Three convertors, three double connectors, switch, wire and cleats. The amount of wire will depend upon the car and may be ascertained by measuring. If the leads are to be extended through the dash the flangeless connectors, such as previously described, may be utilized. At Fig. 16 A is presented a wiring plan which is drawn with two leads, positive and negative, but in the installation twin cable should be employed although single leads may be utilized. This installation is effected easily, requiring as it does but two splices and when these are made they should be covered with electrical tape.

When the gas headlights are to be converted into electrical units the wiring is simplified and the equipment will require but two connectors, one of which may be of the double type to permit the use of a trouble lamp. The method of wiring is shown at B.

For Group of Five Lights.

A wiring plan which may be utilized for a group of five lights, these consisting of two head, two side and a tail member is presented at Fig. 17. This is applicable to both the convertor and straight lamp systems and when a selective type of switch is fitted provides for the use of three groups of lights as follows: Side and tail, head and tail, and all lamps. The advantage of an arrangement of this kind is obvious as it permits the cutting out of the side lights when driving on country roads and the elimination of these

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members prevents reflections from the varnished surfaces of the car into the operator's eyes.

Although the wiring may appear complicated to the novice, it is installed easily by a little study of the diagram. The switch is marked, letters denoting the openings through which the single leads pass, and the ends of the wires are attached to the screw plates directly opposite the apertures. In the accompanying drawing these leads and their location are indicated by "battery," "side," "tail" and "head."

In selecting the connectors for this equipment the design of the car will have to be considered. If it be a roadster and the bullet or torpedo type of lamps is to be fitted, three double connectors may be employed, these being used with the headlights and tail member. Flangeless connectors may be inserted in the dash or the brass armored cable carried outside and ordinary connectors utilized. As with the other wiring plans it is advisable to provide for use of a trouble lamp, and by fitting double connectors the inspection light may be attached at five different points. Another advantage will be that a shorter cord can be fitted to the trouble member.

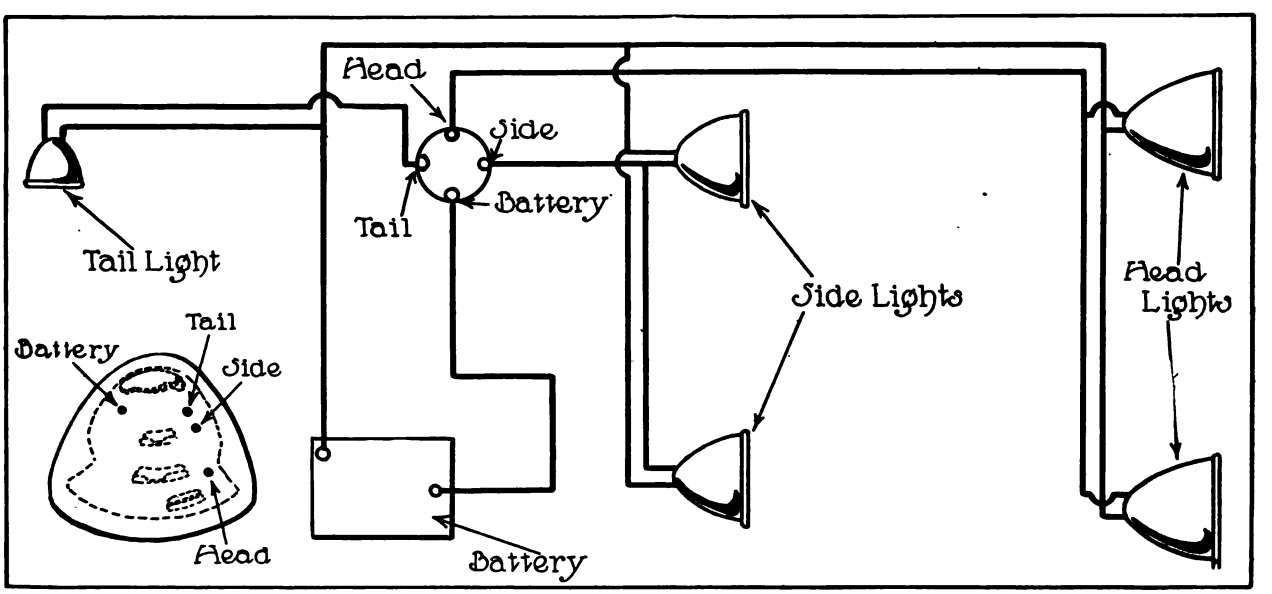


Fig. 17—Depicting Wiring Plan for Group of Five Lights Controlled by Selective Type of Switch.

Wiring a Large Car.

A method of wiring a large car for a group of five lights, also two extra leads one of which may be utilized for an electric horn and the other for the speedometer or a light for the tonneau, is depicted at Fig. 18. In this drawing the rear view switch has been made large purposely to bring out its features, including the terminals to which the leads are fastened.

This system is a very simple one to install inasmuch as there are no splices to be made, and in connecting a lead the ends of a twin cable are stripped, exposing the copper wires which are secured to the proper terminals. For example, in wiring to the tail light, one end of the double cable is stripped and one wire attached to the right hand tail light terminal of the switch and the remaining wire fastened to the left terminal. The wire is then led to the connectors of tail light. The other lights are similarly connected.

In fitting the lead for the electric horn or signalling device one of the circuits is broken to introduce a push button and this may be located on the steering wheel or column as desired. A type of floor switch which is operated by pressure of the foot is depicted at Fig. 15 E, and is installed easily in the floorboards. If the use of a speedometer light be not desired, the circuit may be employed for a trouble lamp by fitting a flangeless connector in the dash or body of the car or at any convenient point. The extra lead may then be employed for a cigar lighter in the tonneau or for a lamp. The switch is of the flush type, fitted with a handle, which may be removed when the car is left unattended. It provides for utilizing the different groups of lamps and its simplicity as well as its multiple arrangement will appeal to motorists not familiar with the installation of electric lighting equipment.

Rear Light Signals.

Those who experimented with the early types of incandescent lamps for lighting the tail member did not find these satisfactory as they burned out, and it is said that it was difficult to note whether the lamp was lighted, without leaving the seat. This objection might hold equally true with the oil member, for the latter has been known to jar or blow out. With the improved lamps and lighting apparatus, however, there is no reason why a lamp lighted by electricity should not give as efficient service as an oil device. With the high grade tail light, the white lens of which projects a powerful beam, the operator should be able to satisfy himself as to the rear signal by merely turning his head and noting the rays on the road.

There are several methods of incorporating devices

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for signalling the driver when the tail lamp is extinguished and one concern manufactures an appliance which lights a bulb on the dash or sounds the electric horn when the circuit is broken to the rear member. The tail and speedometer light may be wired in series, that is, if the voltage be six, two three-volt lamps are fitted and when one burns out the circuit will be broken and the operator warned accordingly. Some object to a continual light on or near the dash but if a suitable shade be fitted there should be little if any reflection.

(To Be Continued.)

GRANT TO SELL APPERSON CARS.

Harry F. Grant, twice a Vanderbilt cup winner, is vice president of the Harry Grant Company of Boston, a recently organized concern which has opened salesrooms at 1008 Boylston street, for the sale of Apperson cars, made by the Apperson Bros. Automobile Company, Kokomo, Ind. The other officers are: President, W. R. White, and treasurer, Hugh Miller. In addition to the Apperson line, the concern will handle the Rayfield carburetor, made by the Findeisen & Kropf Manufacturing Company, Chicago, in New England, with the exception of Rhode Island.

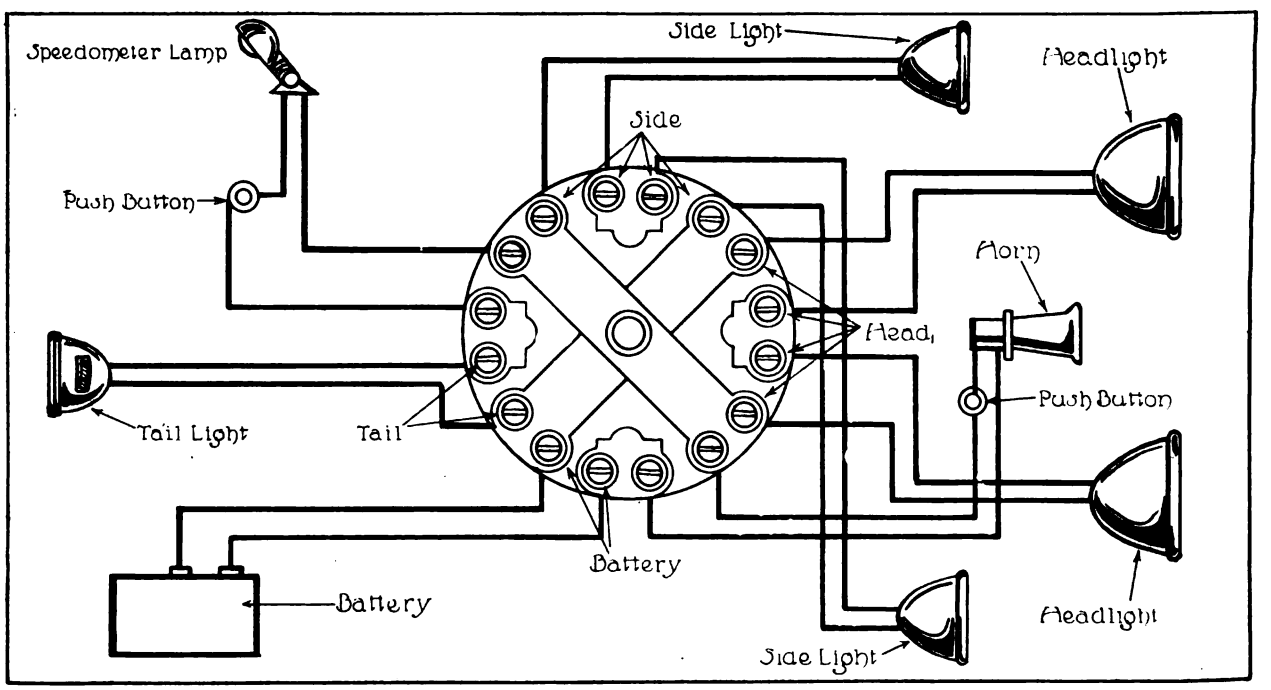


Fig. 18—Outlining Method of Wiring Providing for Group of Five Lamps Controlled by One Switch, Also Two Extra Circuits Which May Be Utilized for Trouble Lamp, Speedometer, Top or Horn.

U. & H. MAGNETO BARGAINS.

The third annual bargain sale of U. & H. master magnetos, made in Germany, is now being conducted at 250 West 54th street, New York City, by the J. S. Bretz Company, sole importer of this product. For those who are unfamiliar with this annual sale, it is proper to state that the business of the Bretz concern is largely with manufacturers of motor cars, who purchase in large quantities for the season's use and who are therefore unable to utilize these bargains, because they represent almost wholly new types, salesroom and salesmen's samples in small lots as shown by the inventory of Jan. 1. All are first class instruments, of the true high-tension type, and are as fully guaranteed as any U. & H. magneto.

MEA HELPS CREATE RECORD.

During a sanctioned race against time at Portland, Ore., Feb. 25, the Oregon Wolf, a nine-cylinder hydroplane, created a new world's record over a five-mile course for all distances up to 30 miles. The new mark for the 30 miles is 42:14.4, against 44:33.2, made by the Dixie IV at St. Louis in 1911. The Oregon Wolf is equipped with a Mea magneto, made in Germany, and represented in this country by Marburg Bros., Inc., New York City.

SWETLAND ELECTED CHAIRMAN.

At a meeting of the board of directors of Wyckoff, Church & Partridge, Inc., New York City, held recently, H. M. Swetland, formerly head of the Class Journal Company, was elected chairman. He is well known to the automobile industry, having been identified with it from its infancy.

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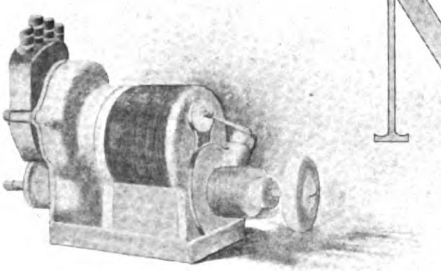
We protect all our dealers. We are as anxious for your success as you are. Here's where we can work together.

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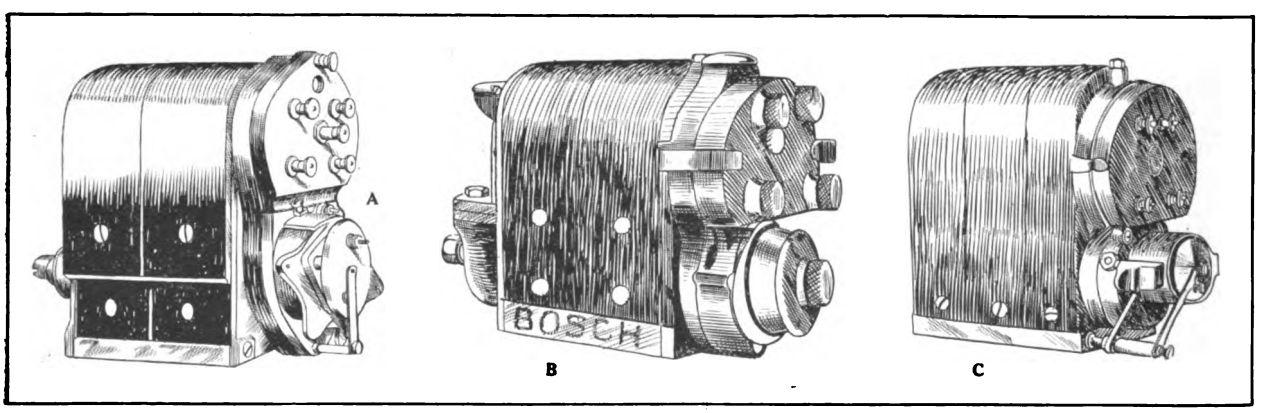
Magneto Types for 1912

AS THE efficiency of the internal combustion motor depends first of all upon engine proportions, second upon effective carburetion, third upon precise ignition and fourth upon lubrication, these essentials receive equal consideration from the designer. The engineer is responsible for results and he must create the motor and its system for lubrication. He may design the carburetor, but he does not attempt to construct the ignition system he employs. The instruments and apparatus are developed and perfected by the electrical expert who has specialized automobile equipment because of the seemingly almost unlimited commercial possibilities of the field. The demands made upon the manufacturers of ignition systems are based on thousands of experiences and tests, and to produce what will give the greatest power and economy in the motor is the ideal sought by every electrical engineer engaged in manufacturing.

In theory to obtain the best result the ignition system ought to be designed with reference to the requirements for each engine, but a common practise is by experiment with a standard instrument, establishing operating conditions that may be expected to obtain in any motor. With these facts known the installation is made and the engine tested and adjusted with reference to ignition, carburetion and lubrication. It is not possible to obtain from any two engines precisely the same power under adjustments that are exactly the same, although the variance may be extremely small, but there are many reasons why the full capacity of the motor may not be realized in operation. The three essentials to efficient power production must be synchronized and to accomplish this it is desirable that each should serve equally well from minimum to maximum.

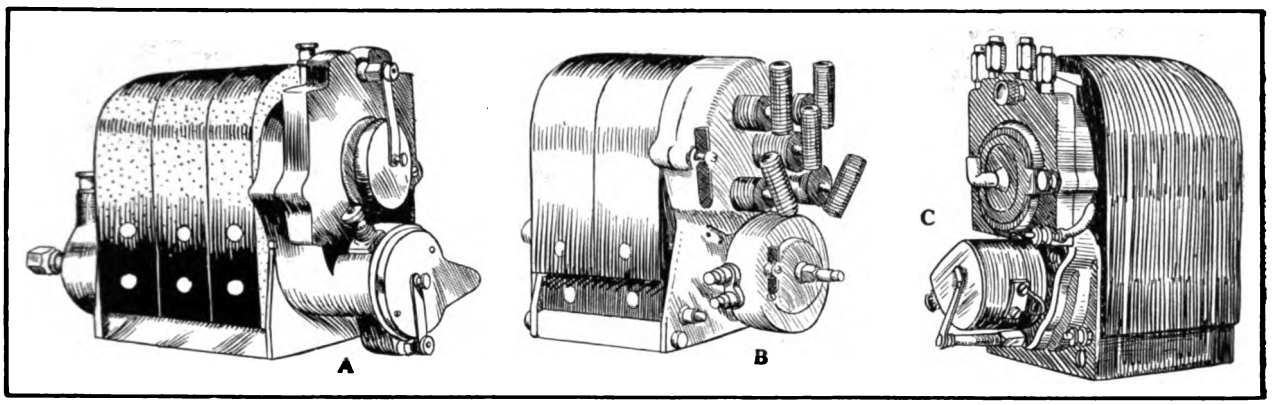
The ideal ignition system should be simple, without complications; be so constructed that it will endure under the most exacting service; should have construction permitting fine adjustment, and yet after being adapted to the motor require no adjusting other than to compensate for wear. It should be absolutely dependable as to continuance of service and it ought to have such protection that it cannot be affected by accumulation of water, lubricant, grease, dust or any form of abrasive. Naturally the mechanical generator is preferred to the chemical generator, for the storage battery and the chemical generator both have limitation which preclude their use save under conditions not usually met with. Some forms of mechanical generators can be used as a reserve in connection with storage batteries, however.

In considering the qualities of magnetos offered in the market or furnished as equipment with motor cars it should be understood that the exact conditions for which an instrument was designed may not be approached in the use made of it. Some have been constructed for more limited service than others, although it is generally assumed that any magneto for



A, Eisemann High-Tension Magneto; B, Bosch Model ZR4 Waterproof Instrument; C, K-W High-Tension Device.

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A, U. & H. Master High-Tension Instrument; B, Kingston Magneto; C, Remy High-Tension Device.

a four-cylinder motor, for instance, may be utilized with some degree of success on any other motor with four cylinders. As a matter of fact, the rapidly increasing number of types of magnetos is a result of manufacturing experiments which have established that there are very widely differing needs which cannot be met generally and which can only be satisfied by machines constructed with reference to special requirements.

Many Refinements Made.

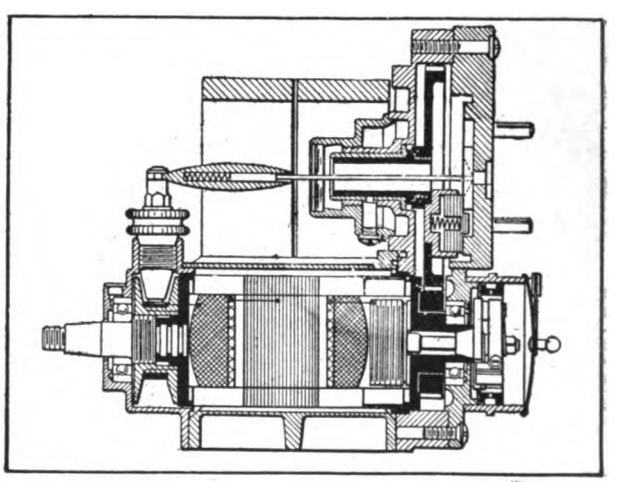
In consideration of magneto development as evidenced by the latest productions it is natural enough to contrast them with similar instruments, yet with the majority of the recent types it is evident that these are generally intended for special purposes rather than for broader use. This does not always apply, however, and some of the machines are designed for adaptation to an increased number of types of motors. Each magneto engineer has worked out some particular purpose in changes made in his production, and while a change may have been comparatively trifling so far as description is concerned the result may have been of material importance in the general efficiency of the instrument.

The magneto, as is undoubtedly well known, will increase the size and consequent heat or firing value of the spark generated as its number of revolutions are increased, and this degree of progression continues to the maximum speed of the motor, so that when the engine is doing its hardest work it is being served with the greatest ignition energy. With the dry cell chemical generator or the storage battery as a source of ignition current there is the same value of spark no matter what the engine speed until the electrical force is so diminished that the spark is ineffective.

This statement explains why it is that when an engine is cranked it will start on a battery spark with perhaps a quarter-turn of the crank, when if a magneto were used a sufficient turning speed must be attained for the magneto to energize itself. In small engines it is possible to turn them rapidly, but with larger machines it is quite beyond the strength of the average man to turn them sufficiently fast to secure ignition. Starting an engine under some conditions means labor decidedly strenuous, and to eliminate this work the self-starting devices have been developed. With comparatively few cars, however, has starting equipment been included for the market price, and not as yet have the magneto manufacturers taken into consideration the influence that starters will eventually have.

Possible Effects of Self-Starters.

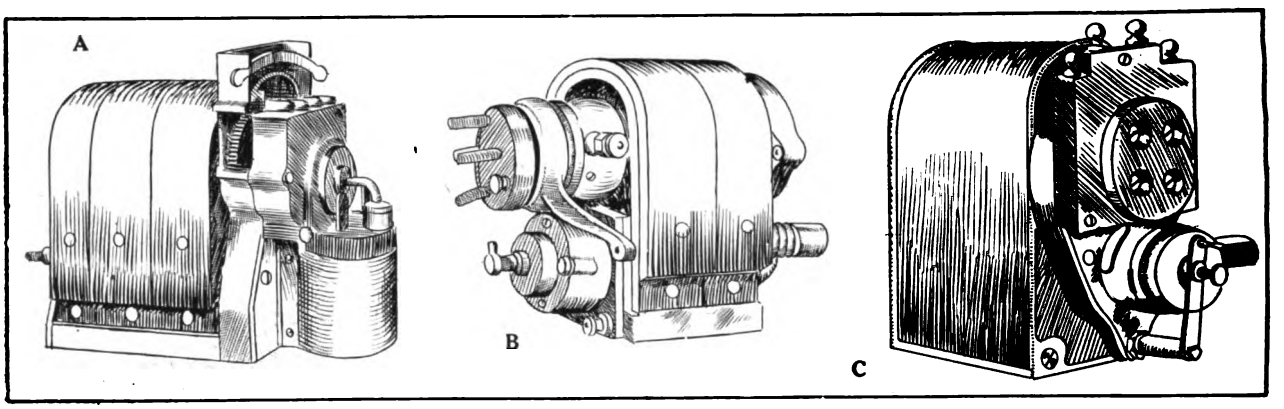
There is no doubt whatever that with the engine started by mechanical means there will be less need of very slow magneto speed unless it is intended to provide for starting independently of the starter. While it is not probable that there will be a disposition to change the designs or constructions of the magnetos so there will be imperative need of automatic starters because of the desire for slow engine work in traffic, it is possible that such devices will later on have more or less influence on the instruments produced. It can be said that practically all magnetos have thus far been designed without regard to automatically starting, yet with a purpose



Section Plan of the Simms Magneto.

that with them engines might be started more easily than with preceding types. Many makers have sought to improve their instruments by increasing the genera-

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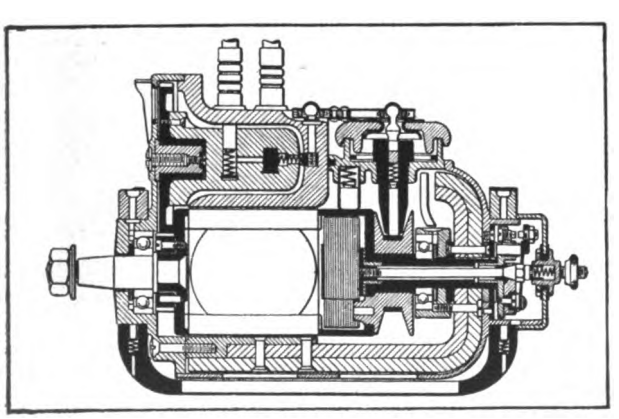
Three Representative Types of Magnetos: A, Duplex; B, National; C, Connecticut.

tion of current at very slow turning speed.

This would seemingly increase the current production throughout the operation of the motor, although this claim is not made for the magnetos by any of the engineers. It is a fact that there is a limit to capacity in any form of generator under specific conditions and this is realized with the magneto, but it would appear that with the effectiveness of the instrument improved at very slow turning speeds this would be continued as the speed of the magneto is increased.

How Magneto Types Differ.

That the references to different magnetos may be understood it may be pointed out that there are numerous forms in general use. These are first of all classed as armature and inductor, and these differ in that the armature form has a single or double winding revolving between the poles of the magnets, while the inductor type has a rotating member that is revolved between stationary windings. The armature construction is the more complicated and the inductor is the simpler of the two. Either may be high or low-tension. The usual form of automobile engine is equipped with jump spark ignition in that the current is made to jump or arc an air gap between the electrodes of the



Sectional Plan of the Mea Instrument.

spark plug, these being often referred to as the sparking points. Such current as is used in a jump spark system has primarily creation at low-tension in the core and first winding of an armature and is intensified to high-tension in the secondary winding.

Taking the armature form of magneto the armature that has but the core and first winding is known as the primary armature type and the current generated is carried to and transformed to high-tension in a separate coil that is generally installed on the dash for convenient examination and adjustment, and for protection against oil and grease accumulations from the engine. The second form of armature magneto has the core and first and second windings in the armature and the current is distributed direct to the engine. The primary armature type is low-tension and the compound form is high-tension.

High and Low-Tension Forms.

The inductor form has been partly described, but this has the rotating member installed between the magnet poles and it may have but a core and single winding and, consequently, primary coil incorporated in its construction. This is then used with the transformer coil, as is the primary armature type. If the windings of the coil are both primary and secondary then the current is used direct and the magneto is high-tension.

To differentiate between the low-tension and high-tension magnetos it may be well to emphasize that the low-tension has precisely the same function as has the dry cell or storage battery in that it is merely a source of current, the energy being generated as the engine is operated. The high-tension magneto generates the current and sends it out to the spark plugs without further intensifying.

Of the two types, armature and inductor magnetos, the inductor forms are much the simpler in construction. To illustrate, there are no revolving wires, no sliding or wipe contacts, no brushes, no collector rings, and these forms are seemingly less susceptible to wear than those with numerous moving parts. The high-tension forms eliminate the necessity of the vibrator coil and timer used with the low-tension, a distributor taking the place of the timer.

Possible Ignition Systems.

The ignition systems differ decidedly in many ways and methods. They may be classified something as

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"QUALITY—BACKED BY BROAD MINDED BUSINESS POLICY"

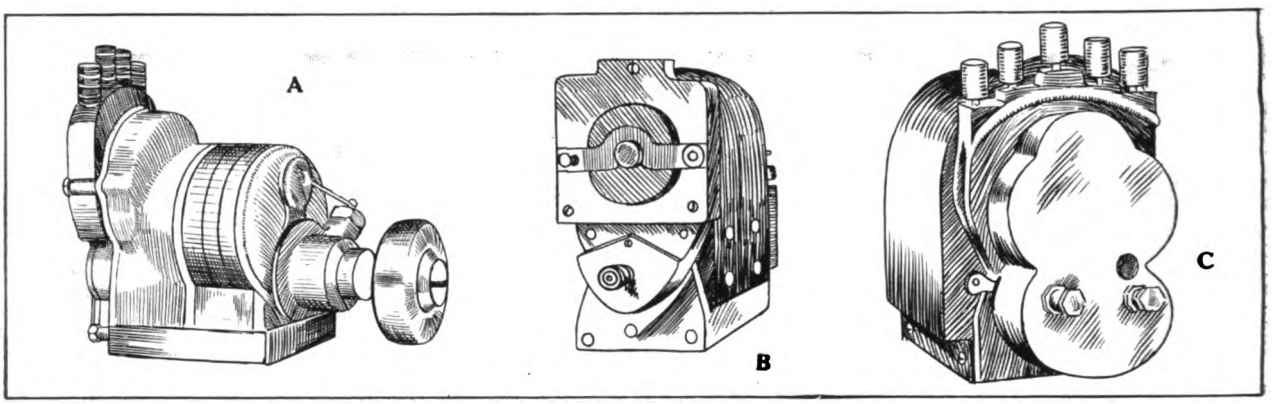
To these two points can be traced the tremendous growth in the sales of Shawmut Tires, which proves that users are demanding adequate return in tire value.

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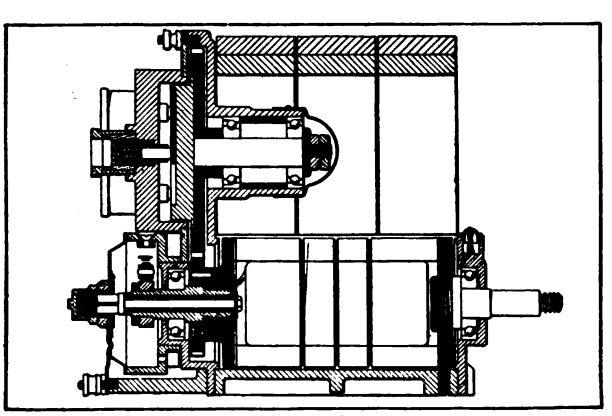
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A, Hers High-Tension Magneto; B, Pittsfield High-Tension Instrument; C, Briggs Magneto.

follows: The use of the dry cell battery with the transformer coil, the storage battery and the transformer coil, the dry cell and the storage battery in combination, the low-tension magneto and the dry cell battery, the low-tension magneto and the storage battery, the high-tension magneto, the high-tension magneto and the storage battery, the high-tension magneto and the dry cell battery, the high-tension magneto and the low-tension magneto (seldom used and named as a possibility), two high-tension magnetos.

With the single or combination battery systems, and with the low-tension magneto and battery there is but a single system of wiring and one set of spark plugs. A switch is used to break the circuit. The battery or batteries are connected with the transformer coil and from the coil there is but single wiring to the spark plugs and the ground. With the low-tension magneto and the battery the general custom is to use the same coil and the one distributor, this being a matter of economy, but it is evident that any defect will cause failure of the system from either source of current. Using the single high-tension system the magneto may not generate an efficient spark



Sectional Plan of the Splitdorf Magneto.

at a very low speed and with a large engine considerable strength and skill is necessary to secure a spark that will start it. This has been the principal reason why these instruments have been used in connection with a battery, but usually provision is made for the use of a battery as a reserve.

The use of the phrase dual, which means two of the same kind, has been often erroneously applied to the combination of high or low-tension magneto and battery, when the word double would properly define it; also to a combination in which two sets of spark plugs might generate either one or two sparks simultaneously in a cylinder, either from a magneto or battery. The true dual system is by two magnetos to two separate sets of spark plugs, each being entirely apart from each other, although possible of connection should there be failure of either magneto or wiring system. Such installations, however, are generally combined with a battery for starting. This system is usually termed two-independent.

Some Results from Refinements.

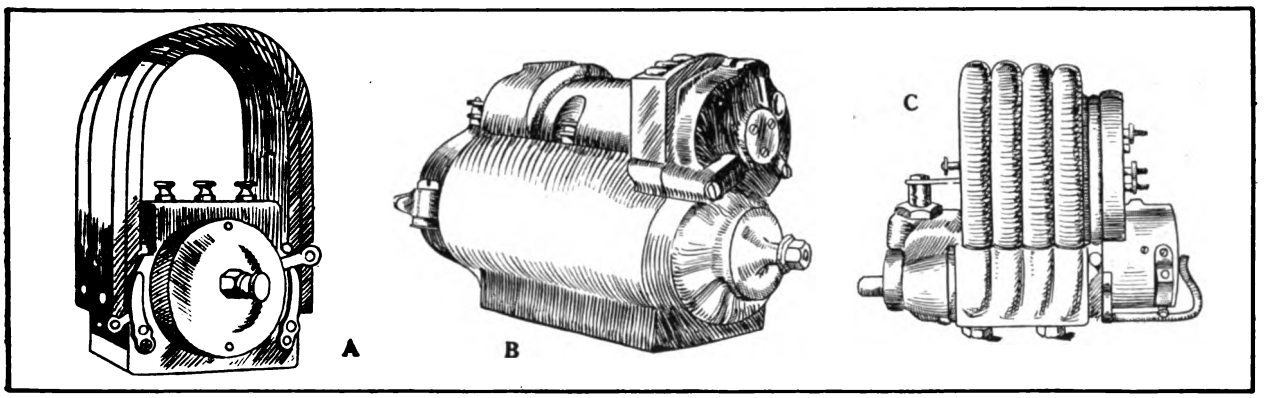
Where two spark plugs are used and each fired from the one magneto at the same time, a system developed by the Bosch Magneto Company, New York City, that has given a decided increase of power because of the more rapid and complete combustion of the charge, the term "two-point" ignition has been coined. This form has not been utilized to a great extent as yet, but its obvious advantages have directed attention especially to it and it has been developed very rapidly.

Summarizing the developments obtaining generally with the latest types of magnetos it may be pointed out that these include the production of a spark at a more uniform intensity at the slower speeds of the instrument, this making for greater ease in starting and for better power in low engine speed. Another improvement has been the utilization of means for automatically advancing and retarding the spark and the use of a governor. The installation of separate transformer coils near the spark plugs to reduce the transmission of high-tension currents, has been adopted by some makers, while all have sought to secure greater durability, more efficient current production, and more accessible construction.

Eisemann Automatically Times.

In considering the different machines it may be

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A, No-Lag Magneto; B, Mea Imported Instrument; C, Heinze High-Tension Device.

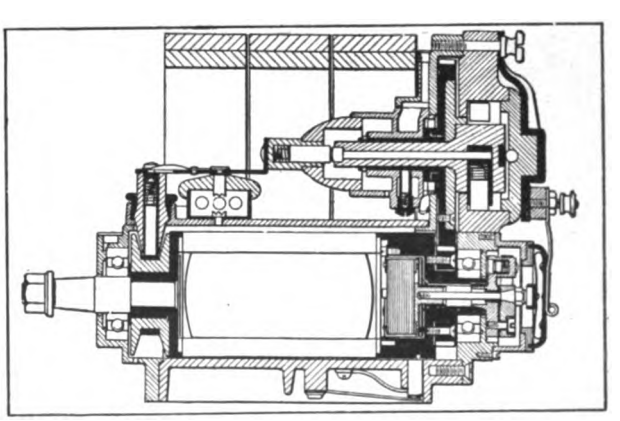
well to refer briefly to some of the improvements rather than to describe each individually. With the Eisemann line, Eisemann Magneto Company, New York City, is the automatically timed instrument, an innovation in America. On an extension of the armature shaft is rigidly mounted a rectangular cage in which is a block into which is fitted and secured by a thread a helical-cut driving shaft. Governor balls are attached to the block by linkage, and as the block will move in a square-cut double thread as the shaft is revolved the governor balls are thrown outward by centrifugal force and the block is rotated, carrying with it the cage and the armature shaft to which the cage is attached. This advance of the armature and the armature shaft carries with it the advance of the contact breaker at the end of the armature shaft. Another Eisemann improvement is a new form of pole piece, these being pointed in the centre so that the lines of force of the magnets are compelled to pass through the pole pieces at these points. This increases the strength of the magnetic field and concentrates it at the centre of the armature, producing a higher voltage and greater efficiency at slower engine speeds. The breaker box has been improved by the installation of large steel pins in lugs at the sides of the box, these taking the place of the usual cams. The contact breaker disc is secured by the use of a safety spring. A small oil wick affords lubrication for the fibre contact lever pieces, drawing oil from the bearings and oiling each piece at each revolution.

The Remy RD Model.

The RD Remy inductor magneto, Remy Electric Company, Anderson, Ind., is constructed with two steel inductor wings revolving within a stationary winding. The magneto has a single winding of coarse magnet wire incorporated in the pole pieces of the magnets, and at either side of this winding are the laminated steel wings. The stationary winding is direct-connected through the magneto circuit breaker with the primary of the non-vibrating transformer coil. The breaker cam is attached to the inductor shaft and the generation of the spark is with reference to the position of the breaker box on this shaft. The contact screw of the breaker box is held by a lock spring and by lifting this spring and turning the screw the adjustment is made. An oil wick lubricates the cam in the breaker box. The distributor shaft is reduced in length and the gear is placed at the free end. The distributor is of bakelite, a new heat-resisting insulating material.

Herz Automatic Control.

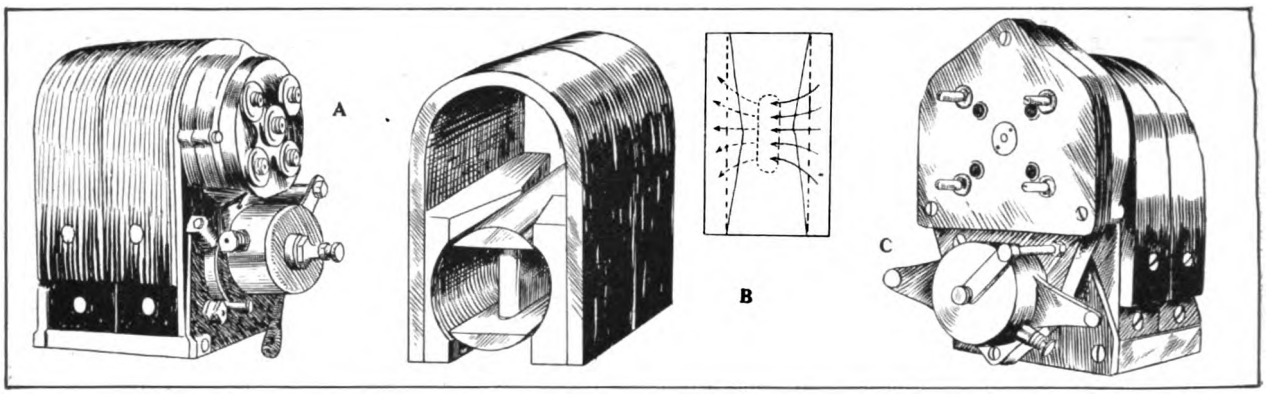
In the latest Herz magneto, produced by Herz & Co., New York City, the magnets are discs of Syrian magnet steel, .5 inch in thickness, faced true and bolted together. The end cases, containing the annular ball bearings for the armature, are aluminum and are attached to the magnets by steel bolts. The condenser is incorporated with the primary and secondary windings of the armature and revolves with it. The secondary winding is connected with the primary and the condenser forms a shunt for both. In front of the condenser on the armature shaft is located the breaker box, which has a hardened steel segment beyond the casing which contacts with a fibre roller and is raised at each revolution of the armature. The segment raises and engages with a spring on the end of which one of the platinum points



Sectional Plan of Bosch Model D4 High-Tension Device.

is mounted, breaking the contact with the other platinum point, which is stationary at the end of an adjusting screw.

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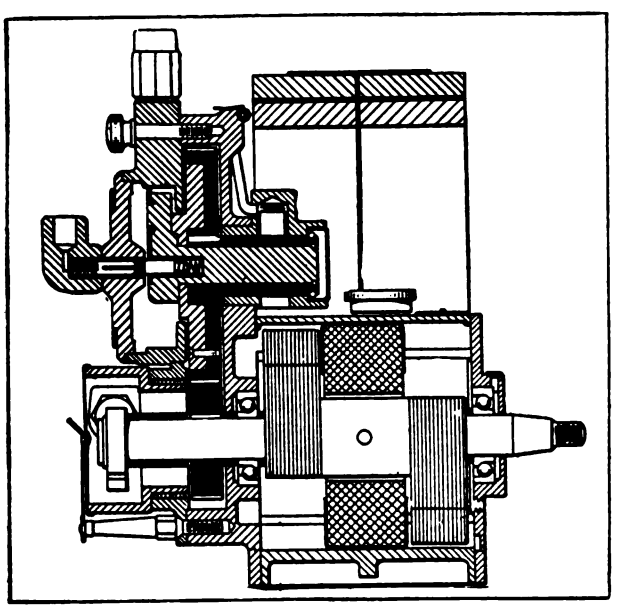


A, Splitdorf Low-Tension Instrument; B, Eisemann Pole Piece Construction; C, Simms Magneto.

The Herz automatic timing device consists of two juxtaposed coupling flanges in each of which are six grooves curving radially from the centre, these grooves reversing when faced. Into each groove a steel ball is set which serves as a coupling and governor weight. As the positions of the balls are changed with the slightest variation of the engine speed the timing is automatically controlled. By varying the curves of the grooves any desired adjustment may be obtained, and it is claimed that with this device the motor may be started with the spark fully retarded. At slow speeds change of adjustment has been shown with a difference of 20 revolutions a minute.

Features of Mea Models.

The Mea magneto, imported by Marburg Bros., Inc., New York City, is distinctive in that it has a bell shaped magnet so formed and mounted that its axis coincides with that of the armature. The entire



Sectional Plan of Remy High-Tension Instrument.

magnet is moved about the axis and by so advancing or retarding the field the spark produced has the same heat and value. The magnets and the breaker are moved together, which maintains the perfect relation of the armature and field at the sparking moment. The dual Mea magneto is a new foreign importation in which the battery breaker is mounted on the distributor shaft so that the battery breaker will not lessen the accessibility of the magneto breaker. The model A4 Mea magneto is made with a stationary shell in which the magnet is installed. This instrument is completely housed for protection and this housing may be lifted by the removal of two screws.

Bosch Line Has Five Types.

The Bosch line, Bosch Magneto Company, New York City, for 1912 consists of five models, the DU type being for motors of six cylinders and generating as large a spark at full retard as when fully advanced. It is fitted with ball bearings throughout and is entirely self-contained. Type DR produces a double spark for motors to eight cylinders through two plugs for each cylinder, but while each pair is in series the failure of one plug or connecting cable will not prevent the spark in its mate in the series. The armature is on ball bearings. Type DU6 resembles the DU and is for engines of approximately 4.5-inch bore and stroke. When used as a dual installation it has two separate contact breakers but the distributor, spark plugs and the secondary leads are used in common. Type D independent magneto is for large motors. It has ball bearings for the armature and it is self-contained. Type DA2 is used principally for motorcycle ignition. Type DU4, model 11, is built with the interrupter housing permanently set so that the cams operate the circuit breaker at the maximum inductance point, thus making it have a fixed spark, reducing the number of components and simplifying the construction, making for long endurance. That a magneto may be used for starting the engine without a battery the Bosch company has constructed a special poleshoe in which comb-like teeth extend outward from the usual edge to a point about the centre of the space between the magnets. When the rear edge of the armature core is passing under the teeth the ignition spark is produced, and when moving the spark is at fixed speed; at full advance a spark is produced when the edge of the armature

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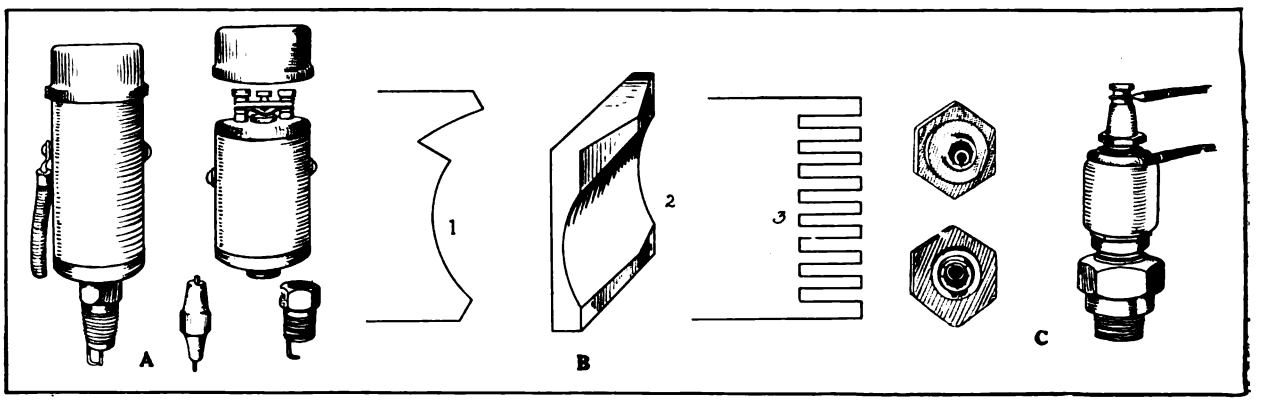
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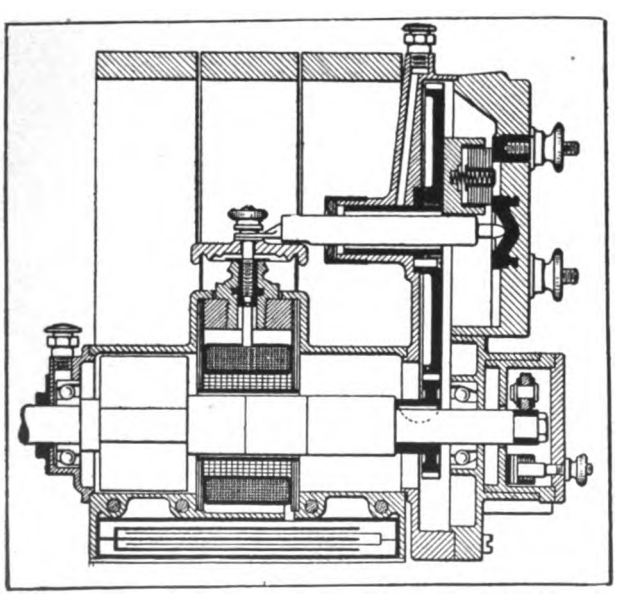


A, National Spark Plug Induction Coil; B, Pole Pieces (1, Simms; 2, Eisemann; 3, Bosch); C, Duplex Spark Plug Electrodes and Terminals.

core passes the base of the teeth, and when fully retarded the spark is generated when the rear edge of the armature core leaves the ends of the teeth.

Qualities of Splitdorf Models.

A quality of the model T Splitdorf magneto, made by C. F. Splitdorf, New York City, is that the engine may be started without regard to the battery. The vertical distributor is used with this instrument and the circuit breaker has platinum contacts, a revolving cam making and breaking the circuits. Both poles of the circuit are brought to the transformer and the battery is not grounded. The model O type differs with model T in that the distributor block is smaller, but in other respects the construction is the same. A new high-tension instrument for foreign markets is soon to be produced, as well as a "booster" high-tension machine for American use. In all of



Sectional Plan of K-W High-Tension Magneto.

the models the insulation has been much improved and the magnetos are better protected from all deteriorating influences.

But One Simms Instrument.

The SU model Simms magneto, Simms Magneto Company, New York City, is the only one yet produced and it is designed to obtain ignition at slow engine speeds through the shape of the pole pieces. The edges of the pole pieces are so formed that there are three points extending beyond usual line of the edge, these establishing two separate points for induction in the same direction for each half revolution of the armature. The point furthest extended generates for the slow speeds and the others for the fast movement of the engine. For four and six-cylinder engines a dual ignition system may be established by the substitution of some of the parts. The dual system may be adapted for use with self-starting motors, as by turning the switch a vibrating spark may be obtained at one of the plugs through a wide range. The switch is combined with a small vibrator and coil, the current from the battery being sent through the switch, vibrator and primary winding of the magneto and back to the battery, producing high-tension through the secondary winding of the magneto.

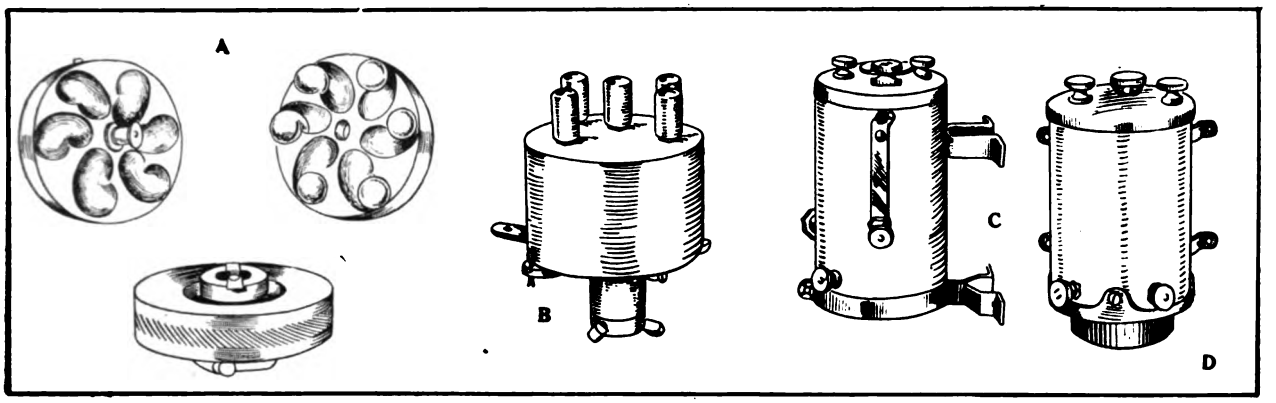
K-W Magnetos Refined.

The K-W magnetos, made by the K-W Ignition Company, Cleveland, O., are with windings concentric with the rotor shaft and between the halves of the rotor, with two wings on either side and at right angles so that there is induction at each quarter-revolution of the rotor. These instruments are in three sizes for high-tension and there are several types of low-tension machines for ignition and lighting purposes. With the high-tension magnetos the current is sent through the circuit breaker from the primary winding and when interrupted in the circuit breaker the current is greatly intensified in the secondary winding and is sent through the centre of the high-tension distributor brush and thence to the motor.

One New Pittsfield Machine.

Model F is the new Pittsfield magneto, produced by the Pittsfield Spark Coil Company, Dalton, Mass., this being constructed with a fixed ignition device

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A, Hers Automatic Coupling; B, Rhoades Distributor and Timer; C, Briggs & Stratton Plug Transformer; D, Briggs & Stratton Master Vibrator.

with single magnets and a jump spark distributor. All of the six types are high-tension and of the inductor form. There are no windings on the inductor shaft or armature, but the windings are externally mounted at the rear of the magneto. The rotor is operated in an oscillating sleeve that permits the spark to be advanced or retarded without affecting the induction or the spark productiveness of the instrument. Type N-B has two sets of double magnets and a wipe-spark distributor. Type NA is well adapted for two-cycle engines as it produces four sparks a revolution. Dual ignition is possible with type NBD, which differs with type N-B in that it has provision for the attachment of a battery wire at the primary.

Two Changes in Kingston Line.

The four models of primary and compound Kingston magnetos are alphabetically designated. A is high-tension and B, C and D low-tension. This line is made by the Kokomo Electric Company, Indianapolis, Ind. Type A is designed with the circuit breaker at the free end of the distributor at the driving end of the inductor shaft. B type has both circuit breaker and distributor at the same end of the shaft. C type has no distributor, and D type is larger and heavier than C. The last two are used for engines that are fired at 180 degrees and with transformer coils. There has been no change in design, but the types have been refined.

Two Distinct Connecticut Types.

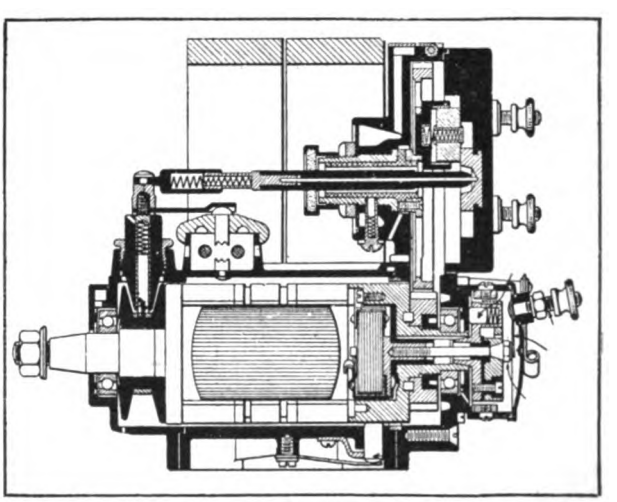
The Connecticut magnetos, made by the Connecticut Telephone & Electric Company, Meriden, Conn., are two distinct types, the single or independent being designed for use as the sole source of ignition with a single set of spark plugs, or with any battery system using two sets of plugs, each being independent and controlled by the Connecticut combination magneto and battery switch. The dual type combines two systems in one and uses but one set of plugs. The magneto is the primary armature type with the transformer coil included as a part of the instrument in a metal tube above the armature. The primary wiring runs to the switch and all secondary wires connect directly with the spark plugs. The claim is made for these instruments that they have all the desirable qualities of the high and low-tension magnetos with none of the faults of either.

New Heinze High-Tension Model.

The latest Heinze magneto, made by the Heinze Electric Company, Lowell, Mass., is a compound armature type and it has the construction characteristic of the Heinze low-tension magnetos in that the magnets are of round horseshoe form. The ends of these magnets are ground and fitted into reamed tapering holes in the pole pieces, which design is claimed to insure against loss of the magnetic force. With this instrument both ends of the primary wiring are attached to the terminals of the circuit breaker box, instead of one end being grounded, wire leads connecting the switch and the breaker box.

Dual Ignition National Magneto.

The feature of a dual ignition system created by the National Coil Company, Lansing, Mich., in which a new National magneto is the source of current, is that the magneto is of the primary armature type



Sectional Plan of Bosch Model ZR4 Magneto.

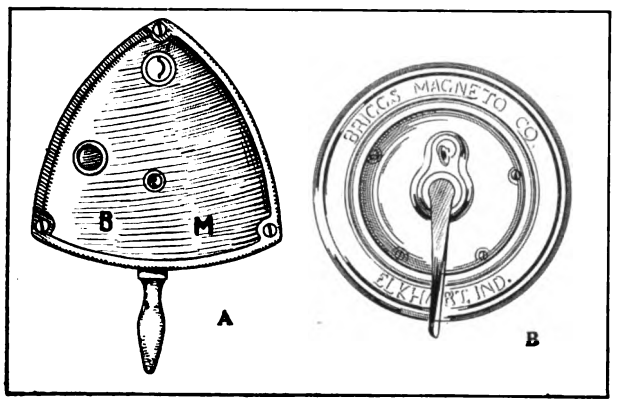
and with it a low-tension timer is used. The switch is a new production that includes a vibrator of the master type. In connection with this magneto a separate

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transformer coil is mounted on the motor near each spark plug. When this system is employed batteries are utilized for starting purposes.

No-Lag Design Unchanged.

There has been no change in the original con-



Two Types of Kick Switches: A, Remy; B, Briggs.

struction of the No-Lag magneto, produced by the American Circular Crown Company, Aldene, N. J., which is of the primary armature type. On the front end of the armature shaft is the double circuit breaker and over the armature is the condenser. At each revolution two alternating waves of current are generated in the armature and when one wave is interrupted by one set of contact points at one side of the circuit breaker and the second wave is interrupted by the other set of contact points, the current is transformed by two separate induction coils, the two functioning as might the ordinary coil. It is claimed there is increased efficiency in that the spark is made in the cylinder at the same time the break is made at the contact points of the circuit breaker. There is claimed to be less wear on the breaker arm springs because of the lessened tension and there is elimination of the destructive effect on the platinum points by the condenser being placed near the circuit breaker. Two spark plugs are used connected in series, one firing at the beginning of the compression stroke and the other in another cylinder at the end of the exhaust stroke, which is claimed to clean the spark in the latter cylinder and intensify the spark in the former.

Briggs Has Two New Models.

The new types of Briggs magnetos are models BC and D. These are made by the Briggs Manufacturing Company, Elkhart, Ind., and are of primary armature form and a dash transformer coil is used. The magnets and the rear end of the machines are enclosed in a water and dust tight metal case. The new instruments do not differ materially in general construction with the previous productions, but in the C model, for instance, is an oil tank under the arch of the magnets which will contain six ounces of oil. Lubricant sufficient for 15,000 miles travel is fed automatically to the bearings. The speed of model BC is controlled by a centrifugal governor, and with model D a specially designed timer will, it is claimed, allow a range of 90 degrees of spark movement and yet maintain uniform efficiency.

Two Forms of Duplex Magnetos.

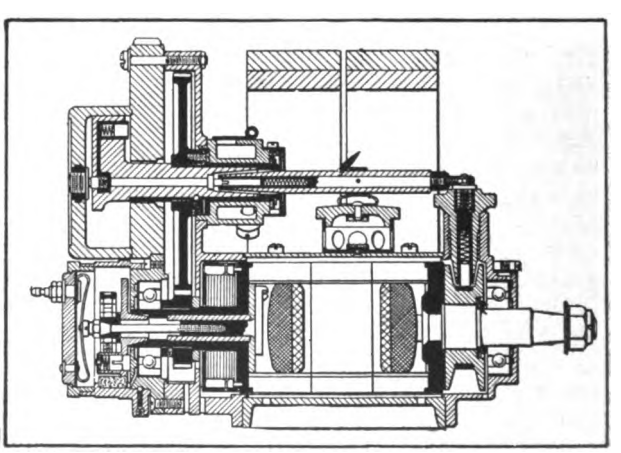
The Duplex magneto is in two forms, one a primary armature type in which a small transformer coil is installed above the distributor. The maker is the Duplex Electric Company, Fond-du-Lac, Wis. The distributor is of a double construction with one series of wires leading to the magnetic make and break terminal of the spark plugs and another series leading to the jump spark terminals of the same plugs. The other magneto is purely high-tension and resembles the type first described in that it has a transformer coil to intensify the battery current. In these magnetos the platinum points of the circuit breaker are placed at the top of the box, which is located between the magnets and the distributor plates for better protection and ease for examination or adjustment.

Michigan Model Is Low-Tension.

The Michigan magneto, made by the Michigan Magneto Company, Detroit, is a primary armature design. The armature is of the laminated form with shaft mounted in F & S ball bearings. The magnets are of tungsten steel. The circuit breaker is carried on the forward end of the armature shaft and from this the primary current is sent to transformer coil and thence to the distributor. The coil is fitted with a kick switch and starting push button. The instrument is well enclosed as a protection against the influences of water, mud, and other accumulations.

High-Tension U. & H. Master Magneto.

The U. & H. master magneto, imported by the J. S. Bretz Company, New York City, is a compound armature instrument and is suited for a single ignition system. It is well constructed and has ball bearings for the armature shaft. At the end of the armature



Sectional Plan of Eisemann Automatic Advance High-Tension Magneto.

is mounted the interrupter by which the normally closed primary current is broken. The distributor is carried in the magneto assembly and by this the current is supplied to the motor. The magneto is well protected against water, mud, oil and grease by a case.

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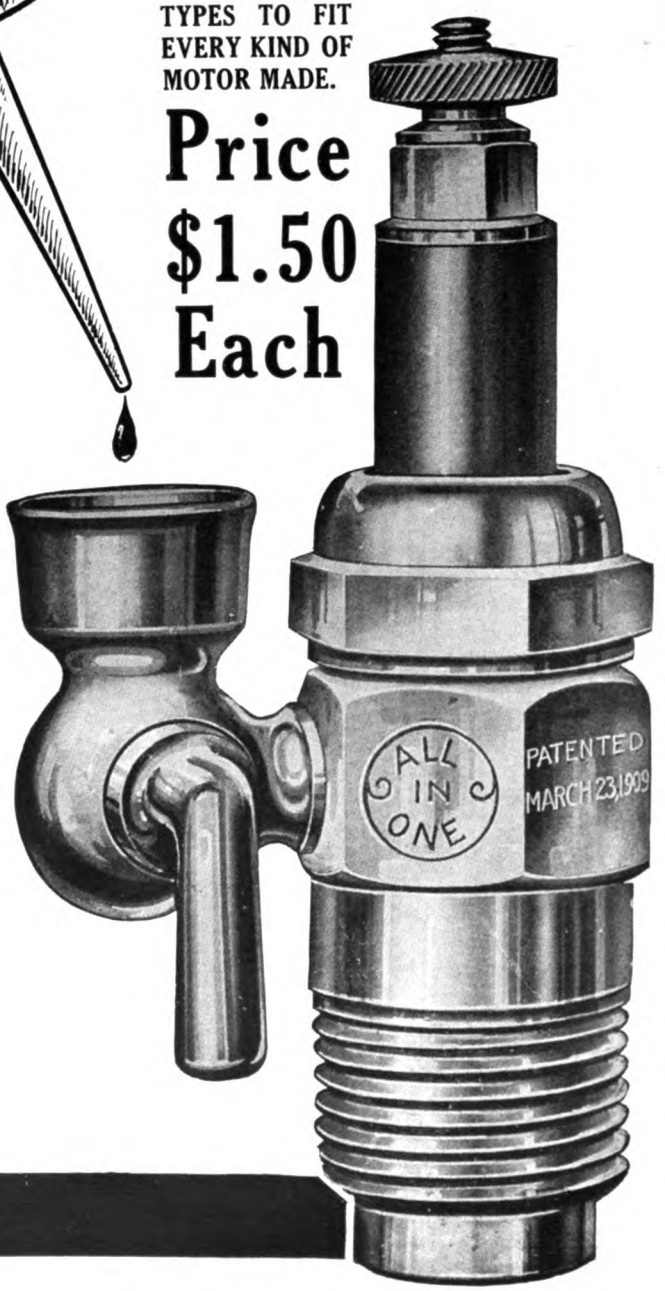
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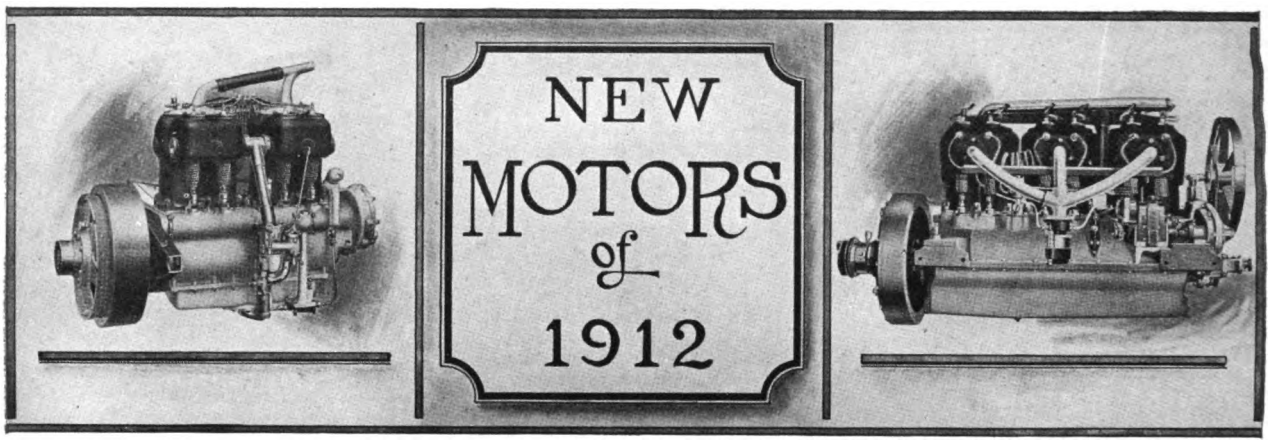
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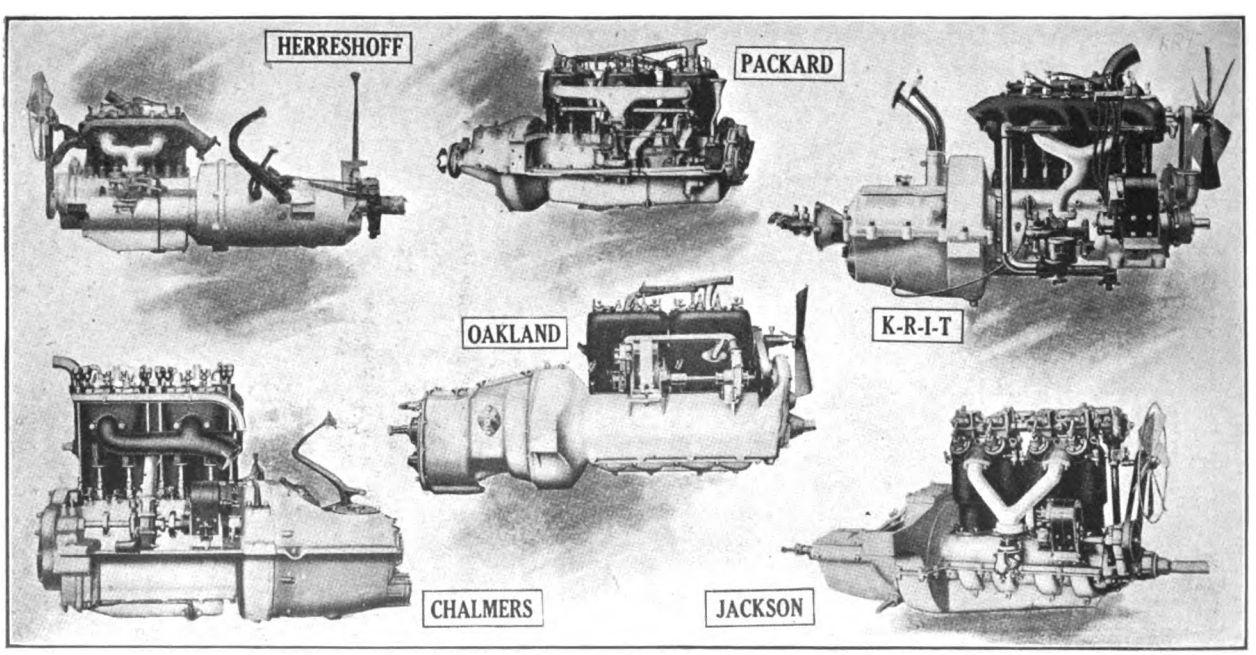
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WITH all who are motorists or motoring enthusiasts there is no question that interest in any vehicle is centred in its power plant. The engine supplies the energy to drive the machine and it is imperative that it be constructed to principles established by knowledge of operation under varying conditions. It is not to be assumed that all engines are alike because they have been designed with reference to certain principles. It is true that when reduced to certain classifications by form of valve, for instance, there are but few types. Yet when classified by other characteristics the forms may be exceedingly numerous. As motors are more generally rated by horsepower, or by cylinder capacity, it will be understood that the different categories may include those which might be differently rated. As there are no recognized rules and the differentiation is largely governed by the judgment of the individual it will be seen that classes as recognized by the one will not always be comformable to the satisfaction of others.

With motorists generally the motors have been differentiated by the number of cylinders, and it has become customary to speak and write of them, and oftentimes to establish their value, according to cylinder number, when as a matter of fact it might be possible to demonstrate by practical tests that the engine with one cylinder might be in every way more efficient and have more desirable qualities than one with four cylinders. This is not meant to imply that the approval of the owners of cars is to be questioned but it is intended to prove that cylinder number has been accepted as a fair estimate of motor value and the consideration of other elements equally potent has been neglected.

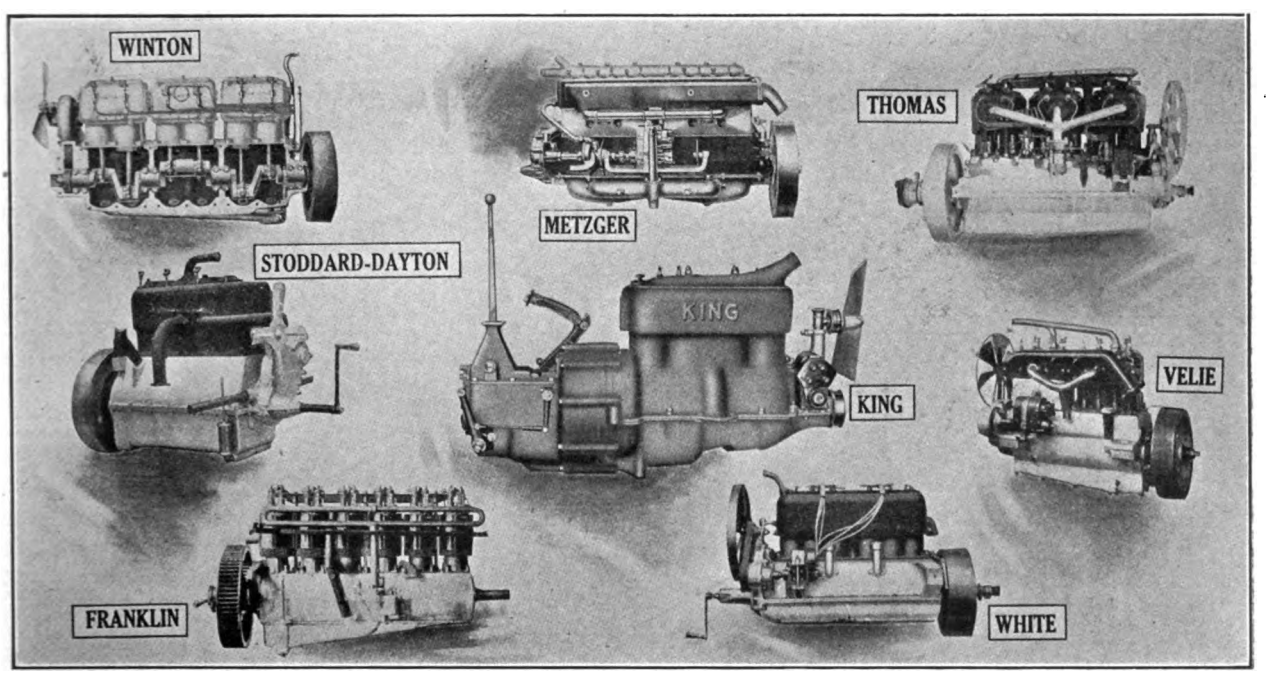
Regarding classification in anything like a fair light it will be seen that the classes might very properly be made with regard to construction. By this is meant the forms of cylinders, the locations of the valves, the types of pistons, the character of bearings, the number of main bearings, the manner of cooling,



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the systems for ignition, the method of carburetion, and so on through innumerable detail. As a matter of fact it would appear that much the clearer classification would be by stroke-cycle, and then by piston capacity, sub-dividing the second according to engine cylinder number.

It is seemingly a very fine distinction to classify a motor by its valve construction alone when as a matter of fact it might be included with much more reason in another class. It might be equally justifiable to establish classes by number of main bearings, or by the system for lubrication, when as a matter of fact the real factor is horsepower developed. But, from the viewpoint of the purchaser, the detail is not of such importance, as results, always assuming that it is worked out mechanically, and results being equal the choice would be for that which was the most economical in operation. Carrying this still further then would come economy in upkeep and maintenance.



Regarding "Trend of Design."

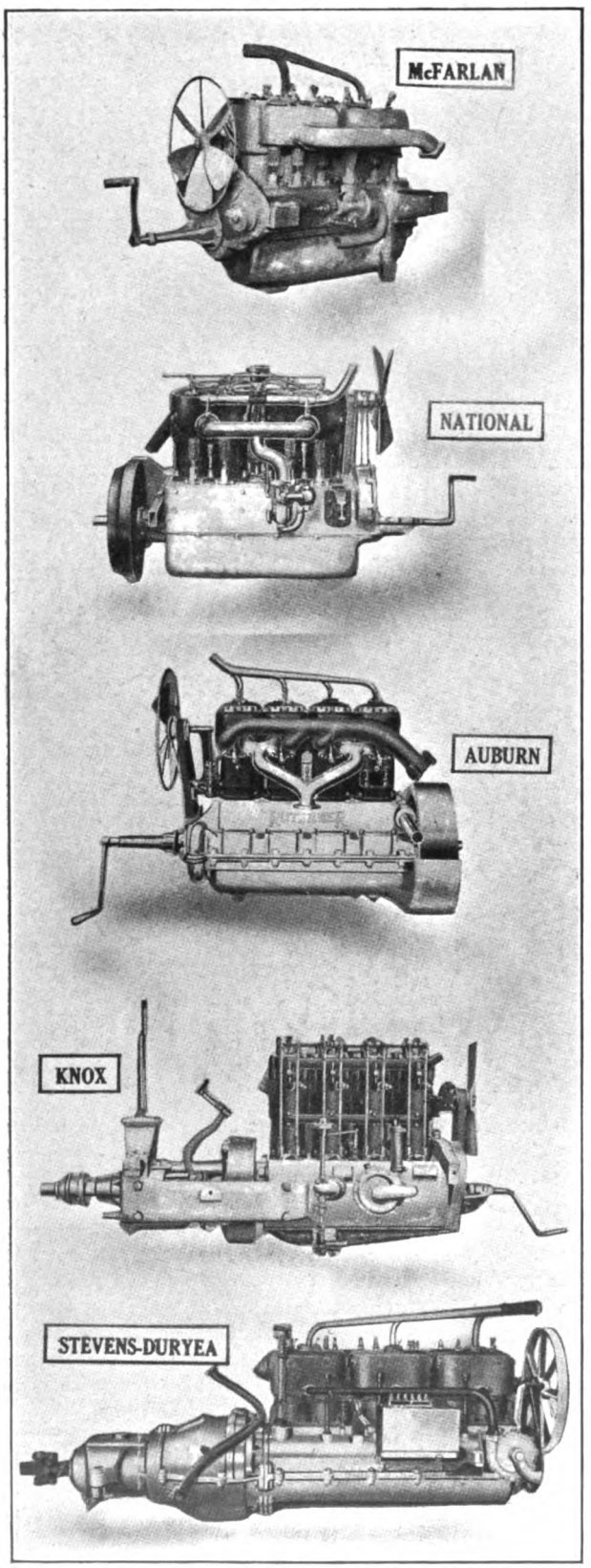
There has been constant discussion relative to "trend of design," a decidedly misleading phrase applied to variance in detail, which seemingly means, or is intended to mean, a certain manner of development, when it really applies to description of differing methods of obtaining a definite result. If the subject as considered were properly applied, as to valve design, to cylinder design, to shaft design, etc., and the differing types specifically considered, the true meaning of the word "trend" might be realized.

No one today is disposed to question the efficiency of the internal combustion motor. But there are possibilities that have seemingly been little realized. In the first five years of active motor vehicle manufacturing practically every form of motor now in use had been created. Since that time there has been development resulting from careful engineering observation and experience. This search for data has been very carefully conducted by the different individuals, firms and organizations identified with the motor vehicle industries. What was first general experimentation based largely on theory was succeeded by more systematized endeavor along lines that seemed to promise results, and naturally this work led those engaged in it in channels often parallel or as often widely diverging.

European practise and experimental work was not so indiscriminate as in this country and for that reason certain types were accepted as standards, which the makers sought to perfect by experiment, not being willing to undertake development until a principle was established beyond possibility of question. This policy directed attention specifically to several forms which justified very general approval, and these were systematically perfected.

It was conclusively established to European engineers, at least, that motor efficiency depended upon proportions rather than upon anything else, and the motor vehicle engineers have directed their work toward creating assemblies that will have the greatest power and the smallest operating cost as compared with the recognized standards. One fact proven was that with any given engine the stroke was quite as important a factor in power development as the bore, and speed was also equally potent. French automobile engineers have for several years worked on these elements of design with surprising results, and while it cannot be said that exact ratios of each to the other have been determined it is fully established that the real trend of motor vehicle design has been to lengthen

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the stroke and not the bore of engines.

Long Or Short Stroke.

The experience with the steam engine was first applied to, or regarded as paralleling, the internal combustion engine in that it was theorized that the short stroke was associated with speed and the long stroke with power. That is to say, that motors with short stroke could be driven more rapidly than those with long stroke and that power was proportionate to engine speed. But, as there were limitations to the speed, which was specified as number of feet of piston travel a minute, it will be understood that the stroke was directly regarded as a factor. It was not considered, however, at the same definite value as the bore.

Considering engine design it will be seen that primarily cylinder bore is the basis for estimating power. The first accepted rating by dimensions was an approximation devised by the technical committee of the Automobile Club of Great Britain and Ireland, afterwards the Royal Automobile Club, in which the bore of the cylinder was squared and this result multiplied by the number of cylinders, and in turn divided by 2.5, a constant regarded as reasonably definite. Under this formula the capacity of an engine was taken at 1000 feet of piston travel a minute. This formula was adopted by the Association of Licensed Automobile Manufacturers and later by the Society of Automobile Engineers.

In connection with ratings obtained in this manner it has often been stated of an engine that while having an estimated capacity by formula it had developed a power considerably in excess of it by brake test. It is probable that such statements are made of the majority of motors, and it is equally reasonable to believe that similar braking tests have been made. But with regard to the determination by actual trial it is apparent that these are not to a standard and the conditions may differ broadly. This being so the brake test is not universally adopted as a means of engine rating. If it were possible to standardize power production by actual uniform trials definite value could be established with a basis of engine speed.

Relation of Stroke to Bore.

In connection with this subject it may be well to note the most interesting experiments have been made by French designers and engineers who have given more attention to the stroke of the engine. Probably the best known of the engines that have been produced commercially is the Sizaire-Naudin, which has the longest stroke of any as compared with cylinder bore. Cars with this engine with 100 millimeter bore and 260 millimeter stroke have been constructed for racing purposes and one was driven on the Brooklands track in England at an average speed of more than 72 miles an hour for six successive hours. This engine, of one cylinder, under the basis of bore, would rate at approximately six horsepower, but the actual power developed has been rated at 38. The engine speed, however, had been increased to 3000 feet of piston travel a minute.

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This is but one of the numerous demonstrations of the value of engine stroke and while it cannot be said that it is possible to establish the exact value of the different ratios, because these ratios would probably differ with each separate motor, and much depends upon carburetion, ignition, quality of fuel, lubrication, temperature and the relation of each to the other, there is no question whatever of the stroke being quite as much of an element in power production as bore.

Now as this subject is considered, the attitude of the American motor car manufacturer is decidedly interesting. Many automobile engineers will say that it is not desirable to have extremely high speed motors. It is well enough known that fast engines are destructive of themselves and the other elements of the car. This being so the desire has been to obtain increased power without increased engine speed, which has been possible by lengthening the stroke. While it would appear that there is no inclination to go to extremes as regards the stroke ratio to bore, it may be pointed out that the material change that would be necessary in manufacturing equipment, should there be a wide variance from previous models, is a restraining influence of decided weight.

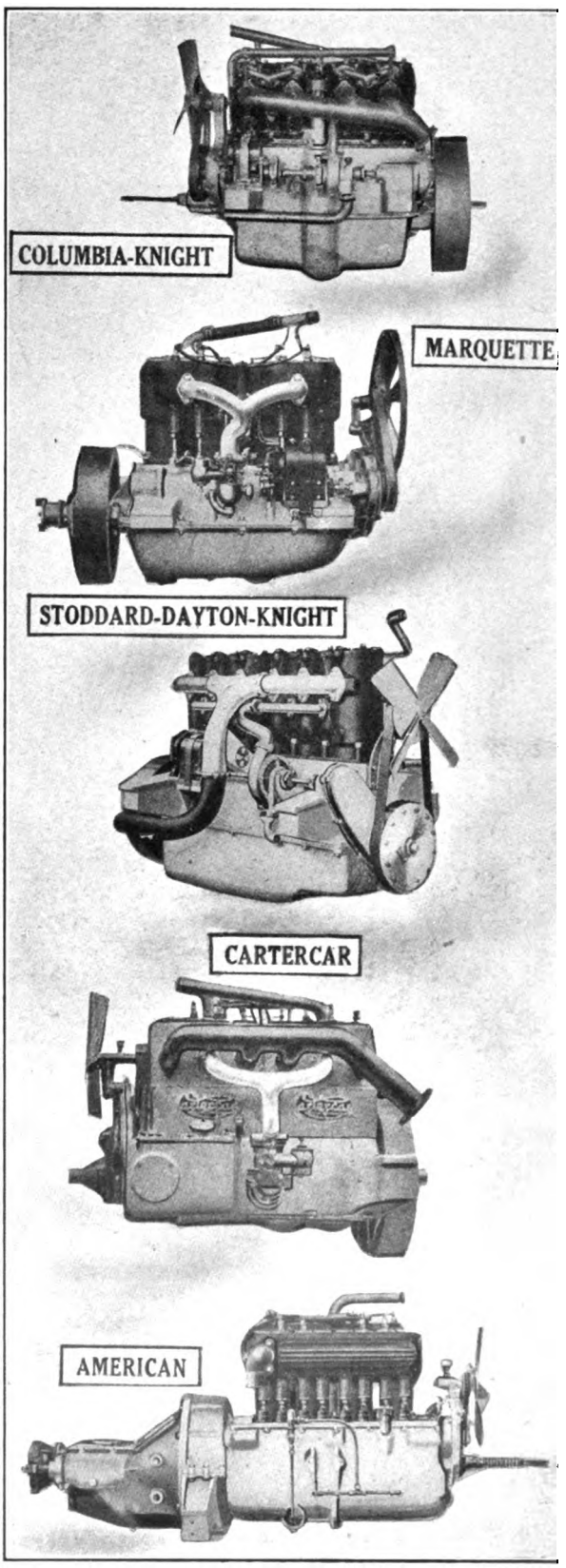
There should be no assumption that the facts as stated are arguments that the ratio of bore to stroke should be extreme. The statements are made to establish that there is recognition of stroke having value, and that this value is not definitely known.

American Motors Analyzed.

Perhaps one of the best illustrations of the increase of stroke is contained in an analysis of the dimensions of the engines of 301 different pleasure cars, these all being the latest products of leading American makes. The percentages given are substantially correct and can be regarded as dependable.

Of these motors but 5.33 per cent. have a bore in excess of the stroke, and 8.66 have the bore and stroke equal, so that 86 per cent. have a stroke which exceeds the bore. This is taking the cars without reference to price or horsepower, but with consideration of the two factors referred to.

On the basis of these figures it is probably assumed that there is a very general adoption of the long stroke, and so it would appear without further consideration, but taking the next group with the ratios ranging from 1.01 to 1.25 it is found that this contains 70.33 per cent. of the 301 motors, which may be illustrated by a cylinder five by four inches. Surely this is not a long stroke in the acceptance of the term by the foreign engineers, and yet it is found that of these 301 engines 84 per cent. of them have a stroke not more than 25 per cent. in excess of the bore. Taking as the next group those having a stroke of 1.26 to 1.50 in excess of the bore it is found that it is 14.66 per cent. of the total, and in the succeeding group, with the ratios 1.75 to one, there is but one per cent. In but one engine is the



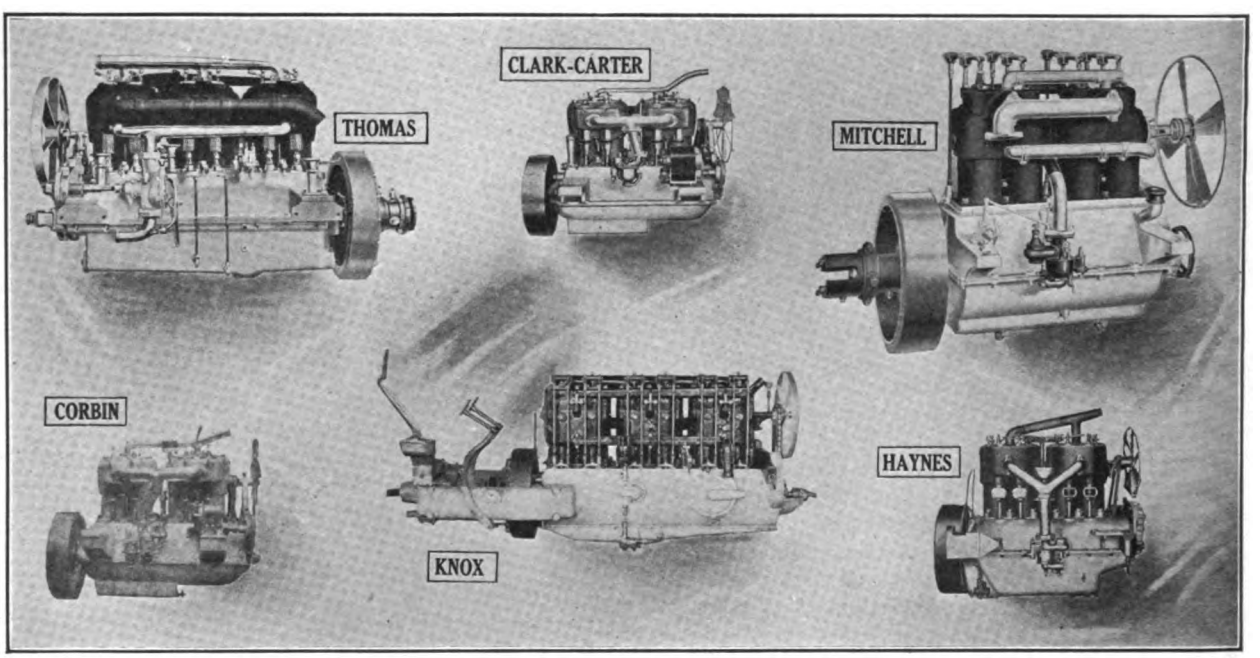
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Bore to Stroke Ratios in American Motors.

Bore to Stroke Ratio	No. of Motors Grouped	Groups Increased 5%	Groups Increased 10%	Groups Increased 25%
.75- .80	1	0.333		
.81- .85	1	0.333	0.666	
.86- .90	4	1.333		
.91- .95	6	2.000	3.333	
.96-1.00	30	10.000		14.000
1.01-1.05	27	9.000	19.000	
1.06-1.10	30	10.000		
1.11-1.15	74	24.666	34.666	
1.16-1.20	47	15.666		
1.21-1.25	33	11.000	26.666	70.333
1.26-1.30	21	7.000		
1.31-1.35	9	3.000	10.000	
1.36-1.40	10	3.333		
1.41-1.45	1	0.333	3.666	
1.46-1.50	3	1.000		14.666
1.51-1.55	1	0.333	1.333	
1.56-1.60	1	0.333	0.333	
1.65-1.70	1	0.333	0.333	1.000
1.81-1.85	1	0.333		0.333

Ratios Based on a Cylinder 4 x 4 Inches.

Bore, In.	Stroke, In.	Ratio.
5.00	4.00	.75
4.80	4.00	.80
4.60	4.00	.85
4.40	4.00	.90
4.20	4.00	.95
4.00	4.00	1.00
4.00	4.20	1.05
4.00	4.40	1.10
4.00	4.60	1.15
4.00	4.80	1 20
4.00	5.00	1.25
4.00	5.20	1.30
4.00	5.40	1.35
4.00	5.60	1.40
4.00	5.80	1.45
4.00	6.00	1.50
4.00	6.20	1.55
4.00	6.40	1.60
4.00	6.60	1.65
4.00	6.80	1.70
4.00	7.00	1.75
4.00	7.20	1.80
4.00	7.40	1.85



stroke more than 1.75 to one. This tabulation is decidedly interesting in that it shows that the general tendency is not to greatly increase the stroke with relation to the bore when compared with some of the engines that are standardized in Europe, and where the stroke has been lengthened with the express purpose of increasing the power of the motor. Considering these figures reference may be made to the table above.

For a better understanding of these values, which have been expressed by proportions or ratios, the other table may be referred to, and it is reasonably accurate. Taking a cylinder four by four inches as the basis the stroke to bore relations are found as stated therein.

The figures stated have been merely for the purpose of illustration and taking any group of cars it will be seen, for instance, that where the ratio of bore to stroke is one to 1.06-1.10, inclusive, the expression in inches is four to 4.20 as a minimum and 4.40 as a maximum. As the cylinder dimensions range from .015625 to .5 inch, and the ratios are expressed decimally in multiples of five the exact number of cylinder sizes is not well demonstrated.

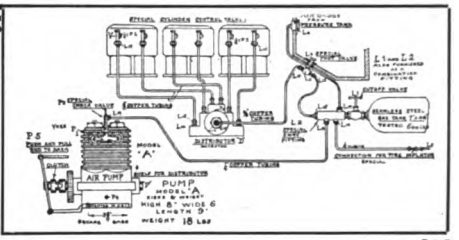
Stroke in Excess of Bore.

There is no good reason why there should be adherence to standard dimensions by any designer. As a rule a motor is constructed to develop a sufficient power, and the horsepower as stated is usually accepted as an average rather than maximum or minimum. Engines built for specific work often exceed requirements, but it is not even reasonable to make comparisons by cylinder dimensions because so much is dependent upon other conditions.

Referring to tabulations of engine ratios, it will

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The JANNEY-STEINMETZ
Motor Starter and Tire Inflator

The advent of the Motor Starter has made Automobiling more popular than ever before and eliminates the danger and trouble encountered when one operates a car depending upon the old crank method of starting.

Many motor starters are now on the market and most of them are flat failures as far as real starting and efficiency are concerned.

COILED SPRING AND RATCHET STARTERS are expensive, unsightly and undependable—they won't pump tires.

ACETYLENE GAS METHODS of starting are not always certain and are expensive and the gas tank is quickly emptied. Acetylene is a dangerous explosive.

THE ELECTRIC STARTING DEVICES are heavy, complicated, delicate and expensive. It requires the constant attention of an electrical expert to maintain its efficiency and besides won't pump tires.

The only proper way is compressed air; clean, pure fresh air. The Janney-Steinmetz way.

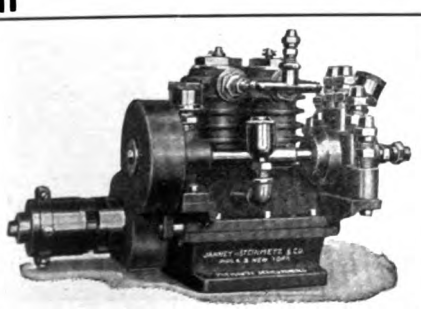
PUSH THE BUTTON ON THE FOOT BOARD AND THE ENGINE STARTS EVERY TIME

It consists of a Double Cylinder Air Pump Motor Starter and Tire Inflator, weighing about 20 pounds; small and compact, but 8 inches high and 6 inches wide, Pump Distributor; Seamless Steel Air Tank tested to 600 pounds pressure; Air and Throttle Valves, one for every cylinder; Pressure gauge and all necessary fittings for air line.

The Distributor automatically directs the compressed air from cylinder to cylinder in the order of firing and admits it only on the power stroke. Starts the motor quickly and easily.

A tire inflating attachment from the tank quickly fills your tires and eliminates all labor from tire inflating.

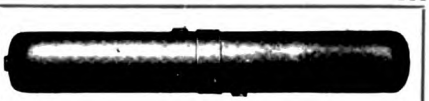
Every prospective or present car owner should install this starter and tire pump on their car. Manufacturers will supply it on demand. Write us for full detailed description and price.



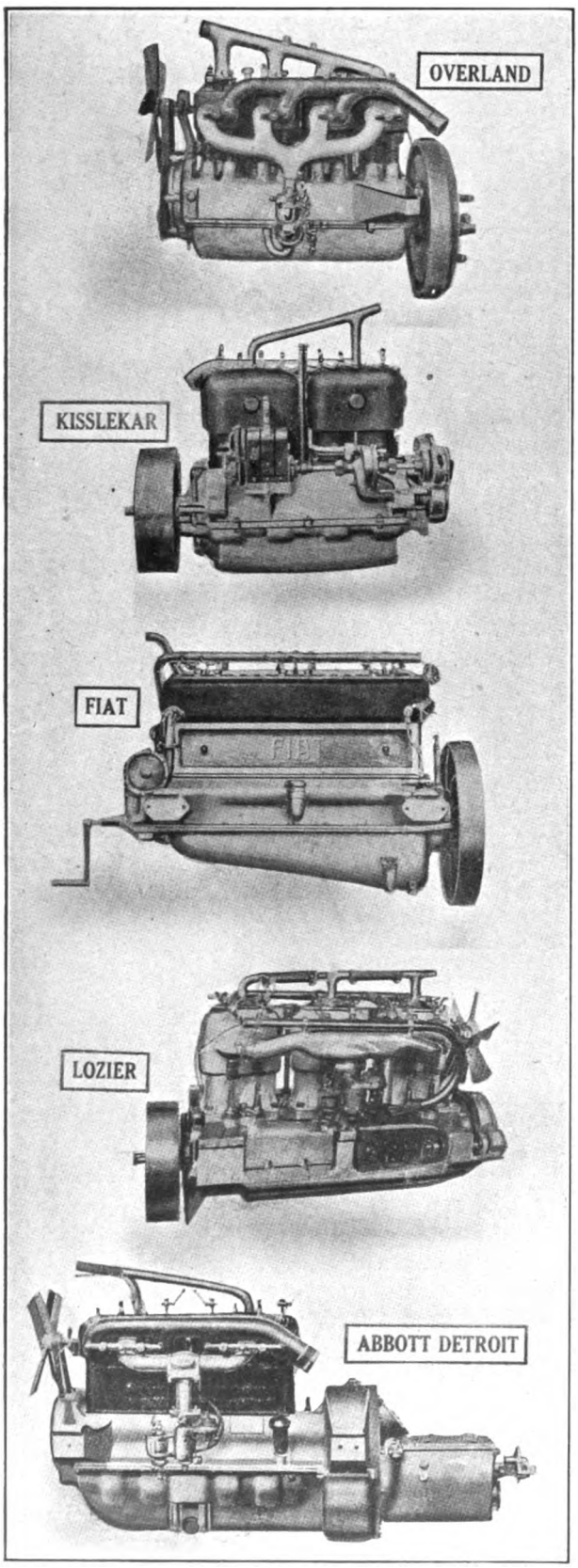
New catalogue ready. Seamless Steel Gasoline and Tested Air Pressure Tanks. All sizes in STOCK.

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be seen that 70.33 per cent. have a stroke between an equivalent to four to five, and that those equivalent to a bore in excess of the stroke, and those with a ratio exceeding four to five, are approximately the same.

The longest stroke ratio engine built is the Only, which is one to 1.85. This vehicle was originally designed to have a single-cylinder motor of the type developed in the Sizaire-Naudin cars, but when the four-cylinder form was decided on the long stroke was retained. This is without question the extreme of American machines, having bore of 4.25 and stroke of 7.87. Next in ratio extreme is the Hupmobile with bore of 3.25 and stroke of 5.50, the Austin with bore of 4.50 and stroke of seven, and the R. C. H. with bore and stroke of 3.25 to five, these ratios being 1.69, 1.65 and 1.54, respectively. The Moline and the Oldsmobile are in the 1.50 class with bore and stroke of four and six inches each, and the Bergdoll is 1.49 with bore and stroke of four by 5.935. The Mitchell is rated at 1.43 with bore of 3.75 and stroke of 5.50, the Dispatch at 1.43 with bore and stroke of 3.50 by five, and in the 1.40 group may be found the Pierce-Arrow and Peerless, with bore and stroke of five by seven inches, the Halladay and the Rayfield, which have 3.75 by 5.25 and 3.562 by five, respectively.

Ranging between this ratio and 1.25 are the Courier, Austin, Peerless, Fiat, White, Roader, King, White, Havers, Penn, Peerless, Simplex, Spoerer, Marion, S. G. V., Kline-Kar, Stearns-Knight, Thomas, Suburban, Alpena, Ames, Arbenz, Auburn, Babcock, Clark, Colby, Davis, Great Eagle, Henry, Imperial, Lambert, Lenox, Lexington, Shelby, Spaulding and Pierce-Arrow. All other makes of machines have motors where the ratio is not in excess of one to 1.25, and there are 211 machines included in this group. Where the bore exceeds the stroke or equals it the remaining 42 machines are grouped.

Term Is Misleading.

Now it is very evident that the phrase "long stroke" is decidedly misleading unless it is intended to be applied exactly as the above figures indicate that it should be—to specify that the stroke exceeds the bore of the engine cylinder, but not necessarily largely in excess.

It might be pointed out, however, that every engine that may be classed as a new production has a stroke longer than its bore, and while among these are the extreme types named above, it is not reasonable to assume that all of these motors are extreme. Perhaps the better illustration is by showing that 253 of 301 different engines have a stroke that might be regarded as equivalent to .75 to 1.25 as compared with the bore. This is a sufficient indication that American motor manufacturers have not been swept away by "long stroke" design, although there is seemingly a desire by many writers to convey this impression. It will also be understood that there are

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but six engines, or two per cent. of the total, that have a stroke 50 per cent. greater than the bore.

It is to be noted, however, that while there has been previously increase of power by increasing the bore of the cylinder there is a disposition to obtain this by lengthening the stroke, and for that reason there is not an indication of greater horsepower in the engine bore. Regarding this it may be instanced that the Only engine, with bore and stroke ratio of one to 1.85 has a horsepower rating of 28.9 by the S. A. E. standard.

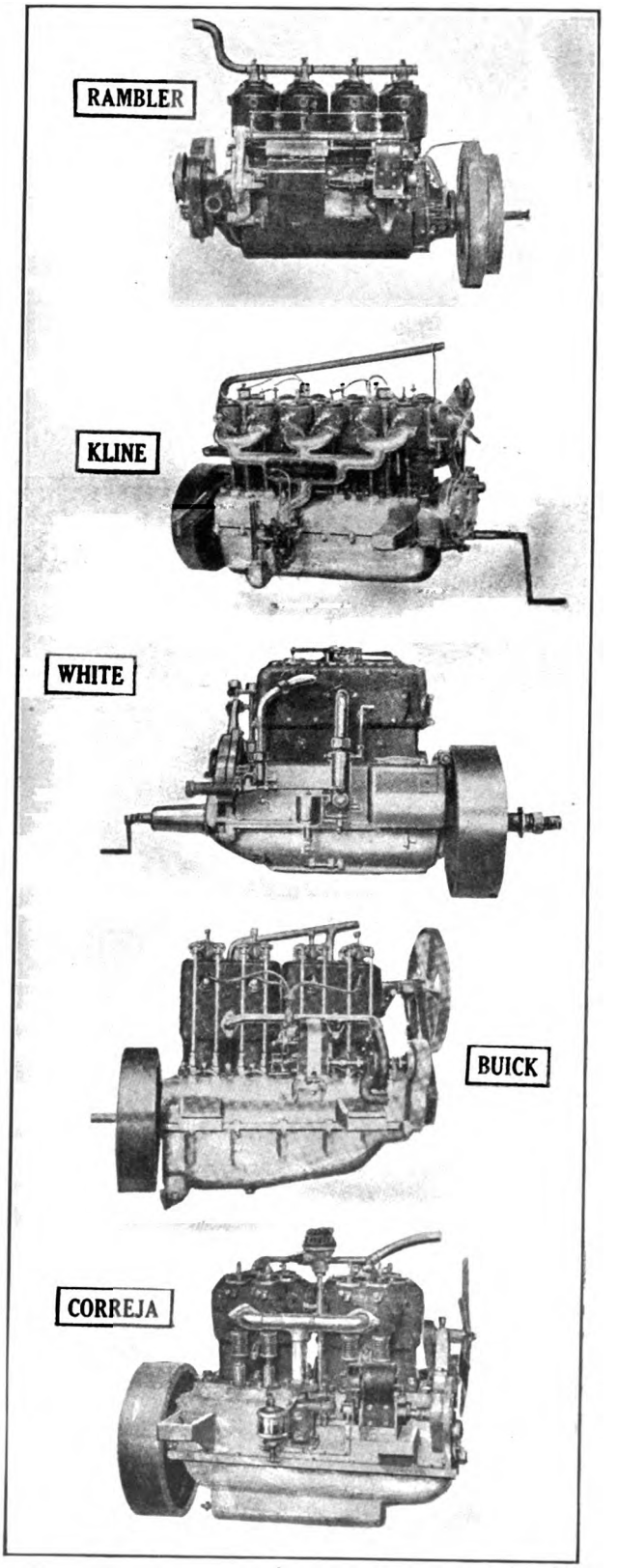
The Austin is rated at 48.6 horsepower for six-cylinder motor, and the Oldsmobile and Moline are allowed 25.6 by the S. A. E. standard. The Moline is held to have 35 horsepower, and there is no question of the validity of the claim.

But it is evident that aside from dimensions many other elements enter into the matter of engine capacity, and of course these cannot be given the same comparison as can be a constant. There is a condition of progression, however, that is not given consideration, and that is the greater efficiency of the motors that are rated according to cylinder bore. The lengthening of the stroke in many cases, and the improved carburetion, ignition and lubrication, has resulted in considerable increase of power that is not in any manner manifested save in actual trials of useful work delivered at the traction wheels. There is admirable judgment in a conservative engine rating and while no one will take issue with the claim made for a machine the rejection of a standard because it is insufficient must be inferred when a different rating is claimed than would be indicated by the standard. Were there but one or two to assume this attitude the question might be regarded as debatable, but when there is every evidence and demonstration that power has actually increased and bore dimensions have not, and these claims are set up by the designers and the manufacturers, it is apparent what has been regarded as a basis or standard cannot be accepted even as an approximation.

Considering Design Details.

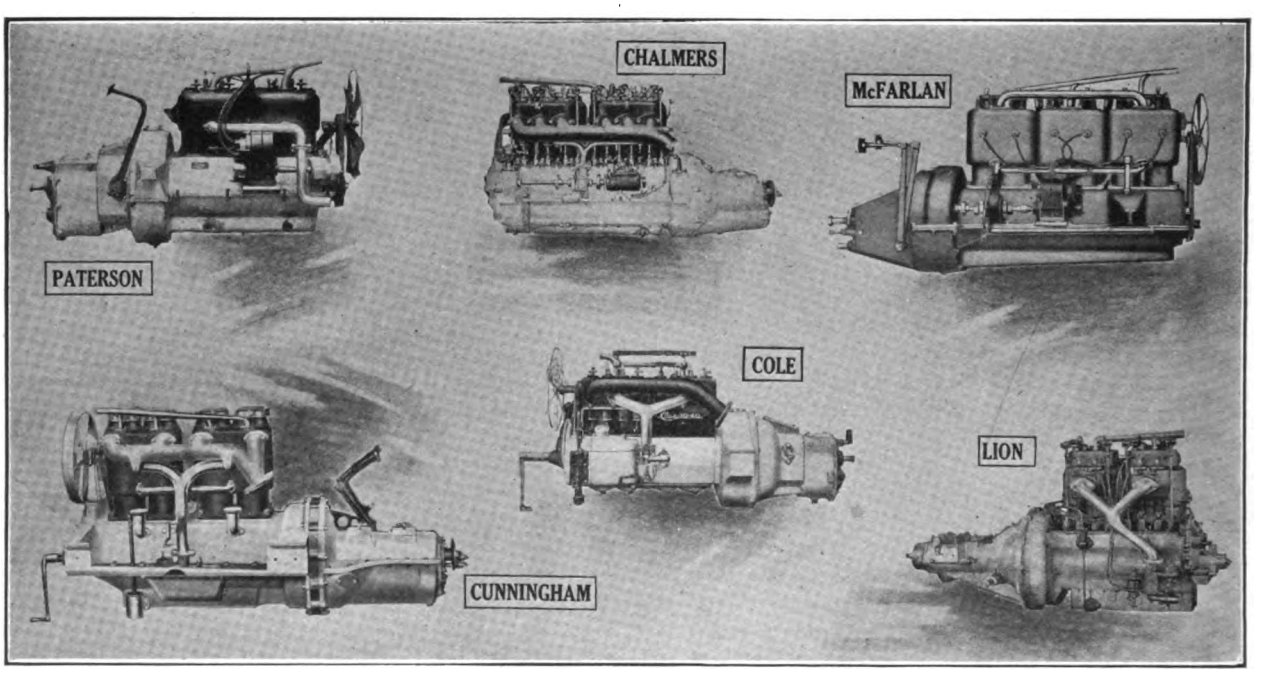
Turning from the subject of engine design to design details it will be noted that there has been a disposition by many engineers to protect the mechanism from every influence that would cause rapid deterioration. Though there may be assumption that many of the motors have been constructed with extreme care to minimize wear, it has been the universal experience that fullest lubrication is absolutely necessary, and this has led to differing methods of housing the moving parts wherever this may be done. Another purpose has been to minimize manufacturing cost, both with reference to materials and workmanship, without sacrificing any quality.

One of the most interesting mechanical subjects for study is the manner in which designers have secured certain results. Considering design details then,



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there is a disposition to enclose the valve stems and the valve lift or pushrods because of the excessive wear from abrasive substances accumulating on them and being retained by the oil. When heated the oil has fluidity that precludes any possibility of wholly retaining it in the wearing surfaces, were they not in any way exposed, and this condition has resulted in encasing the lift rods, valve stems and springs in light metal housings, in extending webs from the sides of the cylinder units below the valve pockets to form chambers to be covered with plates, and in covering these moving elements with metal casings. As all of these are quickly removable the valve stems and rods are nearly as accessible as when open. With constructions where the lift rods and valves operate in bushings it is evident that wear is not so destructive as in those in which the guides are not bushed and restoration may be accomplished as often as necessary.



Motor Design Classified.

The designs of automobile power plants are indeed numerous but they may be divided into classes where the motor, clutch, transmission and differential are each separate, where the motor and clutch are combined and the other two assemblies separate, where the engine and clutch and the transmission and differential are two groups, and where the engine, clutch and transmission are a unit and the differential separate.

In considering the forms of housings attention may be directed to the types that are characteristic of some of the models of the Abbott-Detroit, American Scout, Chalmers, Cole, Cunningham, Havers, Herreshoff, Jackson, King, K-R-I-T, Lion, McFarlan, Oakland and Paterson, in which the motor, clutch and transmission are housed, and with the Packard six-cylinder with the clutch and flywheel completely enclosed. The Knox six-cylinder assembly has the motor, flywheel and clutch in a single assembly, but the flywheel and clutch are exposed. The power plant of the Moline is similarly constructed and suspended. The same construction that has been adopted for the Chalmers four-cylinder has been followed in the six-cylinder car.

The purpose sought by the designers has been to eliminate so far as is possible the stresses upon the motor, clutch and transmission when installed separately and connected by universal joints in the shafting. It has been found that with the two or three groups as a unit that there was less possibility of strains from distortion of the chassis and it has been with a view to relieving the shafts from excessive friction, to minimize the leverage pressure upon the bearings, and to prevent the binding of the gears through temporary twisting of the chassis frame that the machinery of the car has been installed in a single housing.

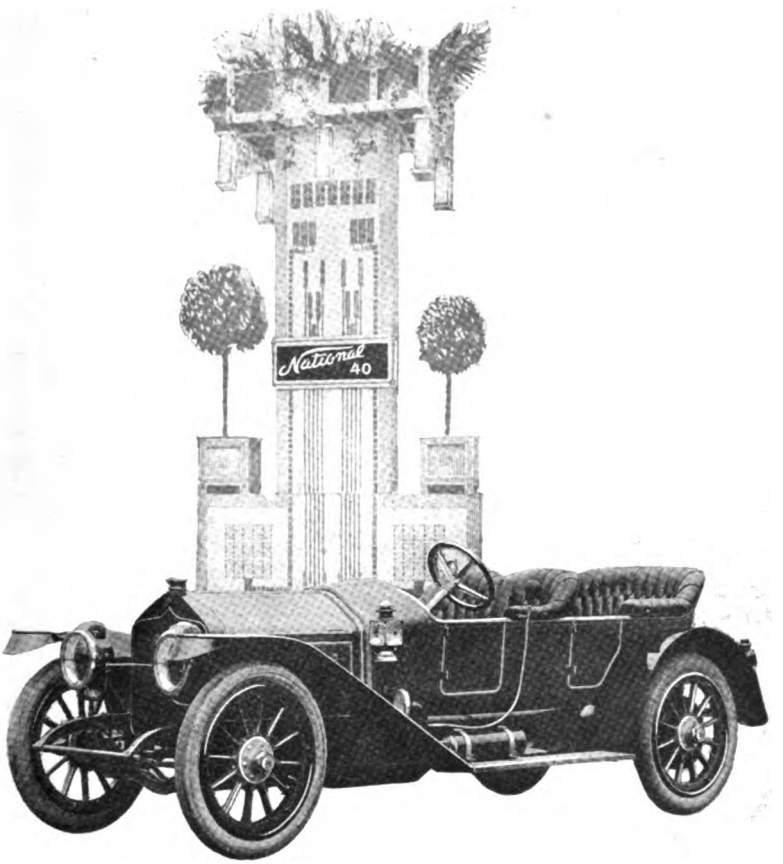
It is not the purpose of this article to analyze the methods adopted by the engineers, but rather to point out that there is unquestionably a well founded belief that it is best to obtain every advantage in motor designing, which in these instances means protection from wear and all of the qualities summarized above. Each designer has worked out the details differently. Not all of those who have adopted the unit assembly have protected the valve mechanism, but of these there is a sufficient number to justify the conclusion that this class will be largely increased in the year

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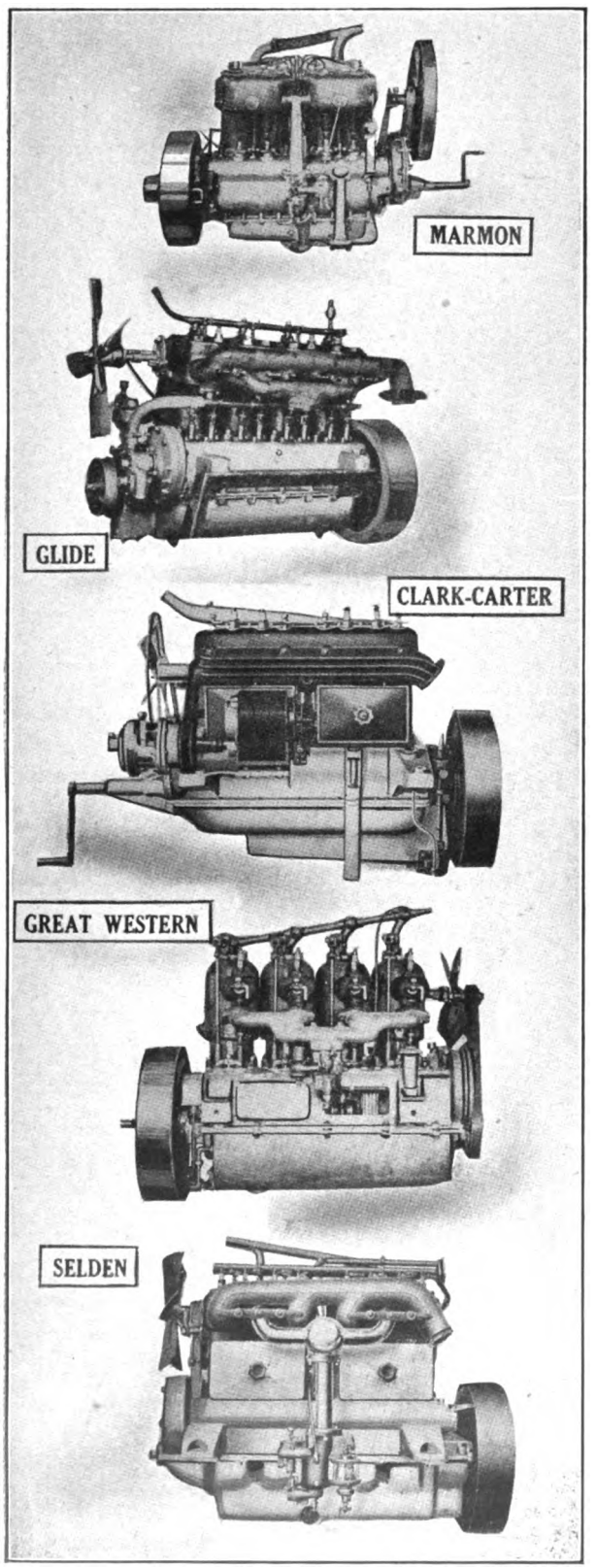
Four Models, $2,600 to $3,000

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SPRINGFIELD, MASS.—J. F. Whitaker, 22 Taylor St.
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NATIONAL MOTOR VEHICLE CO., INDIANAPOLIS, IND., E. 22nd ST.

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to come. Where the motors are of the valve-in-the-head type it is impossible to house all of the valve operating mechanism, a condition that holds true of the side and head valve forms.

En Bloc Construction.

The success obtaining with the motors with en bloc cylinder castings has caused designers to give careful attention to development of this construction. While the production of cylinder blocks, both with and without heads, incorporating water jackets, were the limitations of the first designs of the block forms, the manifolds for fuel and exhaust and for water inlet and outlet have been included until with some of the motors there is but little evidence of the operating mechanism. In this manner protection has been obtained in the casting itself. These motors are splendid examples of iron casting throughout, the proportions being exact so that there is absolute uniformity of heated and cooled surfaces and no untoward effect from extremes of temperature. There is no question whatever there there is a degree of rigidity obtaining in the en bloc assembly that is not always possible with the single or twin unit construction, and the objections that were once raised against this form have been practically nullified by the excellent results. The en bloc castings have been adopted for the Everitt and White six-cylinder engines and the American Fiat motor is of this design, while the four-cylinder form has become so common that it has ceased to be a subject for comment. Naturally in the three motors mentioned there has been much interest because of the increased complications, but apparently these have been worked out with quite as much success as were the four-cylinder types.

If there has been a more general use of the block form of engine by some of the engineers it may be said that with practically every one greater attention has been given to lubrication. The need of positive lubricity under all conditions of use has impelled perfections that have been intended to insure greater equality of oil distribution to every moving part, and the mechanical feed has been recognized as being certain of results with a large proportion of the builders. No other phase of constructional detail has received more careful study and while it may be said there are ideals that have by no means been attained there is no question whatever that decided progress has been made.

Water-Cooling Systems.

So far as the water-cooling systems are concerned there has been a tendency to increase so far as possible the areas cooled by the circulating liquid and to surround the exhaust valves and often the fuel intake with the jackets for the purpose of protecting the valves against extreme heat as well as to enhance the volatilization of the fuel during the colder seasons. The manifolds for fuel and water have been formed with the purpose of eliminating the resistance of

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sharp turns and to make positive flow under all conditions of operation. The exhaust manifolds have been often increased in size to lessen the back pressure and to insure better silencing, two essentials for effective operation.

Improvement of Ignition.

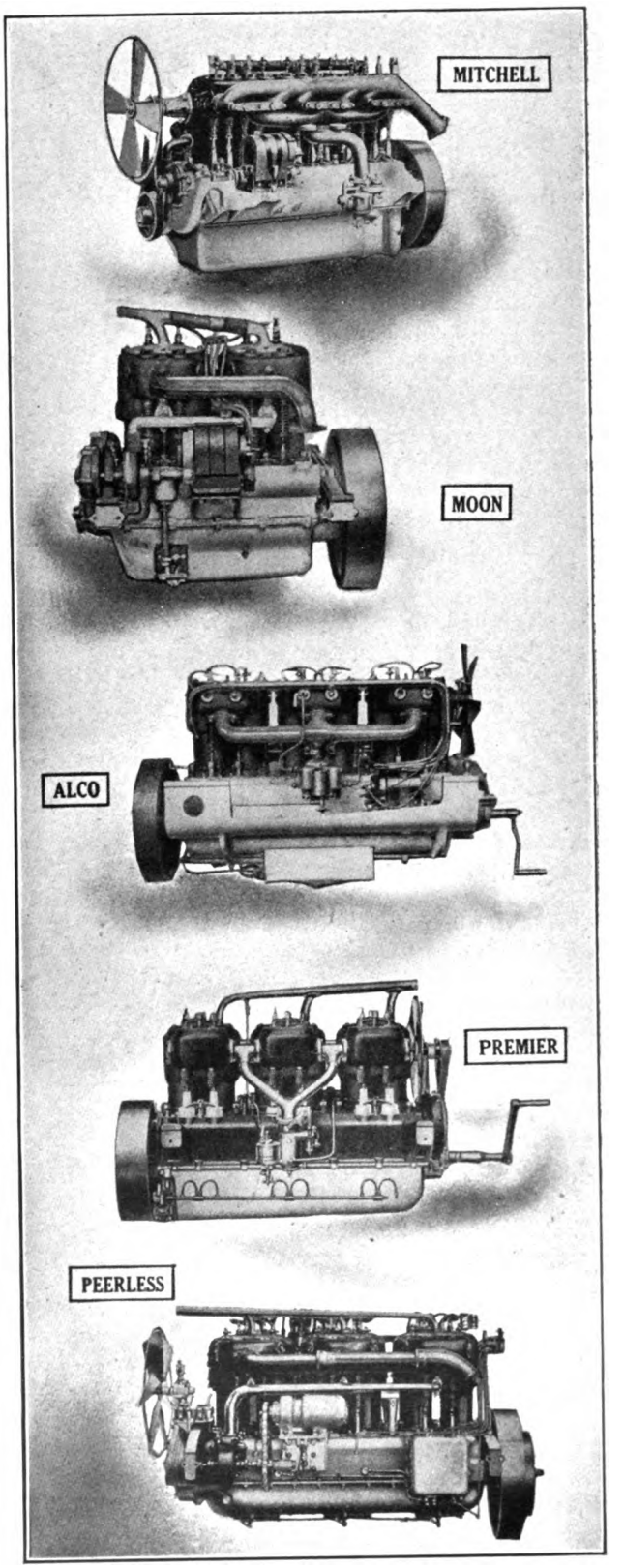
The ignition systems have been improved in many ways. The dual system, in which two sparks are produced simultaneously in each cylinder, and often with one set of spark plugs installed over the exhaust valves, has been adopted by a larger number, it being regarded that this insures more rapid and complete combustion of the gas and with these results greater power and more thorough scavenging of the cylinders. Others have perfected the double systems, in which magneto and battery is used, or the single system of wiring and the double source of current, such as the battery and magneto using the same distributor. There are innumerable variations from these for the purpose of economizing in construction, to obtain a specific result, to afford protection, etc., and with practically all an endeavor has been made to shield the wiring from contact or saturation with water or lubricant. Not only this the magnetos are often housed completely though well protected from dust and fluids.

Few Radical Changes.

As a whole the motors themselves are not radically different. One may go through the entire list and with each point out some instance where detail has been improved. There are the Alco motors, to illustrate, where the maker emphasizes that there has been practically no changes. There is the Packard six-cylinder, for example, which embodies the motor and clutch enclosed in a single casing. The White six-cylinder, the Fiat six, the Knox, the Chalmers, the Everitt and the Stevens-Duryea sixes, are all constructions presenting in combination a very large number of the qualities regarded as ideal.

Going through the list it is possible to select types of construction, each representative, and distinct and apart from others, wherein have been combined good qualities. It is not reasonable nor practical to expect in the small and low priced engines the design, material or workmanship that is characteristic of the more expensive, but if there is any reason for surprise in comparison of the types generally it is the combinations of desirable qualities to be found in the least expensive machines.

But it is not alone with the makers of cars that progression has been manifested. As a matter of fact some of the builders of standard engines have brought out new models that are admirable from every point of view. With some of these, the well known Rutenber and Continental engines especially, the recent productions have qualities that establish them at parity with the products of the best motor vehicle builders. These motors are utilized by many of the car manufacturers because of their efficiency and economy of operation.



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MOTORING NEWS OF NATIONAL IMPORT.

First Combined Show of Kansas City Dealers—Canadian Exhibitions of Importance to Industry in the Dominion and the United States—Many So-Called Minor Displays in All Sections of the Country.

It is well known that the automobile dealers in Kansas City, Mo., have been unable to hold a combined display until this year, but the recent organization of the Kansas City Motor Car Dealers' Association was reflected in the first exhibition of this character in the Convention Hall, Feb. 12-17. Four hundred models, representing some 80 makers were on display, the total value of the exhibit being estimated at approximately $1,000,000.

Special attention was paid to the showing of commercial vehicles, these being segregated in the Arcade. The decoration scheme was very similar for both sections. Wallace J. Ferry, secretary of the show committee, had this matter in charge, and completely transformed the interior of the buildings by a liberal use of bunting, palms, potted plants and electric lights.

Included among those who displayed pleasure cars were the following: E. P. Moriarty & Co., Packard; Buick Motor Company, Buick; Studebaker Bros. Manufacturing Company, E-M-F, Flanders; J. I. Case Threshing Machine Company, Case; Greenlease Motor Car Company, Cadillac; Oldsmobile Company of Missouri, Oldsmobile; Day-Embry Automobile Company, Pierce-Arrow; Rambler Automobile Company, Rambler; Mitchell Motor Car Company, Mitchell; Hall Bros. & Reeves, Premier, Dorris; Witwer Motor Car Company, Marion, Garford, Flanders electric, Ohio electric; Fletcher Cowherd, Jr., Peerless; Bond Motor Company, K-R-I-T, Everitt, Franklin; D. A. Kendall Motor Car Company, Halladay; Kaw Valley Auto Company, Abbott-Detroit; McGee-Huckell Motor Car Company, Stoddard-Dayton-Knight; KisselKar Company, KisselKar; Columbus Buggy Company, Firestone-Columbus, Oakland; Cartercar Company, Cartercar; United Motor Kansas City Company, Columbia-Knight, Maxwell; Cole Motor Car Company, Cole; C. L. Taylor Motor Car Company, Reo; Stafford Motor Car Company, Stafford; Ford Motor Company, Ford; Hart Motor Company, Inter-State; Albertson Boyd Motor Company, Hudson, Marmon; McFarlan Six Sales Company, McFarlan, Alco; Velie Motor Company, Velie; Chalmers Motor Company of Missouri, Chalmers; Winton Motor Car Company, Winton; A. J. Davies Motor Company, Knox; Jackson Motor Company, Jackson; White Motors Company, White; E. R. Hunnewell Motor Car Company, Lozier; Stevens-Duryea Motor Company, Stevens-Duryea; Overland Company, Overland; Hupp Corporation, R. C. H., Hupp-Yeats electric; Clark Motor Company, Baker electric; Dodge-Robinson Motor Company, Woods electric; Anderson Electric Car Company, Detroit electric; Bruening Bros. Automobile Company, Apperson, Waverley electric; Snedeker & Chestnut, Cino; Kansas City Auburn Automobile Company, Auburn; Hupmobile Sales Company, Hupmobile; Brush Runabout Company, Brush; Karshner Motor Car Company, Speedwell, Warren.

Commercial vehicles were displayed as follows: United Motor Kansas City Company, Sampson; Day-Embry Motor Car Company, Pierce-Arrow; General Motors Truck Company, G. M. C.; E. P. Moriarty & Co., Packard; Buick Motor Car Company, Buick; International Motor Company, Mack, Sauer; Avery Company, Avery; Monitor Commercial Car Company, Monitor; W. R. Soher, Kelly; Ford Motor Company, Ford; C. L. Taylor Motor Car Company, Reo; Anderson Electric Car Company, Detroit electric; Electric Truck Company of Kansas City, Walker electric; Hall Bros. & Reeves, Dorris; Mitchell Motor Company, Mitchell; White Motors Company, White; Velie Motor Company, Velie; KisselKar Company, KisselKar.

DAYTON CLUB'S EXHIBITION IN MEMORIAL HALL.

Although it was the first show held under the auspices of the Dayton Automobile Club, that in Memorial Hall, Dayton, O., Feb. 12-17, was the fourth in which local dealers have taken part. The event was under the direction of a committee composed of Walter L. Kuhn, Walter S. Kidder and E. A. Deeds, with Elmer L. Redelle as general manager. The decorative scheme was simple and attractive, and from a business standpoint, the show was a decided success in every way.

Among those who made display of cars were: Baker & Weaver, Cutting; Heathman-Solliday Motor Company, Abbott-Detroit, Paige-Detroit; Dayton Automobile Company, Cole, Winton; Ohio Automobile Company, Republic; Cadillac Motor Company, Cadillac; Standard Motor Car Company, Marmon, Hudson; Peckham Motor Company, Buick; H. H. Barton, Oldsmobile; Hosler-Overland Sales Company, Overland; Dayton & Troy Automobile Company, Ford; G. W. Shroyer & Co., Pierce-Arrow, Mitchell, R. C. H., Colonial electric, Columbus electric; Dayton Electric Car Company, Dayton electric; Stoddard-Dayton Sales Company, Stoddard-Dayton-Knight, Stearns-Knight; Miami Valley Auto Company, Reo; George L. Baker,

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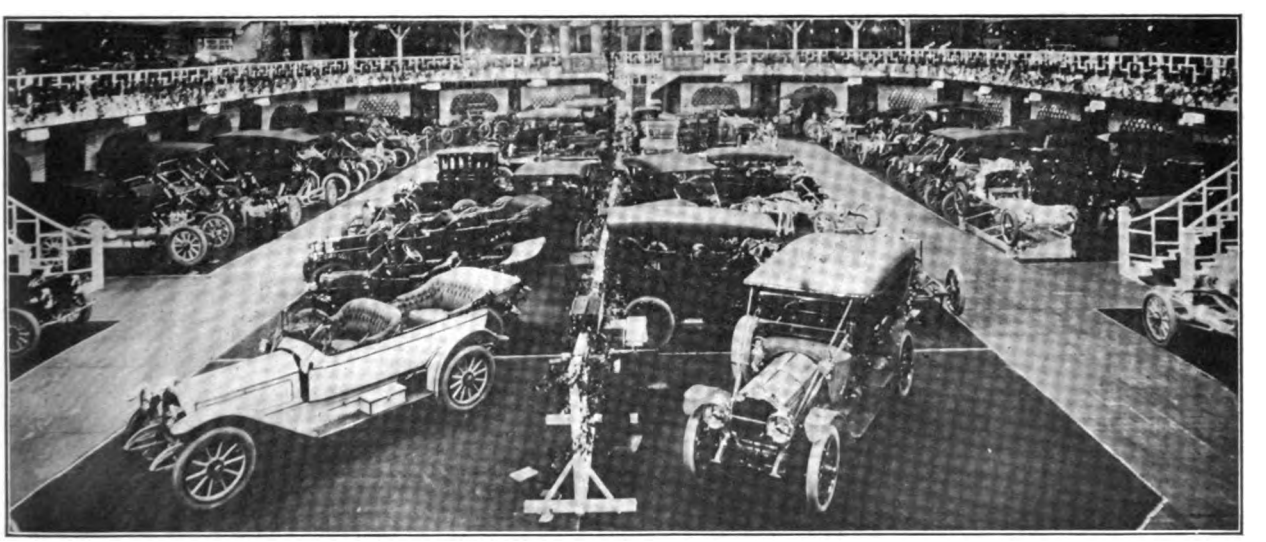
Speedwell; Marion Automobile Company, Marion; H. P. Michael Sales Company, Hupmobile; H. H. Barton, Oakland; Dodds Motor Car Company, Chalmers; Lindsey American Sales Company, American.

Accessories were shown as follows: L-C-R Storage Battery Company, storage batteries and lamps; C. E. Bowman, tires; Economical Auto Tire & Repair Company, Firestone tires; Patterson Tool & Supply Company, tools; Dayton Auto Equipment Company, Dayton airless tires; Goodyear Tire & Rubber Company, Goodyear tires; Diamond Rubber Company, Diamond tires; Dayton Engineering Laboratories Co., Delco lighting and starting systems; Myers Automobile Top Company, tops; Silvey Electric Company, batteries and lamps; Apple Electric Company, Aplco lighting and starting systems.

ORIENTAL SETTING FOR CLEVELAND'S TENTH DISPLAY.

An Oriental setting in red and onyx completely covered the ceiling and side walls of the Central Armory at the opening of the 10th annual show of the Cleveland Automobile Club, Cleveland, O., Feb. 17. The event was held for one week, under the direction of the following committee: Fred C. Wood, Fred H. Caley, H. M. Barger and C. M. Brockway.

Magnificent paintings, hung across the ends of the building and along either side, the motif being that of an automobile speedway. Potted plants and palms marked the various exhibition spaces, and the lighting effects were such as to set off the whole in a most pleasing manner. Those who made display were unanimous in the statement that it was the best show for business that Cleveland ever has known. The estimated value of the exhibits was close to $1,000,000, and a representative showing of motor trucks was a feature.



Splendid Showing Made by Recently Combined Dealers in Convention Hall, Kansas City, Mo.

Pleasure cars were shown by: New York Simplex Distributors, Simplex; States Cleveland Motor Company, Brush, Stoddard-Dayton-Knight, Courier; Ford Motor Company, Ford; Thos. B. Jeffery Company, Rambler; Anderson Electric Company, Detroit electric; American Motor Sales Company, American; F. B. Stearns Company, Stearns-Knight; White Company, Alco; V. R. Hall Automobile Company, Broc electric; Koepke Motor Sales Company, Cutting; Brooks-Norton Motor Sales Company, Ohio electric; Chisholm-Phillips Auto Company, Stevens-Duryea, Hudson; Western Reserve Motor Car Company, Garford, Marion; Reo Sales Company, Reo; Franklin Automobile Company, Franklin; Jackson Motor Car Company, Jackson; J. M. Rauch Motor Sales Company, K-R-I-T; Auto Sales Company, Overland; A. R. Davis Motor Company, E-M-F, Flanders; Richardson-Neighbors Motor Company, Hupmobile; Peerless Motor Car Company, Peerless; Lucas & Christenson, Mitchell; E. Holmes, Alpena; R. C. H. Corporation, R. C. H.; J. I. Case Company, Case; Baker Motor Vehicle Company, Baker electric; Parrish Motor Car Company, Packard; V. R. Hall Automobile Company, Cartercar; Rauch & Lang Carriage Company, Rauch & Lang electric; Weaver-Sealand Motor Car Company, Pierce-Arrow, Everitt; Olds-Oakland Company, Oldsmobile, Oakland; Euclid Automobile Company, Firestone-Columbus; Barger Automobile Company, Cadillac; Lozier Motor Company, Lozier; E. B. Finch, Chalmers; J. H. Greenwald, Abbott-Detroit, Marmon; United Motor Cleveland Company, Columbia-Knight, Maxwell; Buick Motor Car Company, Buick; Winton Motor Car Company, Winton; Pullman Motor Car Company, Pullman, Knox; Ohio Motor Car Company, Ohio gasoline; Henderson Motor Sales Company, Cole; Goss Supply Company, Marathon; Cleveland Mercer Sales Company, Mercer.

Commercial vehicles were represented by: States

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Cleveland Motor Company, Sampson; Jackson Motor Company, Alco; V. R. Hall Automobile Company, Plymouth; Weaver-Sealand Motor Company, Pierce-Arrow; Auto Sales Company, Buckeye; Pullman Motor Car Company, Knox; Ford Motor Company, Ford; Anderson Electric Company, Detroit electric; F. B. Stearns Company, Stearns; White Company, White; Western Reserve Motor Car Company, Garford; A. R. Davis Motor Company, Studebaker electric; Peerless Motor Car Company, Peerless; Baker Motor Vehicle Company, Baker electric; Parrish Motor Car Company, Packard.

Accessory exhibitors were: Perfection Spring Company, Electric Products Company, O'Neil Tire Protector Company, Ohio V-Ray Sales Company, Julius E. Strater, Leader Manufacturing Company, Lister Motorcycle Company, Portage Rubber Company, Kumler Bros., Casino Cycle & Supply Company, Standard Oil Company, L. J. Mueller, Cleveland Automobile School Company, MacAdams Company, Yale Cycle & Supply Company, B. & B. Manufacturing Company, Visco Motor Oil Company, Wayne Oil Tank & Pump Company, Auto Appliance Company, National Motor & Supply Company, National Refining Company, Columbia Refining Company, Cleveland Hardware Company, Chas. E. Miller, Bailey Company, Automobile Vulcanizer Company, H. W. Johns-Manville Company, C. A. Griese.

THIRD WESTERN MICHIGAN SHOW AT GRAND RAPIDS.

Within an hour after the opening of the third annual western Michigan show in the Furniture Exposition Building, Grand Rapids, Mich., Feb. 12-17, "sold" tags began to make their appearance in the cars displayed. The event was under the auspices of the Grand Rapids Herald, but all the local dealers co-operated in making it a decided success. The interior decorations were in keeping with the importance of the display and the 54 makes of cars were disposed to the best advantage. In every way it was one of the largest shows in the state, not excepting those held by the dealers at Detroit, the very heart of the industry.

Pleasure cars were shown as follows: Adams & Hart, Franklin, Rauch & Lang electric; Allen & Dorthy, National; American Motor Sales Company, American; Austin Automobile Company, Austin; Becker Auto Company, Ford; Buick Auto Sales Company, Buick; Central Auto Company, Cadillac; G. P. Dowling, Oakland, Ohio electric; S. A. Dwight, Everitt; W. S. Farrant, Chalmers, Columbus electric; Fox & Wood, Abbott-Detroit; Grand Rapids Auto Company, E-M-F, Flanders, Westcott, Havers; Guarantee Auto Sales Company, Stearns; Hupmobile Sales Company, Hupmobile; Mitchell Motor Car Company, Mitchell; Moran Auto Sales Company, Columbia-Knight, Maxwell, Velie; Oswald Motor Car & Supply Company, KisselKar, Detroit electric, Baker electric; Overland Motor Car Company, Overland, Garford, Marmon, Standard electric; Palmer Sales Company, Peerless; Peck-Haynes Company, Packard; Rambler Auto Sales Company, Rambler; Riekse Auto Company, Cutting; Stratton-Woodcock Auto Company, White, Hudson, Paige-Detroit, Broc electric; Townsend & Thwing, Lion; W. D. Vandecar, Reo, Stoddard-Dayton-Knight; Robert A. Wiley Auto Company, Winton, R. C. H., Crow-Elkhart, Hupp-Yeats electric; I. H. Gingrich, McIntyre.

Commercial vehicles were displayed by: Adams & Hart, Chase; Becker Auto Company, Ford; Buick Auto Sales Company, Buick; W. S. Farrant, Studebaker electric; I. H. Gingrich, McIntyre; International Harvester Company, International; Mercury Garage, Mercury; Oswald Motor Car & Supply Company, KisselKar, Federal; Palmer Sales Company, Peerless; Peck-Haynes Company, Packard; Stratton-Woodcock Auto Company, White; W. D. Vandecar, Reo; Grand Rapids Automobile Company, Decatur; Moran Auto Sales Company, Van-L.

Accessories were displayed by: John Bodbyl, L. W. D'Lye, Paul Eifert, Folgers, Grand Rapids Auto Supply Company, Grand Rapids Electric Company, Heth Bros., Inner Shoe Tire Company, W. B. Jarvis Company, Kent County Good Roads Commission, Lewis Electric Company, Michigan Tire Company, Joseph Poisson, Richmond Sales Company, Star Clothing Company, William E. Starr, Verroys & Veltman, Wayne Oil Tank & Pump Company, O. A. Williams, Grand Rapids Muskegon Power Company, J. W. Russell.

ST. PAUL DEALERS REBUILD AUDITORIUM INTERIOR.

The interior of the Auditorium at St. Paul, Minn., proved far too small to accommodate the members of the St. Paul Motor Car Dealers' Association at its annual show, Feb. 12-17. The event was under the management of W. R. Wilmot, assisted by Harry W. Wiley, and these men decided upon the novel experiment of building a temporary platform over a greater portion of the main floor.

The front was made to represent a viaduct, the piers dividing the exhibition spaces underneath. A mosaic effect was obtained, and the whole was illuminated by numerous clusters of electric lights, so that the view was unobstructed in every part of the building. Several of the cars on display were the same as were seen at New York and Chicago, and much business was transacted throughout the week.

Among those who exhibited pleasure cars were: Central Auto Company, Marmon, Reo; Pence Automobile Company, Stevens-Duryea, Buick; KisselKar Company, KisselKar; Smith & Heberle, Chalmers; P. J. Downes Company, Rambler; Barclay Auto Company, Paige-Detroit; Foster-Lawrence Motor Car Company,

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Commercial vehicles were displayed by: Morgan Bond Motor Car Company, Stegeman; Chas. V. Sales & Co., Federal; Park Garage, Chase; Veerac Sales Company, Veerac; Central Auto Company, Reo; Pence Automobile Company, Buick; KisselKar Company, KisselKar; Northwestern Auto Company, Ford; Waldreff-Odell Motor Car Company, Pierce-Arrow; Morton Motor Car Company, Peerless.

The following were represented in the accessory division: Metal Shelter Company, portable garages; Electric Manufacturing Company, full line; Brictson Manufacturing Company, Brictson treads; Northwestern Motor Supply Co., supplies; Goodyear Tire & Rubber Company, Goodyear tires; St. Paul Tire & Repair Company, G & J tires; Bartles Oil Company, oils and greases; S. F. Bowser & Co., Bowser gasoline storage systems.

IMPORTANT SHOWING OF DEALERS IN PORTLAND, MAINE.

Although the annual display of the dealers in Portland, Me., in the Auditorium in that city, Feb. 12-17, was the seventh held by them, there will be little disposition to question the assertion that this was the most important event the industry has known in Maine. Within the past two years, the automobile has been making rapid strides in this commonwealth, and the state officials have begun to realize the value of encouraging its exploitation. A decidedly effective good roads campaign has been waged, with the result that motor cars are now being used most generally both for pleasure and business.

The event was under the management of F. M. Prescott, and every effort was made to produce an attractive display. The ceiling was covered with blue and white bunting, while hundreds of electric lights were utilized in the illumination scheme. The crowds throughout the week evidenced the interest that is being taken in motor subjects and numerous sales were recorded soon after the show opened.

Among the exhibitors of cars were the following: Frank A. Sullivan, White; W. E. Hackett, Stearns-Knight; Auto Sales & Supply Company, E-M-F, Flanders, Kelly truck; J. H. McDonald, Overland; Harold M. Blanchard, Stoddard-Dayton-Knight; Darling Automobile Company, Maxwell; Spear Automobile Company, Ford; W. B. Thombs, Buick; Forest City Automobile Company, Jackson; Thomas B. Jeffery Company of New England, Rambler; Harmon Automobile Company, Hudson, Franklin, Thomas, Reo; Motor Truck & Auto Company, American; Stoughton-Folkins Company, Oakland; F. A. Nickerson Company, Pierce-Arrow, National; Fred D. Morse, R. C. H.; Gilson Auto Company, Mitchell; C. A. Blanchard, Selden; Eastern Sales Company, Haynes; J. S. Harrington & Co., Everitt; Morrill & Higgins Motor Company, Marquette, G. M. C. trucks; Maine Motor Carriage Company, Peerless, Pope-Hartford, Paige-Detroit, Chalmers, Stevens-Duryea; Mank-Stuart Motor Car Company, Cadillac; Alvan T. Fuller, Packard; Geo. E. Morrison Auto Company, Brush Elmore; Portland Company, Knox, Cole; Inter-State Automobile Company, Inter-State; Clyde H. Smith Auto Company, Nyberg; Bath Garage Company, Cutting; Patterson Garage, Pratt-Elkhart, K-R-I-T, Metz; Alco Motor Agency, Alco; Amos J. Shorey Company, Velie; Empire Motor Car Company, Stutz.

Accessories were displayed as follows: Standard Oil Company, Polarine oils; Valvoline Oil Company, Valvoline oils; C. A. Scott Company, windshields, motors, etc.; Wayne Oil Tank & Pump Company, Wayne storage systems; Pyrene Company of New England, fire extinguishers; James Bailey Company, full line; Underhay Oil Company, Underhay oils; Auto Sales & Supply Company, full line; L. W. Cleveland Company, full line; Gulf Refining Company, lubricants.

SEPARATE COMMERCIAL VEHICLE SHOW IN CINCINNATI.

Two weeks were set aside by the dealers in Cincinnati, O., for the exhibition of 1912 models, the first, Feb. 19-24, being devoted to pleasure cars. Motor trucks will be displayed during the week of Feb. 26-March 2. In the first instance, at least, the showing was much more complete than ever before, and the same thing is expected to be true of the industrial vehicle display.

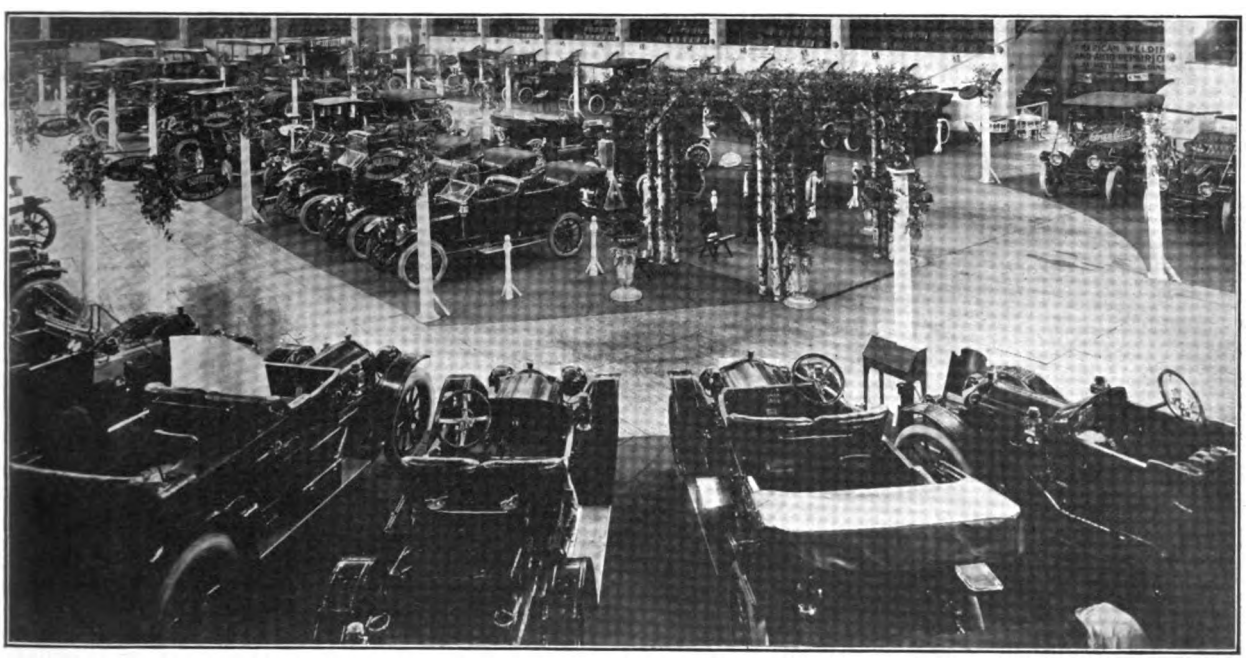
The event was held in Music Hall, under the auspices of the Cincinnati Automobile Dealers' Association, and the decorative scheme was decidedly in keeping with the importance of the show. While numerous displays are being held this year in Ohio, the Cincinnati show had sufficient drawing power to include many of the surrounding towns, and the number of sales recorded was in excess of anticipations.

Pleasure cars were shown by the following: Ford Motor Company, Ford; Cadillac Motor Sales Company, Cadillac; Stevens-Costello Company, Dayton electric, Stutz, Moon; Citizens Motor Car Company, Packard; Franklin Automobile Company, Franklin; Model Garage, Nyberg; Imperial Motor Car Company,

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Stearns-Knight; F. B. Williams Company, Jackson; Olds-Oakland Motor Company, Oldsmobile, Oakland, R. C. H.; Kruse Motor Car Company, Maxwell, Marmon; Cincinnati Automobile Company, Peerless, Pope-Hartford, Everitt; Acme Automobile Company, American, E-M-F, Flanders, Studebaker electric; Dayton Auto Company, Cole; Herold Motor Car Company, Reo, Premier; Haberer & Co., Cino; Fischer Auto & Service Company, Speedwell, Fiat; Schacht Motor Car Company, Schacht; Herschede Motor Car Company, Rauch & Lang electric; Chas. Schiear Motor Car Company, Hupmobile, Apperson, National; Eddy Auto Company, Case; Jungclas Auto Company, Overland, Thomas, Baker electric; Electric Motor Car Company, Standard electric; Leyman-Buick Company, Buick;

Commercial vehicles will be shown the second week by: Leyman-Buick Company, Mack, Saurer; Citizens Motor Car Company, Packard; R. C. Crowthers, Alco, Veerac; U. S. Motor Truck Company, United States; Hanauer Automobile Company, Pierce-Arrow; Psthelhoff & Braukmann, Hatfield; Dr. H. C. Wendel, Dorris; Haberer & Co., Cino; Cincinnati Automobile Company, Peerless, Pope-Hartford; International Harvester Company of American, International; Schacht Motor Car Company, Schacht; Chicago Pneumatic Tool Company, Little Giant; Fischer Auto & Service Company, Speedwell; Herold Motor Company, Reo; Miller, DuBrel & Peters, Avery, Ideal; Otto Armleder Company, Armleder; Cincinnati Motor Truck Company, Federal; Glow Electric Company, Glowicke; Wil-



General View of the Main Floor in the Auditorium During the Progress of the Recent Show in St. Louis.

Payne Motor Company, Hudson, Lozier; Ratterman Motor Car Company, K-R-I-T; George C. Miller Sons Carriage Company, Stevens-Duryea; Hanauer Automobile Company, Pierce-Arrow; Welland Company, Columbus electric; Ohio Motor Car Company, Ohio gasoline; R. C. Crowthers Automobile Company, Alco, Elmore; Charles Behlen Sons Company, Locomobile, Detroit electric; Heileman Auto Company, Haynes, Cartercar; J. H. Ratliff Automobile Company, Chalmers; Dr. H. C. Wendel, Dorris; Imperial Motor Car Company, Stearns-Knight, Broc electric; Rose Hill Garage, Ohio electric; H. A. Langdon, McFarlan. berding & Brandewedie, Modern; F. B. Williams Company, Sandusky.

Accessories were displayed as follows: Coughlin & Davis, full line; Bumiller-Remelin Company, supplies; Moore Oil Company, lubricants; Wayne Oil Tank & Pump Company, Wayne storage systems; Paragon Refining Company, oils and gasoline; Perfection Lighting & Storage Company, batteries; Pyrene Sales Company, fire extinguishers; All-Sides Cleaning Company, cleaning fluids; Andrews Manufacturing Company, anti-freezing mixtures; Highland Body Company, bodies; Kelley, Roth & Co., bodies.

THE ANNUAL SHOW IN NEWARK PLEASES CROWDS.

Perhaps no automobile exhibition ever held in Newark, N. J., was awaited with more interest than the fifth annual display of the New Jersey Automobile Show Association in First Regiment Armory, Feb. 17-24. This interest was maintained throughout the week, and the attendance not only was much larger than at previous displays, but the amount of business transacted was correspondingly large.

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The decorative scheme comprised a painted blue sky over the entire main hall, the exhibition spaces being divided by white trellis work. A false flooring, covered with green burlap, raised the cars about four inches above the aisles, thereby making each machine seen to the best adavantage.

Pleasure cars were shown by the following: Van Deman & Wainright, Abbott-Detroit; F. L. C. Martin Automobile Company, Alco, Mitchell, R. C. H.; J. J. Meyer, Auburn; Baker Motor Vehicle Company, Baker electric; Chace & Bradley, Borland electric; Buick Motor Company, Buick; Detroit-Cadillac Motor Car Company, Cadillac; Paddock-Zusi Motor Car Company, Chalmers; A. G. Spaulding & Bro., King, Stevens-Duryea; Wallace-De Wilde Company, Cole; J. W. Mason, Columbia-Knight, Maxwell; Lenox Motor Car Company, Crow-Elkhart; Junction Motor Car Company, Cutting; E-M-F & Flanders Newark Sales Company, E-M-F, Flanders, Studebaker electric; E. D. Carlough, Franklin; R & L Company, Garford; Cunningham Bros., Havers; Herreshoff Company of New Jersey, Herreshoff; Haynes Automobile Company, Haynes; A. Elliott Ranney Company, Hudson; Hupp Corporation, Hupp-Yeats electric; J. M. Quinby & Co., Isotta, S. G. V., Simplex; Alex. Brunner, Kline-Kar; O'Neil Motor Car Company, K-R-I-T, Paterson; Apgar & Apgar, Lion, Pullman; Greene Motor Car Company, Locomobile; Rickey Machine Company, Marmon; Van Vleck & Kirby, Metallurgique; N. J. Automobile Company, Moline; Weldon & Bauer Company, National; Oakland Garage, Oakland; Oldsmobile Company of New Jersey, Oldsmobile; Overland Sales Company, Overland; Packard Motor Car Company of New York, Packard; Empire City Automobile Company, Paige-Detroit, Warren; H. Heinsheimer, Palmer-Singer; Peerless Motor Car Company of New York, Peerless; Penn Motor Car Sales Company, Penn; Ellis Motor Car Company, Pierce-Arrow; R. M. Owen & Co., Premier, Reo; Central Motor Car Company, Regal; Stoddard Motor Company, Stoddard-Dayton-Knight; Stutz Motor Car Company, Stutz; Linkroum Automobile Company, Winton; H. J. Koehler Sporting Goods Company, Hupmobile.

Commercial cars were shown as follows: A. G. Spaulding & Bro., Chase; Commercial Motor Truck Construction Company, Commercial; Commercial Maintenance & Motor Company, Grabowsky; H. J. Koehler Sporting Goods Company, Koehler; Crescent Automobile Company, Mack, Saurer; Packard Motor Car Company of New York, Packard; Peerless Motor Car Company of New York, Peerless; Ellis Motor Car Company, Pierce-Arrow; R. M. Owen & Co., Reo; E-M-F & Flanders Newark Sales Company, Studebaker electric.

TWO SEPARATE DISPLAYS FOR BALTIMORE DEALERS.

In common with a number of other cities, the dealers in Baltimore, Md., have found that the interest in motor trucks is sufficient to warrant the holding of a separate show, although this will take but three days, Feb. 26-28. Pleasure cars were displayed in the Fifth Regiment Armory, during the week of Feb. 19-24, under the auspices of the Automobile Club of Maryland.

The decorative scheme was even more distinctive than last year. The vaulted ceiling of the armory interior was covered by an immense dome, from the centre of which was hung a fantastic chandelier, resembling a pin cushion as much as anything, containing numerous stick pins, etc., outlined in electric lights. Five hundred tungsten bulbs were utilized to bring about this effect. From the edge of this huge inverted bowl, 20,000 yards of bunting were draped to all corners of the main hall. In addition the four corners of the room were marked by 18-foot torcheres, each capable of reflecting 3000 candlepower.

Those who displayed pleasure cars were: Motor Car Company, Overland, Stevens-Duryea; Foss-Hughes Company, Pierce-Arrow; Norwood Bros., Elmore; Rice Bros., S. G. V., Rauch & Lang electric; Ford Auto Company, Ford; F. W. Sandruck, American, Moline; Mt. Vernon Motor Company, KisselKar; Lozier Sales Company, Lozier; H. H. Babcock Company, Babcock electric; G. A. Pope, Jr., Simplex; Walter Scott, Marmon, Crawford; Callahan Bros. Company, De Tamble; Neely & Ensor, Alco, Kline-Kar; Franklin Automobile Company, Franklin; L. M. Vordenberge Motor Company, Maxwell; White Automobile Company, White, Abbott-Detroit; Carl Spoerer Sons Company, Spoerer; D. C. Walker Auto Company, Cole, Stearns-Knight, E-M-F, Flanders; Mar-Del Mobile Company, Packard; C. R. Misner, Oldsmobile; Winton Motor Carriage Company, Winton; J. S. Ditch Company, Detroit electric; Model Automobile Company, Pullman; Lambert Automobile Company, Hudson, National; Stoddard-Dayton Automobile Company, Stoddard-Dayton-Knight; George R. Snodeal, Guy Vaughn; Zell Motor Car Company, Peerless, Chalmers; Auto Outing Company, Buick; Cooper-Sinclair Company, Moon; F. C. Lathrobe, Fiat; Callahan, Atkinson & Co., Locomobile; Oakland Motor Company, Oakland, Thomas; Standard Motor Company, Cadillac; Everitt Auto Company of Maryland, Everitt; Schall-Crouch Auto Company, Paige-Detroit; Shaffer Manufacturing Company, R. C. H.

Commercial vehicles will be shown during the second week as follows: Foss-Hughes Company, Pierce-Arrow; International Harvester Company, International; George R. Snodeal, Commer; White Automobile Company, White; Oakland Motor Company, Federal; Standard Motor Company, Cadillac; Neely & Ensor, Alco; Everitt Auto Company of Maryland; Board; Norwood Bros, Seitz, Elmore; Kelly Motor Truck Company, Kelly; Chase Motor Truck Company, Chase; Consolidated Gas Electric Light & Power Company, Electric Company wagons; Zell Motor Car Com-

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pany, Peerless; Mt. Vernon Motor Company, Autocar; Ford Auto Company, Ford; International Motor Company, Mack, Saurer; Lozier Sales Company, Lozier; Atterbury Motor Car Company of Maryland, Atterbury; Stoddard-Dayton Automobile Company, Sampson; Mar-Del Mobile Company, Packard; Callahan Bros., Morgan.

Accessories were displayed by: Indian Refining Company, Callahan Bros. Company, Baltimore Buggy Top Company, F. W. Sandruck, Carbolide Chemical Company, Maryland Electric Supply Company, Standard Oil Company, F. C. Lathrobe, Chas. Elliott & Co., H. W. Johns-Manville Company, T. J. Gallagher, G. R. Curtis, Elastic Wheel Company, Auto Supply Company, Randall Manufacturing Company, P. W. Thompson.

ONTARIO MOTOR LEAGUE'S EXHIBITION IN TORONTO.

Second only in importance to the recent Montreal show was the annual display of the Ontario Motor League at Toronto, Ont., Feb. 17-24. Both were national in character, and there even may be some question as to which really was of the more importance to the industry. E. M. Wilcox, until recently the active secretary and now honorary secretary of the league, was the manager at each.

Perhaps there was a larger percentage of Canadian-made machines at the Toronto exhibit, and some of the names do not appear at all familiar in the States. Among those which attracted decided attention was the Russell-Knight, made by the Russell Motor Car Company. This is the only concern in Canada to possess a license from Charles Y. Knight, the inventor of this type of motor.

The decorative scheme centred around an immense Union Jack flag, hundreds of yards of white and blue bunting being utilized in its making. All the emblems thereon were outlined in electric lights. In addition, the beautiful King Edward crown, which saw duty at the Montreal show, was another feature of this portion of the display.

The following makes of pleasure cars were represented: Alco, American, Brockville Atlas, Cadillac, Galt, Century electric, Clinton, Cole, E-M-F, Flanders, Everitt, Fiat, Ford, Gibson electric, Hupmobile, Hupp-Yeats electric, Imperial, Jackson, KisselKar, K-R-I-T, Lion, Lozier, McLaughlin, Maxwell, Mitchell, Moon, Oakland, Oldsmobile, Overland, Packard, Peck electric, Petrolea, Pierce-Arrow, Pope-Hartford, Rambler, Rauch & Lang electric, R. C. H., Reo, Russell-Knight, Schacht, Stoddard-Dayton-Knight, Tudhope, Waverley electric, White, Winton.

Commercial vehicles were represented by the following makes: Brantford, Clinton, Commer, Foden steam, Ford, G. J. C., Gramm, Green electric, International, Kelly, KisselKar, Pierce-Arrow, Reo, Saurer, Victor, White.

Motorcycles were shown as follows: Excelsior, Indian, Pierce, R-S, Russell-Hulett, Tangent.

Among the accessories shown were: Bosch magnetos, Bowser storage systems, Crofton storage batteries, Diamond tires, Dunlop tires, Fisk tires, Goodrich tires, Goodyear tires, Havoline oils, Independent tires, McCord radiators, Mea magnetos, Old Sol lamps, Queen City oils, Springfield tires, Stepney wheels, Tallman windshields, Triple Tread tires, Wayne storage systems, Willard storage batteries, Woodworth treads.

SEVENTH ANNUAL DISPLAY IN OMAHA'S AUDITORIUM.

The seventh annual show of the Omaha Automobile Show Association was held in the Auditorium, Omaha, Neb., during the week of Feb. 19-24. Not only was the number of cars on display much larger than ever before, but the interest in the 1912 models was decidedly more intense, judging from the attendance throughout the week. Omaha being the commercial centre of a large district, it was but natural to expect that the display would attract people from a large area, and this was as true this year as ever. The success of the event indicates that this will prove a decidedly important year for the industry in this section, having in mind the number of possible sales.

Among those who made display were: J. J. Deright Co., Stoddard-Dayton-Knight, Waverley electric, Locomobile; Nebraska Buick Automobile Company, Marquette, Buick; Electric Garage Company, Packard, Rauch & Lang electric, Flanders electric, Baker electric; E. R. Wilson Automobile Company, Lexington; Studebaker Corporation, E-M-F, Flanders, Studebaker electric; Moline Automobile Company, Moline; Apperson Automobile Company, Apperson; Rogers Sales Company, Elmore; Cadillac Company of Omaha, Cadillac; Huffman Automobile Company, Hupmobile, Abbott-Detroit, Hupp-Yeats electric; R. R. Kimball, Stevens-Duryea; Guy L. Smith, Peerless, Hudson, Franklin; T. G. Northwell Company, Detroiter; Marion Auto Company, Marmon, Marion, Ohio electric; United Motor Omaha Company, Columbia-Knight, Maxwell; R. A. Duff, Matheson; Inter-State Automobile Company, Inter-State; Rambler Motor Company, Rambler; J. I. Case Threshing Machine Company, Case; International Harvester Company of America, International; John Deere Plow Company, Velie; Freeland Auto Company, Midland; Van Brunt Automobile Company, Overland, Pope-Hartford; Wallace Automobile Company, Stearns-Knight; Nebraska Regal Sales Company, Regal; Mitchell Motor Company, Mitchell; Andrew Murphy & Son, Kelly truck; Johnson-Danforth Company, Avery truck; Lininger Implement Co., McIntyre; Bradley, Merriman & Smith, Imperial; R. B. Held, Lion; H. E. Frederickson Auto Company, Chalmers.

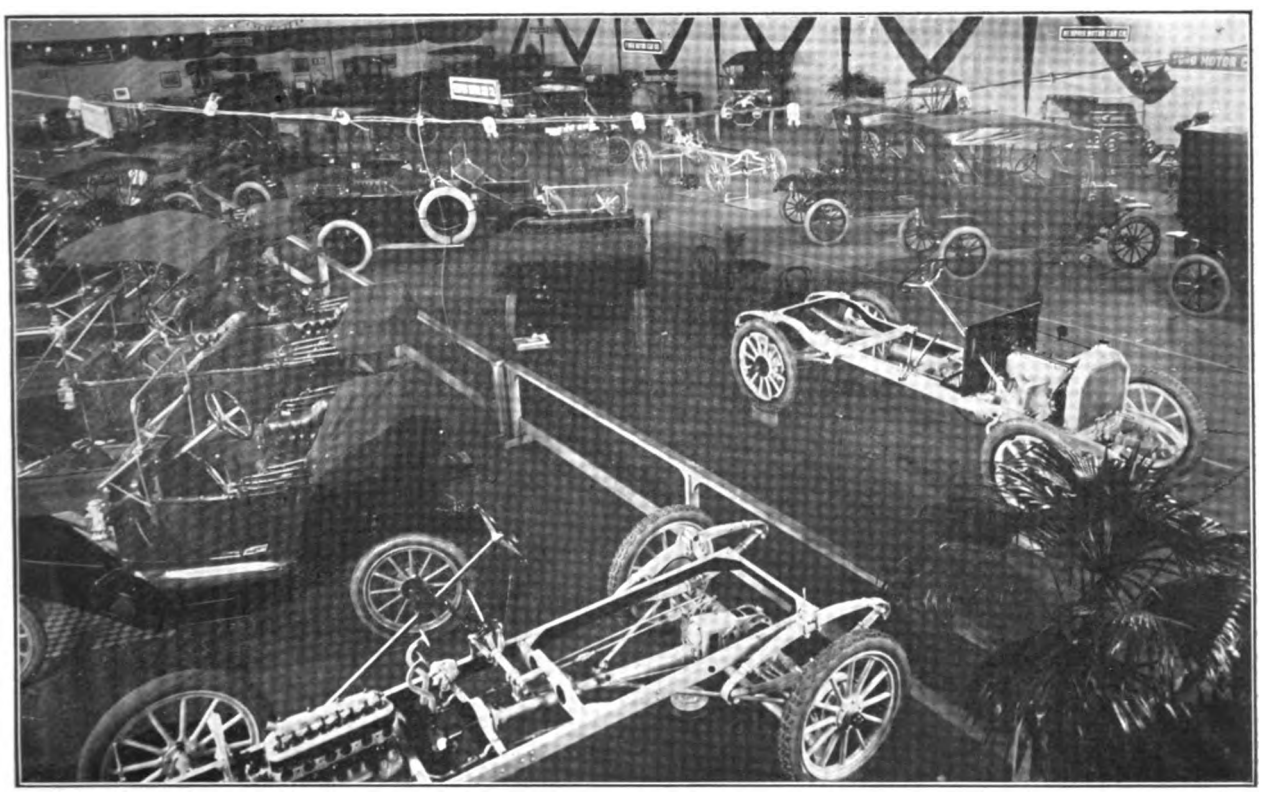
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MEMPHIS CITIZENS INSPECT THE LATEST MODELS.

With over $500,000 worth of cars on display the second annual show of the Memphis Automobile Dealers' Association in the Auditorium, Memphis, Tenn., Feb. 12-17, was one of the most important ever held in the South. A liberal use of bunting transformed the interior of the building, while palms and potted plants were utilized to good effect in making the various exhibits. Over 100 Nernst lights and thousands of incandescent bulbs were employed in the lighting scheme.

Memphis has a total of over 2000 cars in daily use, although Tennessee often is considered as a poor state in which to sell automobiles. The Glidden tourists of 1910 found some sections of the commonwealth with almost impassable roads, but this condition does not apply in the vicinity of Memphis. The association in charge of this show expended nearly $10,000 in staging the display, and the business of the week was sufficient to indicate it was money well spent. The event was under the direction of the following committee: Jerome P. Parker, Aubrey Clapp, W. R. McDonald and Sid. Black, with G. W. Buchanan as general manager. The display was most complete in every way.

Among those who exhibited cars were: Jerome P. Parker-Harris Company, Stoddard-Dayton-Knight, K-R-I-T; Ford Motor Company, Ford; Southern Motor Company, Maxwell; Memphis Auto Company, Packard; Memphis Motor Car Company, Hudson; Evander Williams & Co., Oldsmobile; Vernon Rogers, Jr., R. H. C.; Chickasaw Motor Company, Columbia; W. R. McDonald & Co., E-M-F, Flanders; W. S. Bruce & Co., Abbott-Detroit; McDonald Auto Company, Mitchell; Blomberg Auto Company, Lozier, Bergdoll; E. E. Loving Auto Company, Cole; Baker Electric Company, Baker electric.



How the Various Models Were Disposed in the Auditorium for the Inspection of Memphis People.

SUCCESS MARKS FALL RIVER DEALERS' FIRST SHOW.

Although an automobile show was held in the Casino at Fall River, Mass., last year, that which took place Feb. 12-17 was the first under the auspices of the recently organized Fall River Automobile Dealers' Association. The management was under the direction of William E. Higgins. Although the building is small, it was surprising how many cars could be displayed therein to good advantage.

In transforming the interior, the ceiling was entirely obscured by wide strips of white and lavender. From this were suspended potted palms, while chrysanthemums and other flowers were intermingled with the greenery and gave the touch of color which emphasized the delicate background. The exhibitor's

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spaces were separated by a low railing of green and white tapestry, and strings of mountain laurel.

The list of exhibitors included the following: J. Edward Newton, Stevens-Duryea, Knox, Chalmers, Haynes; Robert W. Powers, Peerless, Pope-Hartford, American, Hudson; Richard W. Tierney, Ford, White, Locomobile; David M. Connell, Overland, Franklin; Albert A. Mills, Chase truck, Briggs-Detroiter; John B. Quinn, Maxwell, Brush; Henry Golden, R. C. H.; Wilfred Cote, Everitt, E-M-F, Flanders; Joseph Fountaine, Buick, Jackson; John Williams, Warren; Byron W. Cottle, Crawford; George N. Durfee, insurance; John B. Quinn, Harley-Davidson motorcycles; Wayne Oil Tank & Pump Company, Wayne storage systems; A. E. Rich & Son, cylinder boring; John Lyons, spark gaps; Standard Wrench & Tool Company, tools; Union Drop Forge Company, sundries; Congdon & Carpenter Company, general accessories; Auto Parts Company, Ford specialties; Jean B. Gaudreau, Indian motorcycles; Borden & Remington, accessories; Valvoline Oil Company, Valvoline lubricants; Waite Auto Supply Company, general accessories.

PITTSBURG ENJOYS ITS BIGGEST AND BEST SHOW.

Although some of the dealers in Pittsburg, Penn., held their display in that city earlier in the month, it appears to be established that the really big event of the year in that city was that conducted by the Pittsburg Automobile Show Association in the Exposition building, Feb. 19-24, under the management of Thomas I. Cochran. In the face of which was believed to be almost certain failure, Mr. Cochran, who was the directing head of the first automobile display ever held in Pittsburg, was able to rally a large number of the dealers to his assistance, and succeeded in presenting the most elaborate and artistic display the city has known.



Thomas I. Cochran, Manager Pittsburg Exposition Show.

In the matter of decorations, the prevailing colors were red, white and gold. Three immense circles, or wheels, 12 feet in diameter, were suspended from the ceiling by electric cables, and the rims and spokes were studded with thousands of electric light bulbs, presenting a decidedly pleasing effect. The side walls were covered with handsome paintings, 23 feet long, presenting scenes from foreign shores and gardens. Another feature was the presentation of moving pictures of some of the more important events in the industry during the past year.

The following displayed pleasure cars: Aaron Deroy Motor Car Company, E-M-F, Flanders; Abbott-Detroit Sales Agency of Pittsburg, Abbott-Detroit; Alco-Pittsburg Sales Company, Alco, Haynes; B. F. Benson, Moon; Buhl-Regal Motor Car Company, Regal; Cole Motor Car Company of Pittsburg, Cole; Columbus Buggy Company, Firestone-Columbus; Correja-Agency, Correja; Craig-Center Auto Company, Republic; East Liberty Auto Company, Paige-Detroit; Federal Motor Car Company, Oldsmobile, Ohio; Forbes Motor Car Company, Inter-State, Stutz, Warren; Great Western Auto Company, Great Western; Halladay Sales Agency, Halladay; Havers Motor Car Company, Havers; Kline-Kar Motor Company, Kline-Kar; Manchester Garage Company, Staver; Paul Marford, Marathon; L. G. Martin, Rambler; Metz Pittsburg Sales Company, Metz; Michigan Auto Company, Michigan; Miller Auto Company, Crawford; A. H. McKellip, National; OttoMobile Company, OttoMobile; Penn Auto Company, Alpena; Pullman Motor Car Company of Pittsburg, Pullman; R. C. H. Auto Company, R. C. H.; Richardson-Neighbors Motor Company, Hupmobile; Selden Pittsburg Company, Selden; State Auto Company, De Tamble, Dorris; Thomas Motor Sales Company, Thomas; E. J. Thompson Company, Fiat; Union Motor Car Company, Penn; Universal Motor Car Company, Lion; Velie Motor Vehicle Company, Velie; West Penn Auto Company, Detroit electric; Williams-Hasley Motor Car Company, Jackson, Mitchell, Clark.

Truck exhibitors included the following: Alco-Pittsburg Sales Company, Alco; Aspinwall Auto & Garage Company, Atterbury; Bessemer Motor Truck Company, Bessemer; Eclipse Motor Truck Company, Eclipse; Federal Motor Car Company, Mais; Harwood-Barley Manufacturing Company, Indiana; Lange Motor Truck Company, Lange, Chase, Dayton; Mack Bros. Motor Car Company, Mack, Saurer; Packers Motor Truck Company, Packers; Pittsburg Automobile Company, Commer; Pittsburg Machine Tool Company, Curtiss; Schacht Motor Car Company of Pittsburg, Schacht; Speedwell Motor Car Company, Speedwell; Union Motor Car Company, Penn; Velie Motor Vehicle Company, Velie; West Penn Auto Company, Kelly.

Accessories were shown by: American Roller Bearing Company, Diamond Metal Garage Company, Doubleday-Hill Electric Company, Duquesne Auto Parts Company, Hoover & Hurst, Jackson Motor Supply Company, John G. Higbee Glass Company, Jos. Woddwell Company, Miles Spring Wheel Company, Motorcycle Exchange, O'Neil Tire Protector Sales Company, Penn Auto Specialty Company, Perfection Auto Lighting Company, Pittsburg Auto Equipment

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Company, Pittsburg Auto Lamp Repair Company, R. D. Nuttall Company, S. & S. Shock Absorber Company, Brictson Manufacturing Company, Union Auto Specialties Company, Walker Shcck Absorber Company, Wayne Oil Tank & Pump Company, Williams & Co., Winterton Manufacturing Company.

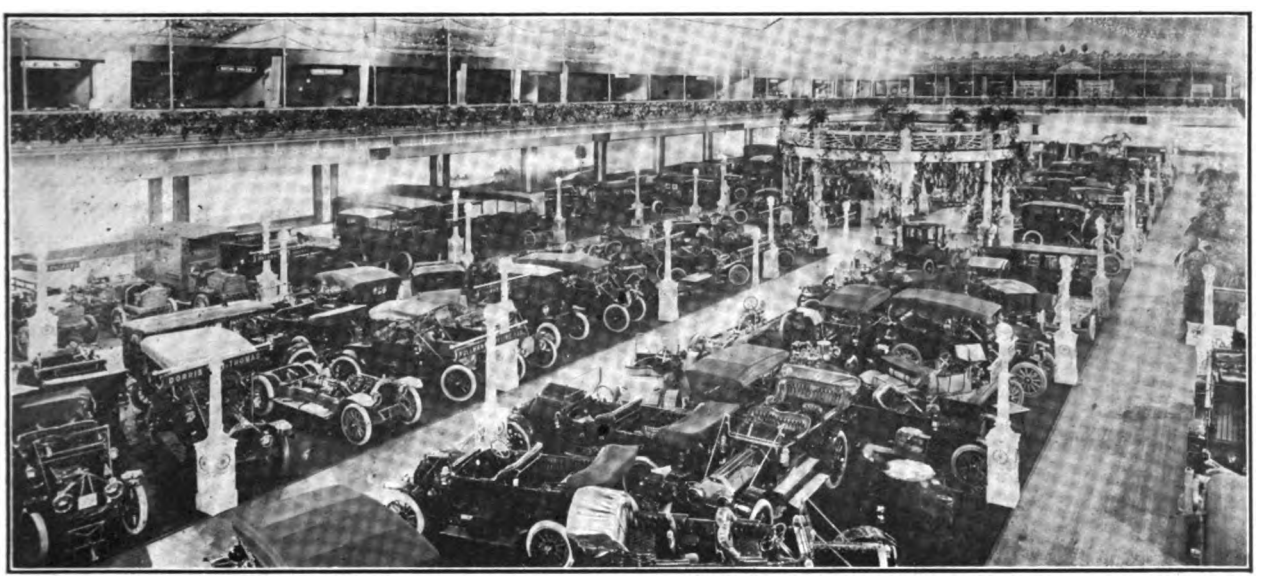
RIVAL DISPLAYS ENGAGE AGENTS IN MINNEAPOLIS.

Two rival displays running at the same time caused something of a stir in automobile circles in Minneapolis, Minn. One was under the auspices of the Minneapolis Automobile Show Association and the management of W. R. Wilmot, in Armory, Feb. 17-24, while the other was in charge of the Minneapolis Dealers' Association in the Auditorium, Feb. 19-22. An admission fee was charged at the former, but the dealers' association presented complimentary tickets for its exhibition.

Both shows were well patronized, and it is suggested that the rivalry will help rather than discourage business. Both shows were neatly decorated and the cars were well displayed. The Auditorium exhibition was marked by the appearance of a number of motorcycles, and trucks were conspicuous at both displays, there being 74 different makes of cars at the Armory and 33 at the Auditorium.

Those displayed at the Armory were: Velie, Ford, Chalmers, Thomas, Paige-Detroit, Case, Speedwell, Bergdoll, Mitchell, Flanders electric, Buick, Stevens-Duryea, Stearns-Knight, Maxwell, Columbia-Knight, Sampson truck, National, Wilcox truck, Detroit electric, Rauch & Lang electric, Lozier, Marion, E-M-F, Flanders, Studebaker electric, Inter-State, Cadillac, Packard, Rambler, Gramm truck, Ohio electric, Reo, Marmon, American, R. C. H., Hupp-Yeats electric, Courier, Waverley electric, Brush, Haynes, Locomobile, Fiat, Lexington, Regal, Westcott, Hupmobile, Pierce-Arrow, Peerless, Columbus electric, Firestone-Columbus, Kelly truck, Winton, Twin City tractor, Motor Wagon truck, Gopher truck, Big Four tractor, Avery truck, Chase truck, Pioneer tractor, Federal truck, Overland delivery wagon, Metz, Cameron, Grabowsky truck.

The makes represented by the dealers' association at the Auditorium were: Everitt, K-R-I-T, Corbin, Amplex, Anhut, Crow-Elkhart, Veerac truck, Babcock electric, Woods electric, Baker electric, Union, Cole, Paterson, Oakland, Premier, Stoddard-Dayton-Knight, Halladay, Elmore, Warren, Abbott-Detroit, Apperson, Colby, Hudson, Jackson, Fuller, Michigan, Nyberg, White, Penn, Midland, Briggs-Detroiter, as well as the following motorcycles: Harley-Davidson, Merkel, Minneapolis, Excelsior, R-S, Wagner, Indian, Yale, Thor.



General View of Main Floor and Balcony Exhibits in the Exposition Building at Pittsburg.

SECOND WESTERN CANADIAN EXHIBIT AT WINNIPEG.

The first automobile show in Winnipeg, Manitoba, last year, was such a splendid success that the industry in Canada and the States has been reaping the benefits ever since. With the increased activity in favor of good roads, it is more than probable that western Canada will present an even more favorable market for automobiles during the coming season.

The second show was held under the auspices of the Winnipeg Motor Show Association in the Palace Garage building, Feb. 12-17. The decorative scheme was modelled after a monster hanging garden. The various exhibition spaces were marked by tall white

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pillars, on top of which were mounted ornamental vases containing potted plants and flowers. Green and white ropes connected the pillars, along the aisles, giving an unobstructed view of the cars and motorcycles on display.

The list of exhibitors was not large, but when it is remembered that very few makes were being represented in this section a year ago, progress made is more evident. Among the cars displayed were: R. C. H. Motor Sales Company, R. C. H., Alpena; Jackson Motor Company, Jackson; Fort Rouge Garage, Hudson, Paige-Detroit; Boyce Carriage Company, Ltd., KisselKar, Brush; Th. Oddson & Co., Rambler; George Duis, Michigan; Walker Motor Company, Maxwell, Columbia-Knight, Paterson; Lion's Garage, White; Canadian Motors, Ltd., Galt.

The exhibit of motorcycles was most complete, including the following: Consolidated Cycle & Motor Company, Indian, Excelsior; Dominion Cycle Company, Merkel, Yale, Flanders; North End Cycle Company, Thor; Winnipeg Cycle & Motor Company, Harley-Davidson, Wagner.

BINGHAMTON AUTOMOBILE CLUB'S THIRD ANNUAL DISPLAY.

For the third time the Binghamton Automobile Club held an annual show in the local armory, Binghamton, N. Y., Feb. 20-24. Besides being a display of the models for the coming season, these annual events take on a society aspect not generally expected. The main drill hall is utilized for the exhibition of motor cars and accessories, while a second portion of the building is employed for dancing and other social events.

The decorative scheme this year was entirely new. A liberal use of vines and colored electric lights transformed the exhibition hall into an open air garden, the sky effect being produced in blue bunting. Palms and potted plants aided in making the dancing room attractive. The attendance was in excess of previous years, and the social feature did not appear to detract from the business side of the venture.

Among the exhibitors may be mentioned: New York Sales Company, Hudson, Cole, Rambler, Paige-Detroit; Lowell, Hammond & Worden, Winton, Stearns-Knight, Marmon, E-M-F, Flanders, Pullman; Binghamton Ford Sales Company, Ford; S. H. Lewis & Co., Maxwell, Columbia-Knight, Franklin, Waverley electric; J. M. Davidge, Pierce-Arrow; R. W. Whipple, Packard; Abbott-Detroit Sales Agency, Abbott-Detroit; Palmer-Singer Agency, Palmer-Singer; Binghamton Cadillac Company, Cadillac; June Automobile Company, Brush, Chalmers, Mitchell; Lewis & Niblett, Reo; S. B. Judd Company, Overland; Purdy & Mix, Hupmobile, Fiat; Broome County Motor Car Company, American; H. W. Brown, Buick, Pope-Hartford, Thomas.

SPLENDID ATTENDANCE MARKS YOUNGSTOWN'S SHOW.

That there is decided interest in the 1912 models in the vicinity of Youngstown, O., was made evident during the opening night of the second annual show of the Youngstown dealers in the Auditorium in that city, Feb. 12-17. Liberal use of electric lights and "Old Glory" served to transform the interior of the building for the event. In every respect it was a successful display, and the crowds came as well to purchase as to examine the various makes on display.

Among the exhibitors of cars were: City Auto Garage, National, Jackson, K-R-I-T, Firestone-Columbus; F. M. Mayberry, Cartercar; J. Ralph Seidner, Warren; Buick Sales Company, Buick; Eddy & Henderson, Overland, R. C. H., Maxwell; Drury-Wells Motor Car Company, Marathon; Viaduct Garage, Everitt; Motormart, Packard, Hudson, Rauch & Lang electric; Elton Auto & Repair Company, Cadillac; Cutting Sales Company, Cutting; Youngstown Auto & Repair Company, Reo, Oakland, Oldsmobile; Youngstown Carriage Company, E-M-F, Flanders, Baker electric, Peerless; Ralph P. White, Cole; Standard Auto Sales Company, Chalmers; F. R. Smith, Rambler, Ford; Leonard & Haynes, Grabowsky truck; Park Auto Sales Company, Michigan; J. C. McClaren, Elmore; McNutt Auto Company, Motor Wagon truck; E. J. Thomas, Kline-Kar.

CONNECTICUT'S BIGGEST EVENT IN HARTFORD ARSENAL.

The importance of Hartford, Conn., as an automobile producing centre is sufficient reason why it should be selected as the location for a state display of motor vehicles and accessories. The Hartford Automobile Dealers' Association has been holding shows in that city for some year, but it always has been handicapped for lack of room. This year permission was granted for the use of the new state arsenal, and the desire of the association to carry out its plan for a state-wide display was gratified, Feb. 19-24.

The management of the event was under the direction of F. W. Dart, E. G. Biddle and W. L. Ledger. These three men solicited the co-operation of the city officials to the extent of securing a special appropriation, and the business men aided in making the week one long to be remembered. All the principal streets were decorated with bunting and flags, and many of the local manufacturers and others made special display of their wares in the store windows.

The interior of the arsenal was transformed into an Italian pergola with lattice work surrounding the four walls, while clusters of grapes, each grape enclosing a tiny electric bulb, were trailed over these frames. A canopy of silk, blue for the dome and white for the side walls, entirely covered the display, and the sky effect was further accentuated by the use

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of electric lights as stars. Heavy bronze shields, on which were embossed a Roman chariot vying with the modern automobile, marked the various spaces.

Pleasure car exhibitors were: Electric Auto Station, Flanders electric, Baker electric; Alpena Motor Car Company, Alpena; F. L. Caulkins, Buick; F. W. Williams, Metz; F. H. Strong, Schacht; Firestone Motor Car Company, Firestone-Columbus; W. W. Wetherell, Stoddard-Dayton-Knight; Columbia Motor Car Company, Columbia-Knight; Winton Motor Car Company, Winton; R. D. & C. O. Britton, Maxwell; Palace Auto Station Company, E-M-F, Flanders, Thomas, Waverley electric, Oldsmobile; J. T. Curtis Company, Sibley Curtis; Dunbar Motor Car Company, Elmore; Knox Automobile Company, Knox; Packard Motor Car Company, Packard; R. M. Spencer, KisselKar; Kilby & Barrett, Matheson, Jackson; Brown, Thomson Company, Stevens-Duryea, Lozier, Cadillac; Capitol City Auto Company, Mitchell; Russell Taber, Reo; J. A. Palquist, Pratt-Elkhart; Andrew Cassky, De Tamble; Fiske Garage, Marion; J. J. & F. Ahern, Abbott-Detroit; New England Garage, Cutting; Miner Garage Company, Pierce-Arrow; Pope Manufacturing Company, Pope-Hartford; Elmer Auto Company, Ford; Carl H. Page Associates, Chalmers; S. A. Foster & Co., Regal, Rambler; Eldree Clark, Paige-Detroit; Fred Reed, National; E. H. Harris, Overland; George L. Kaiser, Empire; George D. Knox, Peerless, Hudson; Corbin Motor Vehicle Corporation, Corbin; Skinner Bros., Stearns-Knight; A. H. Eddy, Cartercar; Buick Garage Company, Buick, Alco, Hupp-Yeats electric; M. T. Bill, Havers; A. D. Scoville, Stanley steam; Fred E. Purinton, Marathon.

Commercial vehicles were represented by: Knox Automobile Company, Knox; S. A. Foster & Co., White; S. A. Miner, Pierce-Arrow; New Haven Truck & Auto Works, Moeller; Hartford Electric Light Company, General Vehicle electric; Packard Motor Car Company, Packard; Pope Manufacturing Company, Pope-Hartford; Buick Garage Company, Buick, Alco; Atterbury Truck Company, Atterbury; E. H. Harris, Overland; Russell Taber, Reo; Elmer Auto Company, Ford; R. D. & C. O. Britton, Federal.

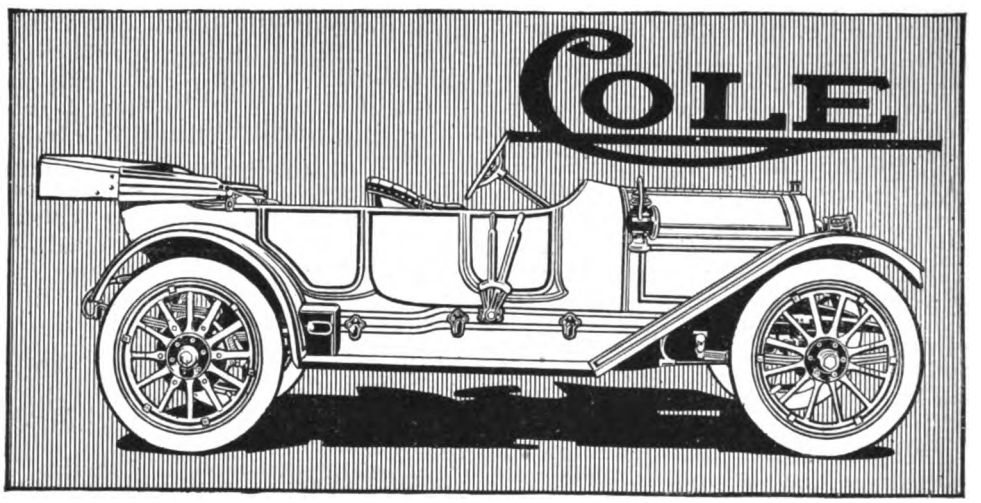
Accessories were displayed as follows: Maxfield Bros., garage equipment; Dahl Punctureless Tire Company, tires; Frisbie Motor Company, engines; Windsor Locks Auto Company, garage equipment; Hartford Auto Parts Company, full line; Todd Rubber Company, tires; Bi-Motor Company, sundries; R. D. & C. O. Britton, general line; Auto Tire Company, tires; Richardson Tire Company, sundries; E. R. Clark, pumps; O. D. Cornell, gas lighting system; Baldwin-Stewart Electric Company, electric supplies; Spencer Turbine Cleaner Company, vacuum cleaners; Universal Auto Repair Company, sundries; Connecticut Oil Company, lubricants; Wayne Oil Tank & Pump Company, Wayne storage systems; Hart Gas Igniter Company, lighting equipment; G. W. Fuller, leather goods; Chas. E. Miller, general line; Post & Lester Company, full line; Alling Rubber Company, tires; G. F. Thomas, vacuum cleaners; Welding Company, autogenous welding; Lathrop Company, sundries; Connecticut Steel & Wire Company, sundries; Finch & Hayes, motorcycles; Smith Worthington Company, leather goods; Aetna Insurance Company, insurance; Blue Ribbon Garage, sundries.



Interior of State Arsenal at Hartford, During Progress of Recent Big Connecticut Show.

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COLE



The Cole Toy Tonneau—Four Passengers.

At the Boston Show

If you attend the Boston Show don't fail to see the Cole models at the exhibit of our Boston Representatives, G. E. & H. J. Habich Company.

The Cole is a perfect combination of stylish beauty and mechanical perfection. An examination of its specifications, size, power and construction will convince you that it is a matchless value at its price---$1885.00.

And back of the Cole is years of satisfactory service to thousands of Cole users.

At every show the Cole exhibit is the center of interest. We feel sure that at the Boston Show it will repeat the triumphant successes it has enjoyed at the New York, Chicago, Philadelphia, Detroit, Buffalo and other shows.

We repeat, if you attend the Boston Show, see the Cole Cars. Our Boston representatives will take great pleasure in explaining and demonstrating the Cole either at their Show rooms or at the Show.

HENDERSON MOTOR SALES CO.

Indianapolis, Ind.

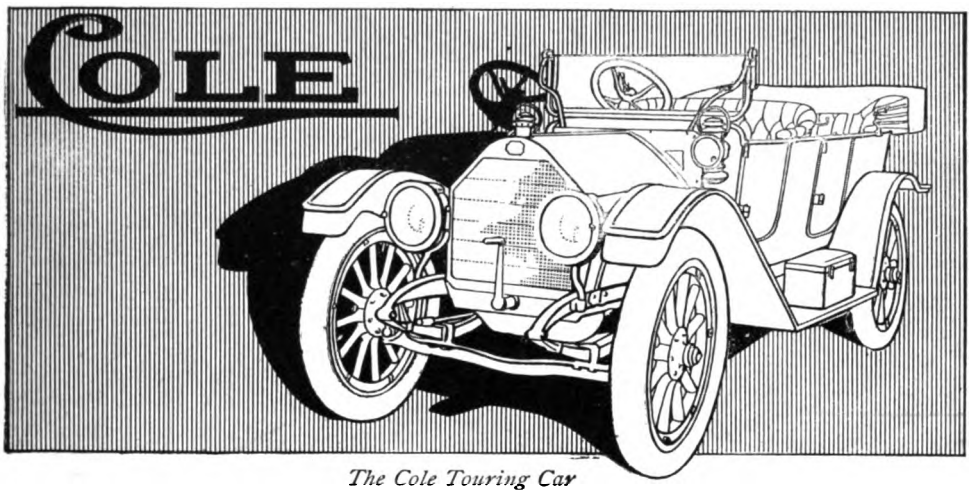
COLT STRATTON COMPANY
2000 Broadway, New York, N. Y.
Eastern Distributors.

G. E. & H. J. HABICH COMPANY.
117 Massachusetts Ave., Boston.
Massachusetts Distributors.

COLE

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COLE



The Cole Touring Car

122-Inch Comfort

The Cole has a 122-inch wheelbase---every inch for comfort. Long wheelbase makes for ease of riding---the same as big wheels do. It smooths out the road "humps."

The Cole 122-inch wheelbase also provides for a large, roomy body. There is plenty of leg room and the seats are big and thickly upholstered. The size and roominess of the Cole lend distinction and elegance to its appearance.

But the Cole is not only big in size. It is big in value. Consider what is offered for $1885.

Self-Starter---the most reliable in the market. Dynamo Electric Lighting---the Ward Leonard System---service guaranteed. Long Stroke Motor (4 1-2 by 5 1-4). Unit Power Plant---enclosed valves; clean, silent. Bosch Dual Ignition. Timken axles front and rear (full floating rear)---demountable rims---36-inch wheels.

All Cole models will be on exhibition at the Boston Show at the exhibit of G. E. & H. J. Habich Company.

HENDERSON MOTOR SALES CO.,

Indianapolis, Ind.

COLT STRATTON COMPANY
2000 Broadway, New York, N. Y.
Eastern Distributors.

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APPARENTLY manufacturers of tires have reached a point where little may be expected in the nature of radical departure from accepted practise in the construction of the tire itself. Continued improvement undoubtedly will result in different methods, with a view to producing a shoe that will withstand better the stresses and strains imposed upon it in service. However, these must be regarded as details of manufacturing, such as the selection of materials and their incorporation in the proper proportions, not easily discernible by the average motorist.

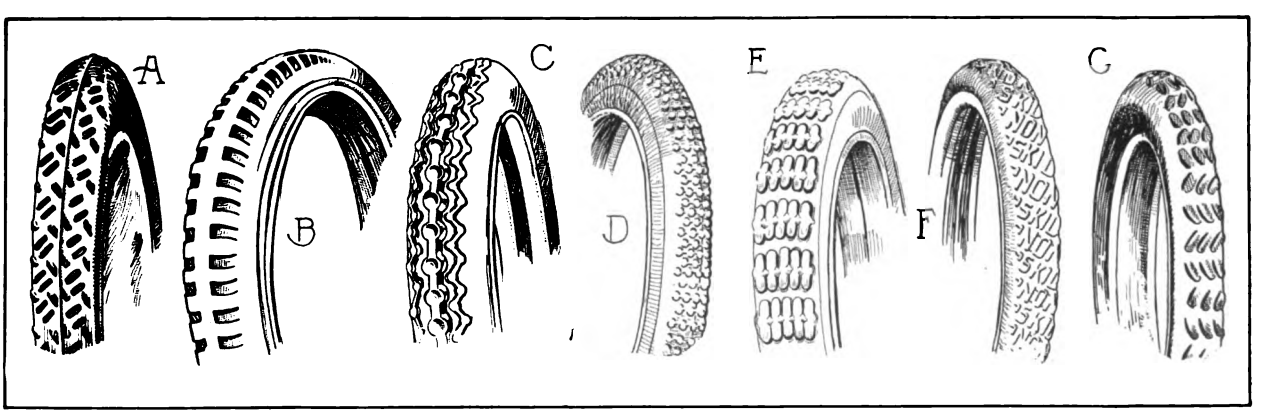
Car owners are beginning to realize that they have an important share in the responsibility for satisfactory tire service. The producers have been waging an educational campaign in the matter of overloading and improper inflation, until the users have begun to take the proper precautions in this respect. In addition car manufacturers are acting in conjunction with the producers of tires in specifying sizes that will have an ample margin of safety. This does not mean necessarily larger wheel diameters, but it is noticeable that several makers are presenting tires of wider section.

Rubber compounds and textile fabrics are the principal materials employed in the manufacture of tires, and as neither of these is especially strong in itself, extreme care is needed in building to insure adequate strength. For this reason every factory has different methods of construction and the compounds, number of layers of fabric, and its strength vary in nearly every instance. Each maker believes that his proportions are best adapted to the requirements of the motorist.

Development of Non-Skid Tread.

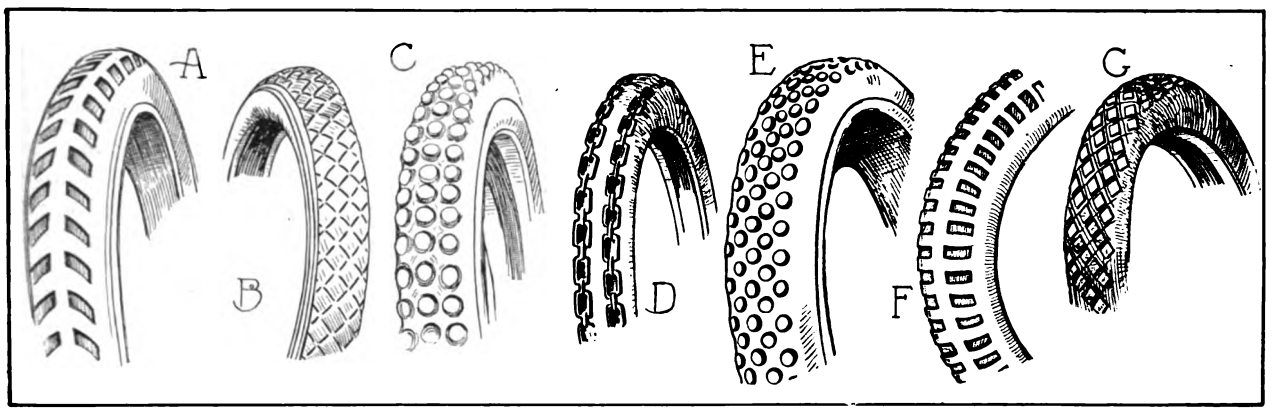
Perhaps the most notable feature of the tire situation at present lies in the development of the non-skid tread. The advantages claimed for all types are much the same. The first requisite is that they shall prevent side slipping, and some companies go so far as to guarantee this. Even when the protuberances have worn away from the contact surface of the tread, there still remains on each side a shoulder, which has a tendency to keep the car on the road. An additional feature is that when the anti-skidding portion has been worn away entirely, there still remains a tire practically as good as a new plain tread shoe.

While few manufacturers make a guarantee as to the mileage that may be obtained from non-skids, it has been pretty thoroughly demonstrated that it takes about 1500 miles to show any appreciable difference in the tread itself. As it is admitted that the tire is then capable of rendering the same service as a plain tread type, it would seem perfectly fair to assume that a tire equipped with protuberances will add at least 1500 miles to the guaranteed mileage of the regular shoe. The result is an indicated economy



New Ideas in Non-Skid Treads: A, Shawmut; B, Seamless; C, Goodrich; D, Kelly-Springfield; E, Diamond; F, Firestone; G, Morgan & Wright.

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Another Group of Anti-Skids: A, Prowodnick; B, Ajax; C, Federal; D, United States; E, Michelin; F, Batavia; G, Goodyear.

in the use of tires with anti-skid treads.

Since it has been explained that each manufacturer believes his method the best and that the difference lies mainly in the use of the compounds or the proportions employed, it will be necessary only to note the various means of bringing out the anti-skidding feature. Reference may be had to the accompanying drawings, presenting a large number of the newer non-skid designs.

Some Distinctive Designs.

The Shawmut Tire Company, Boston, Mass., has a continuous line along the centre of the tread, with small protuberances branching off on either side at stated intervals. In addition similar protuberances are disposed in regular order over the remainder of the tread.

Arrow head indentations stud the surface of the Seamless tread, made by the Seamless Rubber Company, New Haven, Conn., and much the same formation is noted in the Prowodnick, made by the Russian Tire Company, New York City; the Stein lap lock, made by the Stein Double Cushion Tire Company, Akron, O.; the Hardman, made by the Hardman Tire & Rubber Company, New York City; the Security, made by the Batavia Rubber Company, Batavia, N. Y.; and others, although, of course, they differ more or less in the manner in which they are arranged.

In the Goodrich Master tread, the B. F. Goodrich Company, Akron, O., has brought out a new design. It consists of large, round studs running in a straight line along the centre of the tread, while smaller circular studs are placed along the sides of the tire.

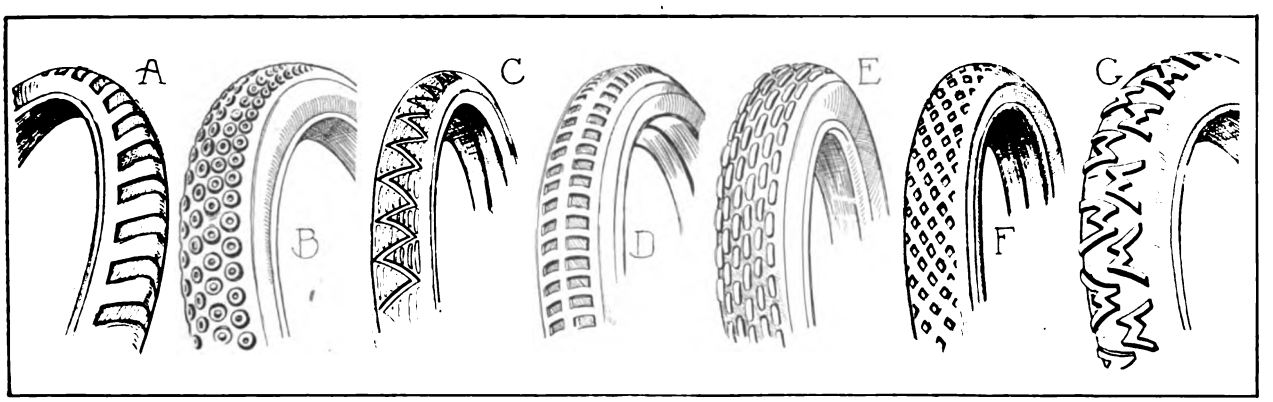
The Kelly-Springfield, made by the Consolidated Rubber Tire Company, Akron, O., is more in the nature of the standard Bailey tread, which is one of the oldest types made in America under license from the original inventor.

The Diamond Rubber Company, Akron, O., presents its new Safety tread, in which rows of studs are run in series circumferentially about the tire.

The Firestone Tire & Rubber Company, Akron, O., utilizes the word "Non-Skid," arranged diagonally over the surface of the Firestone tire, the resulting angles and curves supplying the anti-skid element.

The Morgan & Wright Nobby tread is continued by the United States Rubber Company, New York City, which has taken over the original concern, the three rows of knobs being molded upon the surface of the tread in zig-zag style.

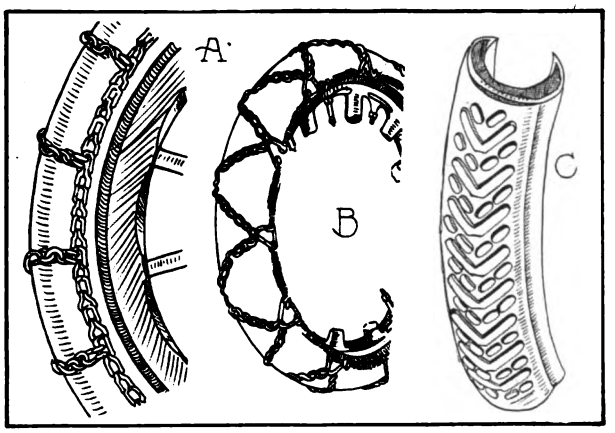
The Ajax-Grieb Rubber Company, Trenton, N. J., has a checkered tread on its Ajax non-skid, the diamond shaped apertures being disposed entirely over



Additional Non-Skid Designs: A, Hardman; B, Pennsylvania; C, Lee; D, Stein; E, Republic; F, Swinehart; G, Miller.

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the surface of the tire. Much the same arrangement is provided in the Goodyear, made by the Goodyear Tire & Rubber Company, Akron, O., although the



Tire Protectors: A, Weed Chain; B, Auto Appliance Chain; C, Standard Tire Protector.

diamond shaped studs are a triffe smaller.

The Federal Rubber Manufacturing Company, Milwaukee, Wis., has brought out a Rugged tread, which resembles the Bailey very closely. There are three rows of studs, those in the centre being shorter than those on the side.

The United States Rubber Company, New York City, has placed in the market a new tire bearing its name, on which the anti-skid feature is produced by protuberances shaped like the links of a chain.

The Michelin steel studded tread is continued by the Michelin Tire Company, Milltown, N. J. This form has been copied widely by American makers.

The Pennsylvania Vacuum Cup tread is still made by the Pennsylvania Rubber Company, Jeannette, Penn. The surface is covered by rows of round studs, and in the top of each stud is a small cup, giving the tire its characteristic name and appearance.

The Lee Tire & Rubber Company, Conshohocken, Penn., presents the Lee, in which a zig-zag line works back and forth over the entire surface of the tread, and different sizes of knobs are disposed between the points of the zig-zag line.

The Republic Rubber Company, Youngstown, O., continues its Staggard tread, in which six rows of studs run circumferentially about the tire, the studs of one row being arranged to overlap the spaces between those of its neighboring row.

The Swinehart Tire & Rubber Company, Akron, O., has a checkered tread, which differs from others of a similar nature, in that the squares are cellular instead of being raised.

Protuberances composed of the letter "M" form the anti-skid features in the Miller tire, made by the Miller Rubber Company, Akron, O.

This is by no means a full list of the non-skid treads presented, but will serve to illustrate the wide diversity of design. It is stated that about 40 per cent. of the total output of the American tire factories may be designated as anti-skids. Their cost is from 18 to 20 per cent. higher than the plain treads. Some factories are making more of the former than of the latter, while one or two report that the production of non-skids runs as high as 60 per cent. of their total product. It would appear that the future is to see a much larger proportion of these.

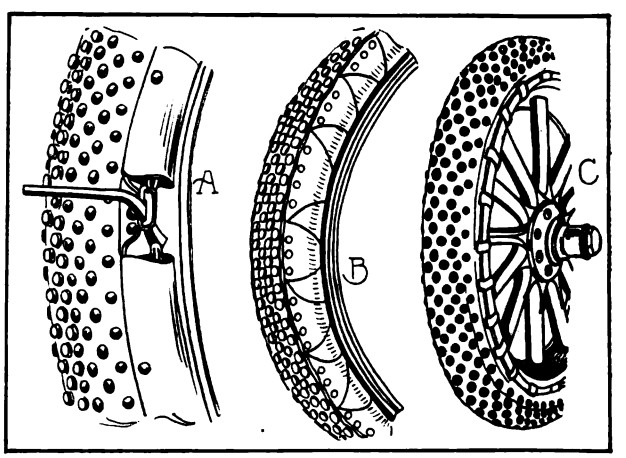
Auxiliary Anti-Skid Devices.

Closely allied to the non-skid tires are the appliances for converting the plain tread types into anti-skid. This is accomplished either by fitting extra treads or by applying tire chains. A few examples of each will be presented.

The Woodworth tread, made by the Leather Tire Goods Company, Niagara Falls, N. Y., is composed of leather in which steel studs are imbedded. This is held in place on the tire by coil springs along the side which are designed to take up all slack and prevent any looseness. The Universal Tire Protector Company's Universal tread is similar in appearance, though the method of anchorage is different. The same thing applies in a measure to the tire protector of the Twentieth-Century Tire Protector Company, Midlothian, Tex.

The Standard tire protector of the Standard Tire Protector Company, Akron, O., virtually is a removable tread, and is made both in the plain and non-skid types. Several layers of sea island cotton and a compound of para rubber are combined in its manufacture, and it is much the same as an additional tread for the regular pneumatic tire.

One of the best known tire chains is the Weed, made by the Weed Chain Tire Grip Company, New York City. This consists of a strand running along each side of the tire, and connected at short intervals by cross chains. In the Auto-Appliance chain, made by the Modern Auto Appliance Company, Chat-



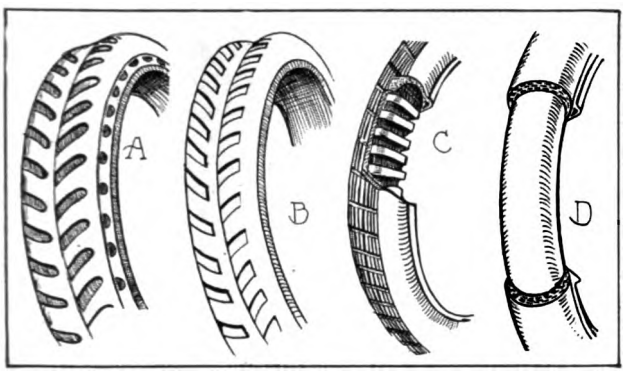
Special Treads: A, Woodworth and Special Tool for Applying; B, Twentieth Century; C, Universal.

ham, N. Y., the cross chains run diagonally about the tire, being held in place at the sides by helical coil springs.

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Quick Detachable Features.

The no-rim-cut feature, which was brought out originally by the Goodyear Tire & Rubber Company,



Special Tires: A, Motz Cushion Electric; B, Firestone Electric; C, Dayton Airless; D, Double-Fabric Interlock Inner Tube.

Akron, O., appears to have gained new converts. In some instances it may be termed a straight edge tire and in others a quick detachable, but whatever the name, the principle is that of providing for attaching to the rim without the clincher ring, so that there is no possible danger of cutting the base of the tire should it be run with less air than recommended.

The Empire Tire Company, Trenton, N. J., is among the concerns which have brought out one of these straight edge, quick detachable shoes. It will be noted from the accompanying illustration that the Empire differs in shape from the Goodyear, although the base fits the rim at right angles, permitting of heavier construction at this point.

The Shawmut Tire Company, Boston, Mass., also has a new tire of somewhat similar design, only this is called a straight edge, or quick detachable U. It is manufactured with wires imbedded in the bead so that the rim fits perfectly when inflated. It differs from the other Shawmut tires only in the type of rim it is made to fit.

Some few firms specialize in the manufacture of tires for electric cars, and among the best known of these may be mentioned the Motz Tire & Rubber Company, Akron, O. This is a cushion tire, made of solid rubber to fit all standard rims on electrics, and is a trifle less in width than is a pneumatic of the same diameter. The inequalities of the road surface are taken up by a series of molded cuts in the sides. The tread is elastic and of a high quality rubber to withstand wear and provide constant and uniform traction.

The Firestone Tire & Rubber Company, Akron, O., also makes a cushion tire for electrics, in which a double or dual tread is employed, with internal cavities at frequent intervals in the base and directly under the tread, so that the full cushioning effect may be gained. This is made either with plain tread or anti-skid as desired.

Tires for Electric Cars.

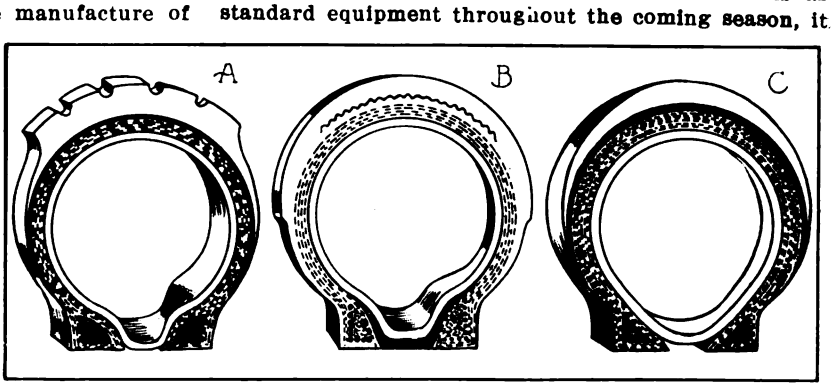
There are some half dozen concerns which continue the production of pneumatics for this class of service, including the United States Tire Company, New York City, with one of the Morgan & Wright lines; Diamond Rubber Company, Akron, O., with the Silvertown Cord tire; the Goodyear Tire & Rubber Company, Akron, with the Long Distance, and the B. F. Goodrich Company, with the Palmer Webb. None of these has undergone important changes.

A tire that is designed for use for either gasoline or electric cars is the Dayton Airless, made by the Dayton Rubber Manufacturing Company, Dayton, O. The carcass and tread are like the ordinary pneumatic casing, but the space usually occupied by the inner tube is taken up with a series of solid rubber piers, separated by air chambers, the former supporting the tread and filling out the side walls.

The stands at the tire exhibits during the present show season display a variety of new things in blowout patches, inner sleeves, tire preservatives, etc., but space does not permit of taking these up in detail. Among the novelties in connection with inner tubes, is the interlock inner tire of the Double Fabric Tire Company, Auburn, Ind. This is made in one piece with no seams or joints, and by a new process in which the bead or tire portion is drawn in at the same time the tread is pushed out, sufficient adjustability being provided to insure a perfect fit. By means of double lapping endless flaps, it is possible for the thickened side portion of each flap to draw past the thinner centre of the bead and form an interlocking bead, which makes the tire self-sustaining and obviates any possibility of the inner tube being cut by the edges of the inner fabric.

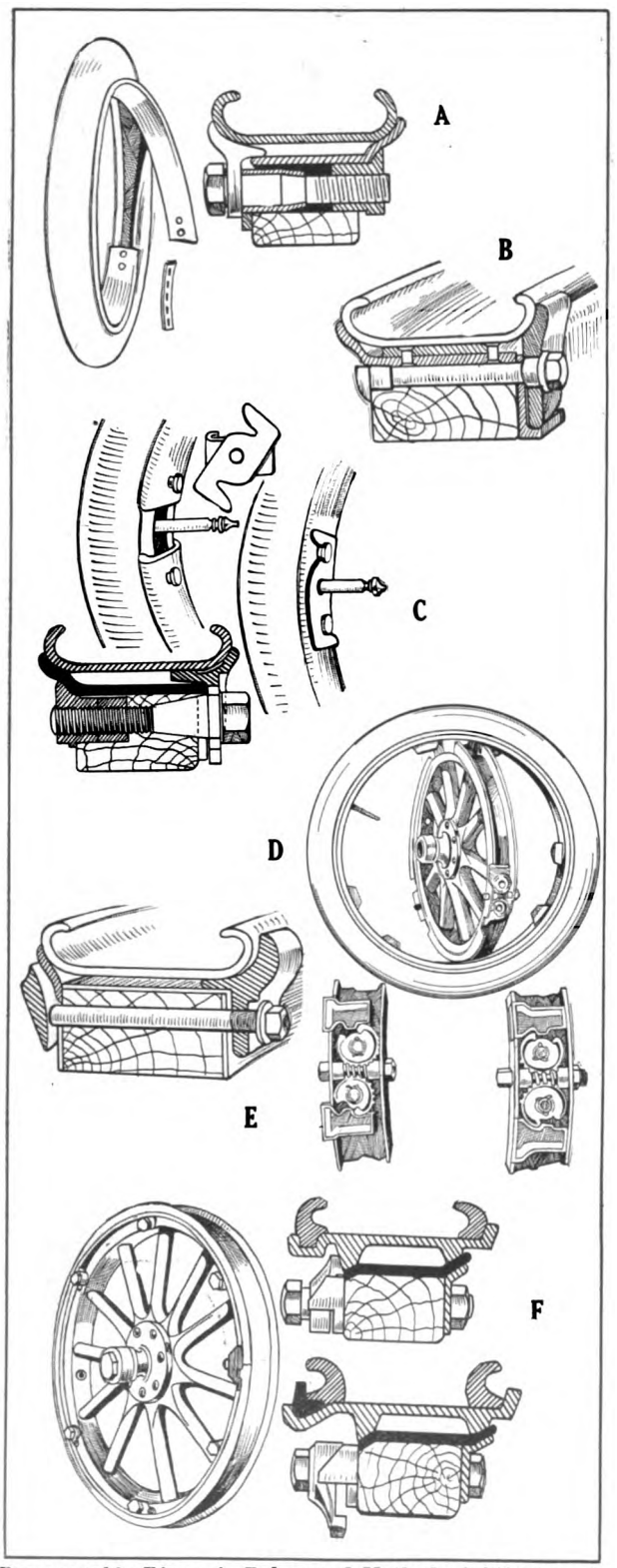
Demountable Rims.

Inasmuch as car manufacturers have displayed a tendency toward the fitting of demountable rims as standard equipment throughout the coming season, it is evident that motorists will be interested more than ever in this section of the subject. Speaking generally, there has been a notable attempt upon the part



New Types of Quick Detachable Tires: A, Goodyear No-Rim-Cut; B, Empire Straight Edge; C, Shawmut Straight Side.

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Demountable Rims: A, Baker and Method of Attachment; B, Cross Section of Empire; C, Detroit Cross Section and Locking Device; D, Booth and Two Views of Locking Arrangement; E, Cross Section of Michelin; F, Standard Universal and Cross Sections of Nos. 1 and 2.

of rim producers to simplify design and reduce the number of parts. In this respect, at least, there has been decided improvement.

Demountable rims may possess the quick detachable feature or not, although this usually is combined, and when that is the case, the rim may be constructed so as to permit the operation of the detachable feature without demounting, or it may be so arranged that it is necessary to take it from the wheel before the tire can be removed. An attempt has been made to divide all demountable rims into four general classes, as follows: Bolted, split rim, expanding ring, and wedge. However, the practise is such that two or more of these features may be found in the same construction.

The Baker, made by the Universal Rim Company, Chicago, combines the bolted, split rim and wedge features. The wedge clamp is attached in such manner that it immediately swings out of the way when the nut holding the bolt in place is loosened. This is accomplished by the use of a bolt on which a collar is pressed. This holds the wedge against the bolt head, but only so far as to permit of its being turned by the brace wrench when the bolt is loosened. The rim is split only for the purpose of quick detachment of the tire, and is held in place by a stud plate carrying four dowel pins, which pass through holes in the rim and into depressions in the felloe.

Rims for Wire Wheels.

The Booth Demountable Rim Company, Detroit, is bringing out a new type of Booth rim for use on wire wheels. This is exactly like that for wooden wheels, with the exception that the rim is drilled for the insertion of wire spokes. This may be described as of the true expanding ring type. The expanding and locking device is placed in the felloe band and three or more are employed on a rim. Two toothed wheels mesh with a worm gear, which is turned by a socket wrench. The teeth on each wheel are cut away about one-quarter of the circumference, forming two shoulders for each, which engage on lugs on the rim so that when the rim is pushed into place on the felloe, turning the worm rotates the wheels so that they engage these lugs and bind the rim in place. The rim is split for detaching the tire, and the locking device consists of a taper pin, which draws the edges of the rim into contact and into alignment vertically.

The Detroit, the product of the Detroit Demountable Rim Company, Detroit, also is of the bolted type, although the rim is split for tire detachment. The chief feature of the design is the construction of the lug or wedge clamp, which is provided with a projection designed to pass under and hold the rim. It is slotted so that when the bolt is loosened the lug will drop and release the rim. A special tool is furnished for drawing the split portion together, and the additional plate in the lock fills the gap when in use.

The Dorian is made by the Dorian Remountable Rim Company, New York City. This is of the bolted

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type, but the detachable feature is permitted by expansion. A wedge clamp and nut are attached permanently to the felloe. The nut passes partly through the clamp and carries a collar, over which a cap is fitted, this being riveted to the clamp and allowing the nut to be turned by a socket wrench, although it is kept from moving away from the clamp. A pin fastened to the lower part of the clamp passes through a plate screwed to the felloe and prevents the clamp and nut from falling to the ground. The split rim is connected by a double jointed hinge, consisting of six rods, pin jointed at either end. A special tool is provided for insertion in the slots, by which the tire is brought away from the rim.

Special Type for Light Cars.

A new Dorian rim has been brought out this year for use on light vehicles. It is of the expanding type, and instead of the hinge is provided with a lock, consisting of a tongue with a downwardly extending end which fits into a corresponding recess in the other portion of the rim. Still another special tool is provided for working this.

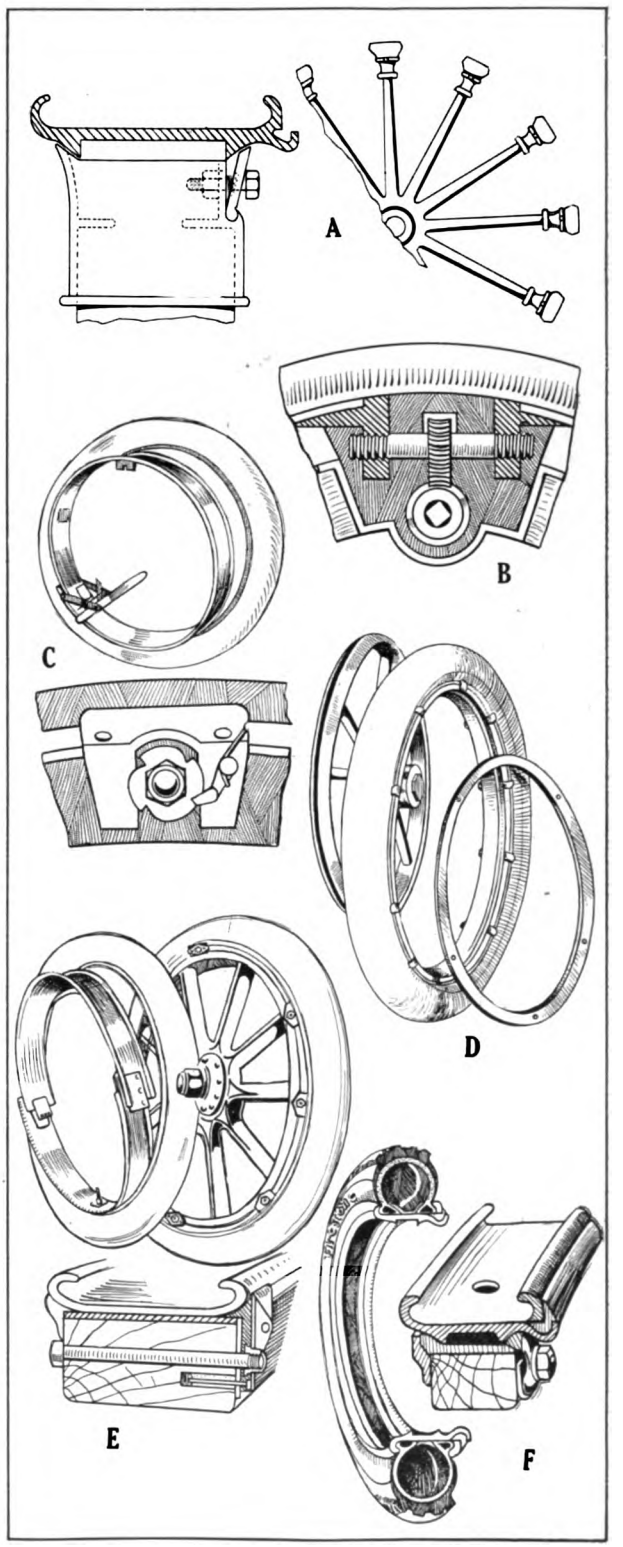
The Empire demountable rim of the Empire Tire Company, Trenton, N. J., is also of the type in which the loosening of a nut on the through bolt permits the wedging lug to be turned out of the way. The nut is provided with a collar upon which rides the wedge clamp, and L shaped pieces are riveted to the felloe band, on which the lugs rest when in place. The new feature is the zig-zag split in the rim for the detaching process, this being locked by a plate screwed on the inner side and held in place by four dowel pins.

The Firestone, made by the Firestone Tire & Rubber Company, Akron, O., is of the through bolt type, in which by loosening a nut a lug is permitted to slip downward from its seat on a plate, releasing a wedge ring and allowing the rim to be slipped off. The clincher side ring has been simplified by the substitution of one pin for two in the locking device. The dual demountable rim for solid or pneumatic tires, brought out last year, has been improved, so as to permit of sliding both tires off at the outside instead of one each way.

The Fisk, designed by the Fisk Tire Company, Chicopee Falls, Mass., for use with its special type of bolted-on tires, offers little change from last year The felloe is bevelled off at an angle of about 45 degrees through half its width. On this fits a band of the same shape and carrying a shoulder on the side opposite to the bevel. This is held in place by bolts passing through the felloe band and through a continuous wedge ring, which has a similar shoulder. This ring is forced up the bevelled side and the shoulders grasp a U shaped channel ring to which the tire is fastened. The Fisk dual demountable also is retained practically without change.

Eliminates Wheel Felloe.

The Gibson is produced by the Newmastic Tire Company, New York City. This is decidedly new and



Demountable Rims: A, Method of Attaching Gibson to Wheel Spokes, Eliminating Felloe; B, Cross Section of Howard Locking Device; C, Lambert and Its Locking Arrangement; D, Fisk Bolted-On Tire and Rim; E, Dorian and Cross Section; F, Two Views of Firestone.

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novel, particularly as both felloe and felloe band are eliminated. On the end of each spoke there is a steel clamp which engages the rim. The outside clip of this has a recess in which a spiral spring is wound around a studbolt. This bolt passes through another clip, the upper end of which serves to clamp the rim into place. When the bolt is loosened the pressure of the spring forces the clip outward and releases the rim. This is designed primarily to be used in connection with tires employing the Newmastic tire filler made by this concern.

The Howard, made by the Howard Demountable Rim Company, Trenton, N. J., is of the expanding ring type. Its action depends upon the spreading of the segments of the ring placed between the rim and the felloe. The rim itself is not split, but in demounting the ends of the ring are brought together so as to present a smaller circumference and permit the rim to be slipped off. Only one bolt is employed, and a lug on the inside of one portion of the ring is brought to and catches in a slot in the other portion for the purpose of locking.

The Lambert is the product of the American Rim Company, New York City. This is of the wedge type, a number of these being welded permanently to the wheel. On the side of the rim are an equal number of plates. At opposite points on the rim two slotted tongue shaped pieces fit into the felloe. These latter are termed dismounting wedges, while those on the rim are known as adjusting wedges. These act in conjunction with those on the felloe band in supporting the rim in place. In mounting, the cap nut is turned by means of a socket wrench so as to engage the thread of a bolt secured to the felloe. This draws the rim on so that the wedges on the felloe band and rim slide over each other and gradually lock in place. On this nut is a ratchet wheel which engages with a pawl under pressure from a spring, thereby locking the nut automatically.

Another Wire Wheel Type.

This concern also has brought out a demountable rim for wire wheels, which presents a slight modification of the above. The single bolt of the locking mechanism is welded to the steel rim in place of running it through the felloe. In all other respects it is the same,

The Michelin, made by the Michelin Tire Company, Milltown, N. J., offers practically no change over the design which has seen satisfactory service in racing and ordinary work for the past five years. The clamping members have a wedge shaped projection which fits between the felloe and the rim carrying the tire. This latter is provided with a series of keys on its underside which fit suitable recesses in the felloe band and prevent the rim slipping back and forth on the wheel.

The Standard Universal is the product both of the Standard Welding Company and the United Rim Company, the former of Cleveland, O., and the latter of Akron, O. This is made in three styles, known respectively as Nos. 1, 2 and 3. No. 3 is the older, in which the nuts and wedges must be removed entirely before demounting is permitted.

In the Standard Universal No. 1, there are six locking clamps, each secured by a bolt passing through the felloe. A nut and washer on the inner edge of the felloe band engage the latter to give it support. A collar on the outer extension of the bolt on the opposite side serves the double purpose of holding the front washer against the face of the felloe and of supporting a seat for the bushing end of the clamp nut. The front washer, which fits over a square shank on the bolt has an outwardly extending lug which acts as a stop and prevents the clamp from being overturned in either direction. The top of the washer is cut off square to receive a square shoulder on the clamp and a bushing nut is threaded to the clamp on the outside and the bolt on the inside.

In locking the rim to the wheel, the mere turning effort of the socket wrench carries the clamp upward to position, and in unlocking, two turns of the wrench will loosen it sufficiently to allow the clamp to be turned on the collar to a position out of the way of the rim. In tightening, the squared portions of the clamp and washer overlap and the clamp nut jams on the bolt collar. Bolts, clamps, nuts and washers remain on the rim at all times and there never is any danger of their becoming lost. The universal feature is provided by reversing the rings so that the rim may be made to take either clincher or straight sided tires.

The Standard Universal No. 2 is identical with No. 1, with the exception of the rim base and locking device. The rim consists of a continuous wedge ring, the inner side of which presses on a flat band on the felloe, which has a similarly shaped extension to fit it. This band is bevelled at its outer edge, and upon it rests the bottom of a U shaped channel rim. The edge of the clamp extends above the felloe, and when tightened, wedges the rim against the inner edge of the band.

Accompanying drawings set forth the important features of these various rims, and in connection with the brief descriptions outlined should make the method of operation clear.

IDEAL PUMP'S EXHIBITION SPACE.

Owing to a rearrangement of some of the exhibition spaces to provide for late entrants for the Boston automobile show, the Ideal Oil Pump & Tank Company, 146 Summer street, Boston, maker of Ideal storage systems, has consented to accommodate the show management by accepting another location than that first assigned. Ideal pumps and tanks will be seen therefore at space 300, department D, instead of at the space mentioned in the company's advertisement on page 27 of this issue.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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WHILE decided progress has been made in perfecting a carburetor which will maintain the proper proportions of gasoline and air at constantly varying speeds of the internal combustion motor, the problem of perfect carburetion has not wholly been solved. That there is a wide variety of ideas concerning this important component of the motor car is manifest by the large number of different designs. This apparent lack of uniformity is due in a measure to the introduction of modifications in motor design, such as variance in the bore-stroke ratio, and a lower grade of commercial gasoline.

The original carburetor, of the surface type, was fairly successful insofar as mixing the gasoline and air was concerned, but the regulating devices required constant changing, these alterations being made in accordance with the engine speed. It was a simple vaporizer, inasmuch as air was drawn through the fuel, or over surfaces wet with it, by suction.

With the introduction of the spraying carburetor, in which the gasoline was reduced to a fine spray or mist before it was mixed with air, the supersensitive feature of the surface device was eliminated as well as the staleness of fuel. Another marked improvement was that it permitted the use of a separate fuel container and one of liberal size. Furthermore, its construction allowed proper proportions of the air and fuel through their respective passage areas because of the same approximate pressure acting simultaneously upon both fluids. Slight errors in proportion also were less noticeable in their effect upon the engine.

Although the early forms of the spraying type obviated the sensitive feature of the surface carburetor, the former at extreme high engine speeds developed too rich a mixture, but this trouble was remedied by the introduction of the automatic carburetor, in which the suction of the engine piston is a factor in operating a spring returned valve. The varying of this pressure, due to the different speeds of the piston, creates a disturbance in the flow of the fluids through their respective passages, and it may be stated that the flow of gasoline will become proportionately greater than that of air with increases in either the frequency or the intensity of the pressure changes, the former causing the greater trouble; that is, if the air and fuel passages be unchanged. This may be explained by the statement that the inertia of gasoline is several times that of air.

The usual method is to regulate these pressure changes by an automatic valve which opens when a certain point is exceeded, and acts indirectly upon the fuel passage, reducing to a certain extent an over supply of gasoline, as it is important that the liquid be completely vaporized, that the ingredients of the mixture be proportioned properly.

Basic Principle Involved.

In considering the vaporization of fuel the basic principle involved is the transfer of enough heat to convert it from a liquid to a vapor. This may be brought about by the transfer of sufficient heat to the fuel, maintaining the air temperature at a certain value, or by keeping the walls of the mixing chamber at a relatively high temperature.

Regarding this vaporization and proper proportions of the ingredients, the manufacturers of modern carburetors have incorporated features which make for easy starting; accessibility of adjustments, either on the device itself or by dash control, and independent adjustments for low, intermediate and high speeds. Refinements of these features are noticeable in the design of the carburetor during the past year, as well as improvement in the material used.

The low grade commercial gasoline is responsible perhaps for the increase in number of hot air devices whereby heated atmosphere is led into the mixing chamber—a distinct aid in starting. Some makers of the water jacketed carburetor have adopted the hot air method which usually consists of heat taken from the exhaust members. It may be stated, however, that this is not entirely new, it having been in vogue several years ago.

No Radical Changes Noted.

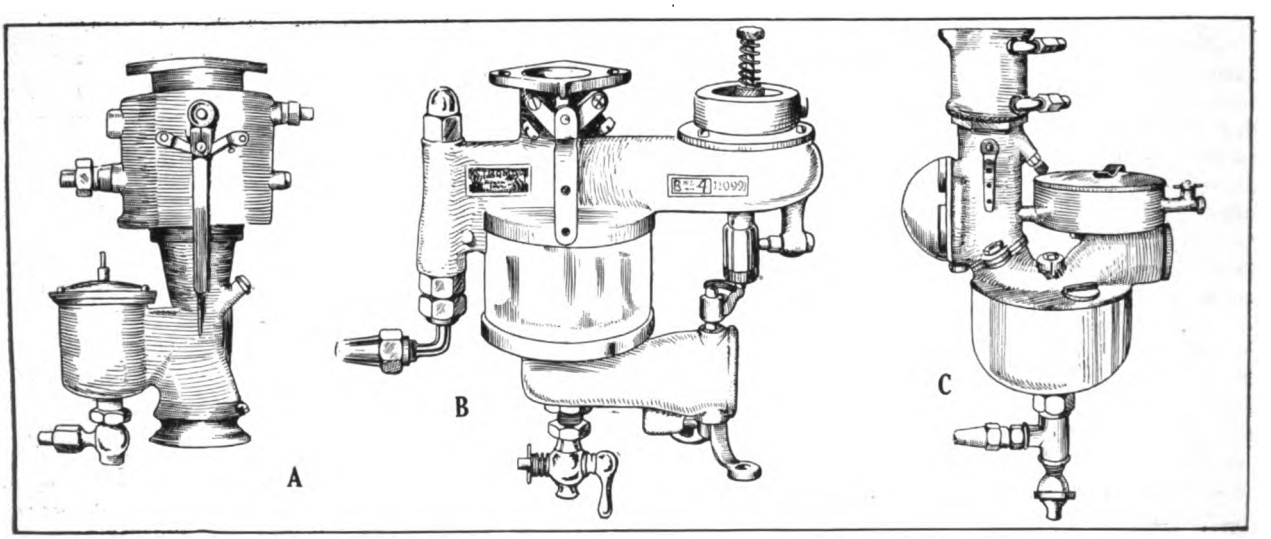
Considering the 1912 carburetor it may be said that no radical changes are to be noted. During the past year a number of makers have moved the adjusting means from the bottom and sides to the top, and

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these with the separate controls for the different speeds, appeal to the motorist who makes his own adjustments. Dash control has many followers this season and while this is not in the nature of a necessity, it is a refinement, inasmuch as it facilitates starting as well as aids in securing a proper proportion of air and fuel without the operator leaving the seat. The use of better material is noted, extruded metal replacing the casting, and all-steel needle valves instead of steel tipped brass members are finding favor.

The types of carburetors may be divided into three classes, namely: Concentric, offset float and the non-float. The first two utilize either a cork or metallic float, the latter made generally of spun brass, while the non-float relies upon a ball check to regulate the flow of fuel from the tank.

Some makers believe in other means than the suction of the motor to control the flow of gasoline to the float chamber and utilize a cam or some other device to raise automatically the needle valve, while others adopt the multiple jet. With the latter system two or more are used, this depending upon the speed of the motor.



Carburetors: G. & A., in Which Auxiliary Air is Regulated by Balls; B, Stromberg, Featuring a Starting Device; C, Excelsior, Having a Ball Governed Venturi Tube, Clock Spring Controlled Air Valve and Graduated Setting Attachment.

G. & A.

An ingenious system comprising 12 balls of different sizes governs the auxiliary air supply of the G. & A. carburetor, made by the G. & A. Carburetor Company, New York City. The number and sizes of the spheres lifted are governed by the speed of the motor and the suction of the piston. The float chamber is set to one side of a well formed Venturi tube in the throat of which is located the outlet of the fuel discharge nozzle. This tube forms the main air intake to the motor, and the air passing through it picks up the fuel. A new feature is a valve for starting, this cutting off the air supply.

Stromberg.

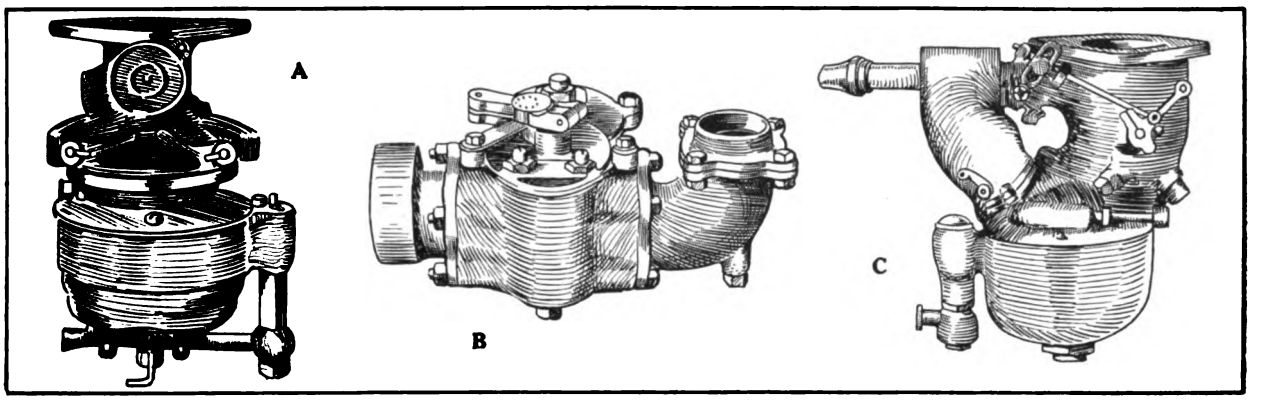
The use of the heavy glass float chamber, one of the unique features of the Stromberg carburetor, made by the Stromberg Motor Devices Company, Chicago, is retained this year. It is made in three types, A, B and C, A being the original to which many refinements have been added. Both A and B employ the single spray nozzle, but a double jet is utilized with C, which is designed for six-cylinder motors. Separate adjustments are provided for low and high speeds. The changes in these carburetors include the addition of a dust proof cap over the float chamber, the removal of the gasoline level regulating device from its position over the float chamber, and the fitting of a hot air horn and starting device. The latter consists of a valve in the horn which is closed by means of a lever operated cam.

Excelsior.

The Excelsior carburetor, manufactured by the Excelsior Needle Company, Torrington, Conn., presents interesting features inasmuch as a ball governed Venturi tube is fitted and the air valve is controlled by a clock spring; these with the device for adjustment contributing to the success of the vaporizer. The spray nozzle is located in the Venturi tube passage and the amount of opening is regulated by a needle valve. The outlet of tne Venturi is restricted by the ball and at low speed the area around the member is very small, obstructing partially the flow of air, lessening the suction on the spray nozzle and consequently diminishing the amount of fuel drawn into the mixture. As the speed of the motor increases, the ball is lifted proportionately. The auxiliary air valve is controlled by a finely tempered clock spring, housed in a dust proof case, proportions the air accurately and is adjustable.

A feature which will appeal to motorists is that

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Carburetors: A, C. R. G., Incorporating Three Fuel Jets and Jet Passages; B, White & Poppe, English Vaporizer of Many Refinements; C, Marvel, with Initial Air Port at the Bottom.

the fuel adjustment is obtained by exact figures. The knurled head of the adjusting device is calibrated and numbered and the carburetor is set according to a table of figures compiled by the company. The arrangement is such that six different positions are obtainable. Another feature is a visible fuel level; that is, by removing an inspection cap the height of the float may be noted readily without removing the carburetor. The float is of brass, concentric with the spray nozzle and maintains a level constantly. A lever is provided for closing the air valve, facilitating starting in cold weather. The Excelsior is made in the water jacketed form or without.

White & Poppe.

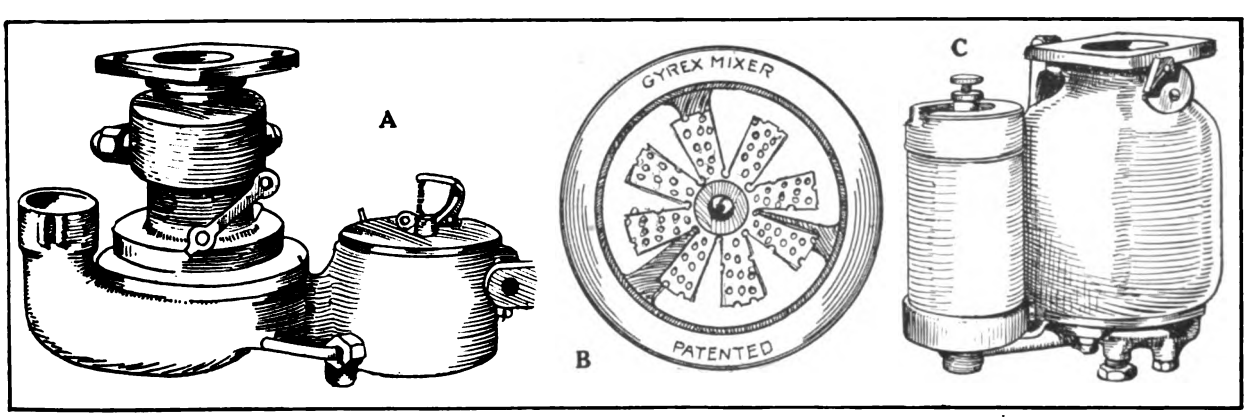
The White & Poppe, an English carburetor for which the Sarco Engineering Company, New York City, is the American representative, presents two notable changes in the 1912 design. The slight whistling noise which is noticeable when the throttle of carburetors is partially open, has been entirely eliminated by the fitting of two corrugated plates which deflect the stream of air. The second improvement is the introduction of what is known as an acceleration lever, consisting of means whereby the admission of air to the mixture can be adjusted to a very great nicety. The extra air is taken through the spindle of the throttle sleeve, the cam valve controlling the air being attached to the throttle lever, and revolving with it. In addition to these adjustments, the original one of altering the relation of the air port to the inlet port by a lever on the cover of the throttle chamber is still retained. The White & Poppe is of the float feed type and fitted with a hot air attachment which is heated by the exhaust.

C. R. G.

Three fuel jets, the passages of which are of the Venturi form, are the feature of the C. R. G. carburetor, made by the C. R. G. Manufacturing Company, Saugus, Mass. The three tubes are nested together and surrounding them is the float chamber. All three tubes open into an upper chamber attached to which is an outlet passage fitted with a butterfly throttle valve. A cam turns with the throttle spindle, and permits the progressive communication of the Venturi passages with the chamber containing the throttle.

Marvel.

The new model Marvel carburetor, made by the Marvel Carburetor Company, Indianapolis, Ind., takes initial air through a port at the bottom of the float bowl, and the atmosphere drawn in acts upon the fuel discharged from the spraying nozzle which is adjustable. The main mixing chamber is of U form and a



Carburetors: A, Mayer with an Offset Float Chamber; B, Gyrex, a Device for Facilitating Mixture; C, Newcomb, in Which Is Incorporated a Novel Proportioning Device.

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butterfly valve is incorporated to deflect the air entering the main port down around the nozzle. The valve is controlled by a special double spring which permits the admission of additional air when the motor is operating at speeds and under load.

Holley.

The Holley carburetor, the product of Holley Bros. Company, Detroit, utilizes a double jet. The main member is within the Venturi passage and uses a needle valve with hand adjustable features. The second jet is in the seat of the auxiliary air valve and when the latter is lifted by the suction of the engine, due to high speeds, additional fuel is drawn in.

Mayer.

Compact in design and simple in construction is the Mayer carburetor, made by the Mayer Carburetor Company, Buffalo, N. Y. The gas lever is controlled by means of the usual cork float. A single air intake pipe is fitted with a horn for the attachment of a hot air tube, the warm air being led into the carburetor at the bottom and passing around the spraying nozzle. The float chamber is offset from the mixing member, and the latter contains an air valve so arranged with reference to the position of the nozzle outlet that as the suction of the engine increases the action upon the nozzle becomes proportionately less than upon the air passing the valve.

Newcomb.

The Holtzer-Cabot Electric Company, Brookline, Mass., maker of the Newcomb carburetor, presents novel features, inasmuch as proper proportions of the ingredients are obtained by measuring. Surrounding the nozzle is a form of valve which seats over an opening concentric with the nozzle through which the entire air utilized is caused to enter. The valve arrangement is practically a cylinder having a closed top and bottom, and enclosing the nozzle within it. The top wall carries a rectangular needle of tapered section, which lifts the valve and controls the fuel. Means for adjustment are provided by an annular ring.

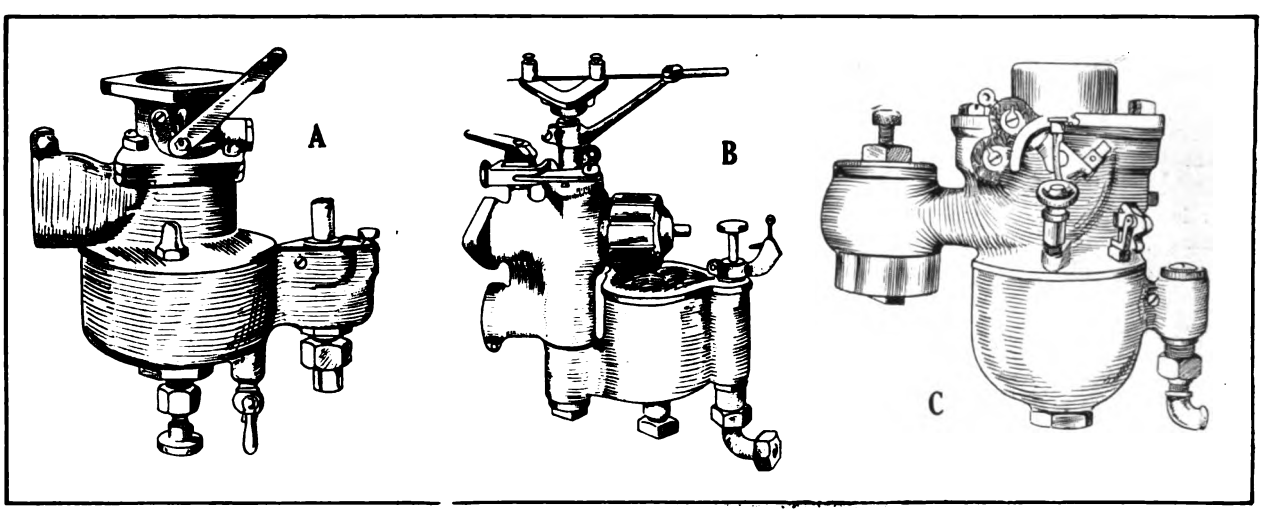
The Gyrex.

The Gyrex, made by the Royal Equipment Company, Bridgeport, Conn., is too well known to need very much in the way of description. It consists of a small bronze helical wheel which is placed in the intake manifold and the blades of the wheel are perforated with a large number of small holes. The gas in passing through the intake pipe imparts motion to the wheel, thus cutting and breaking up any of the globules of gasoline which are very apt to be present. In addition to perfecting the mixture it effects an economy of fuel. This is not a carburetor, but a device to assist in proper carburetion.

Rayfield.

Economy in fuel, reliability in varying temperatures and an increase of power are the features emphasized by the Findeisen & Kropf Manufacturing Company, Chicago, maker of the Rayfield carburetor. It is produced in two types, D and F; is compact in design, and proper proportioning is obtained by automatic means. The high and low speeds operate independently of each other—a desirable feature. The nozzle through which the fuel is discharged is of novel construction, the outlet area being controlled by a movable sleeve by means of which the amount of fuel may be regulated according to the demand. The spray nozzle is actuated by an adjustable cam on the end of the throttle spindle.

In addition to this control, one of the air passages is fitted with a butterfly connected with the throttle so that they move in a fixed relation with each other. The automatic air valve is provided with a spring latch adjustment. The regulating means are all near the top of the carburetor, and a dash adjustment for air is a 1912 feature. The float chamber is easily



Carburetors: A, Holley, Utilizing a Single Air Opening; B, Rayfield, a Compact Design in Which Proportioning Is Obtained by Automatic Means; C, Schebler, Equipped with a Cam-Actuated Needle Valve.

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accessible by removing the screws which retain the dust proof cap. Model D is water jacketed.

Shain.

Utilizing a ball to regulate the gasoline supply instead of a float, the Shain ball spray carburetor is unique. The device, which is made by Charles D. Shain, New York City, automatically shuts off the supply of fuel by the ball seating. It is lifted by the suction of the piston and the quantity of air is regulated at all speeds, accordingly. The ball sprayer revolves, due to the action of the fluid beneath it, throwing up a fine spray, which the air passing through 10 ports vaporizes.

Schebler.

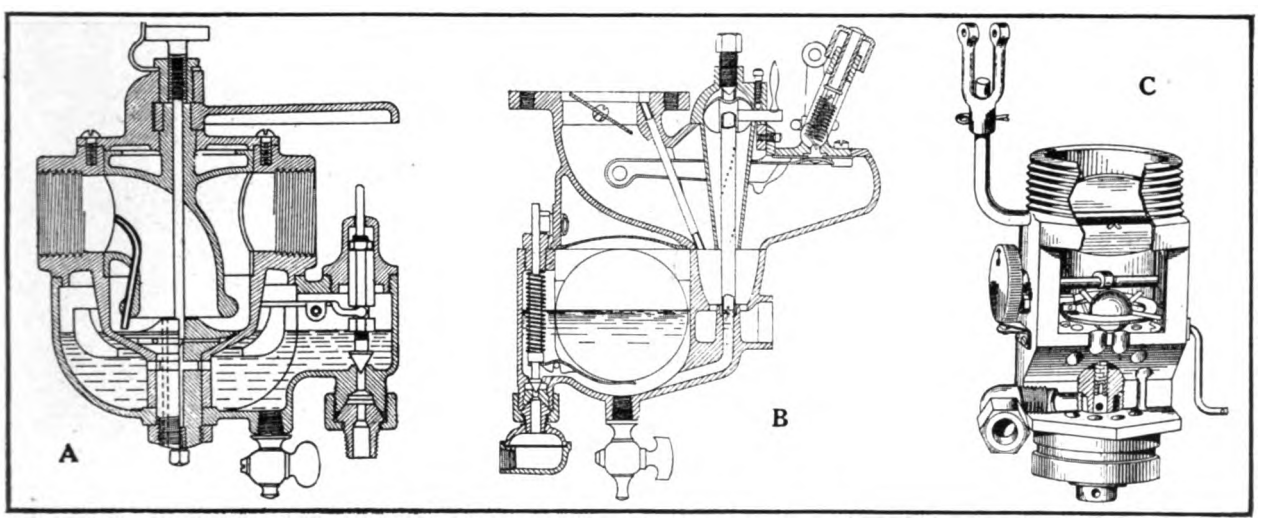
A feature of the Schebler carburetor, manufactured by Wheeler & Schebler, Indianapolis, Ind., is that the needle is raised at the same time as the opening of the throttle, this being brought about by a rocker or bell crank lever carrying a roller which bears against the throttle arm. When the throttle is opened the needle valve is lifted from its seat, augmenting the amount of gasoline. Several types are manufactured, that known as L having several new features, including an interchangeable air valve, standard needle valve and a device for facilitating starting. The intermediate and high speed dials are numbered, making adjustment easy. The low speed is set by means of a knurled nut which is securely held by a boss.

Krice.

A feature of the Krice carburetor, made by the Krice Carburetor Company, Detroit, is the annular spraying principle utilized in mixing the liquid fuel with the air. The gasoline enters the mixing chamber from the float through horizontal ducts and a vertical duct whose opening is regulated in size by a needle valve and annular crevice. The latter is exceedingly small so that the emerging fuel spreads out in a film and creeps up the walls of the mixing chamber instead of being sprayed. The air sweeps down over the walls and basin of the chamber absorbing the liquid and converting it into vapor.

Carter.

The Carter carburetor, manufactured by the Carter Carburetor Company, St. Louis., Mo., employs a ball float and is of the multiple jet type. When a partial vacuum is created by action of the piston, air is drawn into the main opening and up through a circular opening around the lower end of the jet tube. Fuel is drawn through the lowest or primary jet and strikes the surrounding wall of the seat of the jet tube imparting a whirling motion. Upon opening the throttle additional air enters through an auxiliary air port and funnel. The fuel rises in the jet tubes and sprays out through the upper members. The number of jets engaged varies with the speed of the motor. An air dash control is fitted and the 1912 improvement is an improved type of air valve.



Carburetors: A, Krice, with Annular Spraying Device; B, Carter, Utilizing a Ball Float and Multiple Jets; C, Shain, with Float Replaced by a Ball.

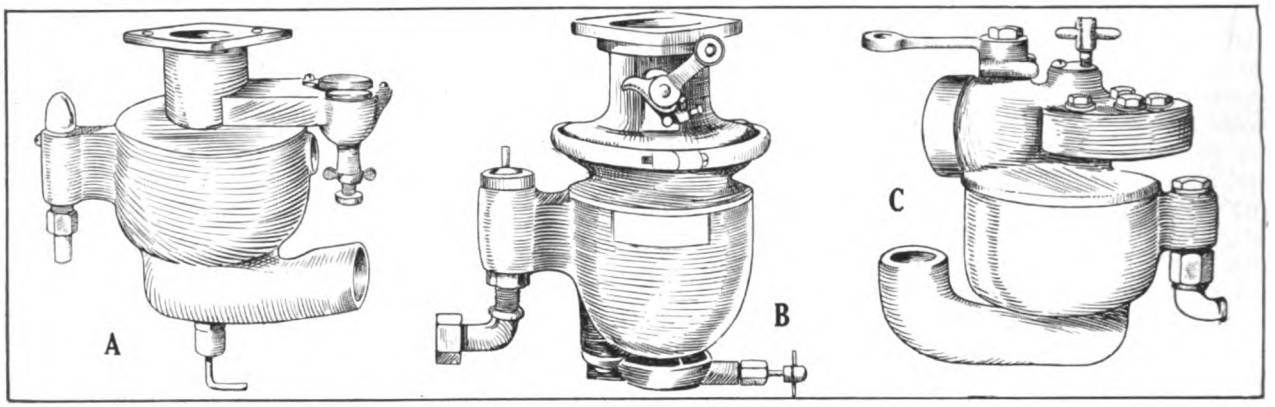
Bowers.

In the Bowers carburetor, produced by the Gilbert Manufacturing Company, New Haven, Conn., the initial air enters through a fixed opening in the bottom, and passes through a Venturi constriction in the throat of which is located the spraying nozzle, which is adjustable. Surrounding the outlet of the Venturi tube is a flat circular chamber divided horizontally into two parts by a partition wall into which the end of the tube fits. The lower part of the flat chamber is open to the atmosphere through several openings and others also are provided in the partition. Over these latter are arranged flat valves of spring brass, fastened at one end.

Columbus.

Triple air supply is the feature of the Columbus carburetor, made by the Columbus Carburetor Company, Columbus, O. One of the air passages is at

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Carburetors: A, Columbus, Featuring Three Air Passages; B, Bowers, with Partitioned Mixing Chamber; C, Kingston, Employing Concentric Arrangement of Float and Mixing Chamber.

the centre of the bottom of the device and the atmosphere passes through a constricted passage in which is located an adjustable fuel nozzle. The second supply is by means of balls seated over openings in a flat chamber while the third source is a horizontal branch of the main mixing chamber and contains a small valve, this being utilized only at high engine speeds.

Kingston.

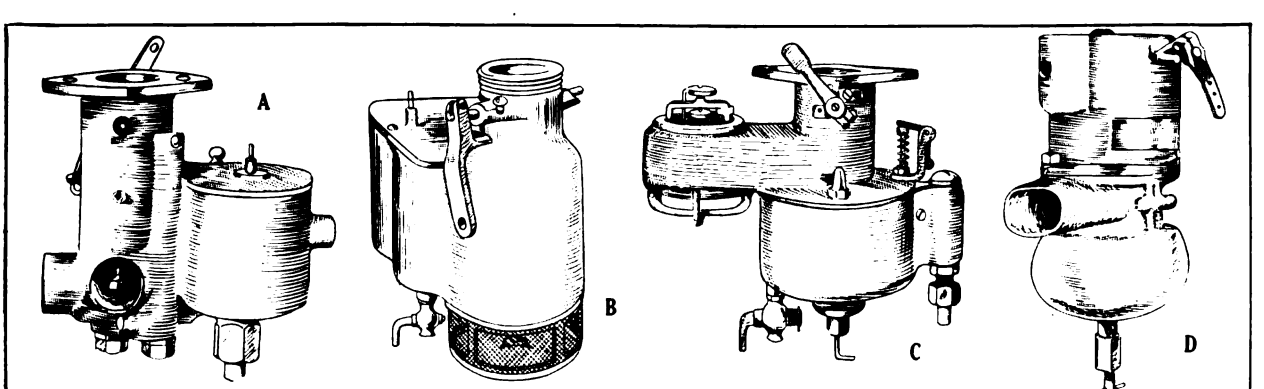
The Kingston carburetor, made by Byrne, Kingston & Co., Kokomo, Ind., employs a concentric arrangement of the float and mixing chambers. The former is of cork and governs the supply of fuel by means of a lever pivoted in the body of the instrument, controlling the needle valve in the fuel intake pipe. The initial air port surrounds the centrally located fuel nozzle, and is of constricted Venturi form. The auxiliary supply of air is governed by five balls located in the upper part of the carburetor. The adjusting devices placed on the top of the device offer the principal refinement in this design.

Krause.

A unique air valve is one of the features of the Krause carburetor, made by R. F. Krause, Cleveland, O. Around the bottom of the mixing chamber is a large gauze covered opening through which all the air used enters. The mixing chamber is located at one side of the float chamber, and standing vertically in its centre is the fuel nozzle. Surrounding the latter and concentric with it is a nest of five valves. These, with the exception of the topmost and inner one, all have the same outer diameter and are guided by vertical ribs in the main mixing chamber body. They are all gravity controlled, and have progressively decreasing inner openings, which the suction of the piston opens.

Zenith.

Of French origin is the Zenith, handled in this country by the Zenith Carburetor Company, Detroit. It utilizes a single Venturi shaped air passage in the throat of which is located a compound nozzle, comprising a central fuel jet of ordinary form and a concentric tube which forms a second nozzle of annular form surrounding the first. Both communicate directly with the fuel chamber, the flow being controlled by a calibrated hole in a plug. Ordinarily both nozzles supply fuel to the air passing their outlets, but as the maximum demand is approached the discharge from the annular member automatically diminishes in correct proportions because of the nature and positions of its supply passages.



Carburetors: A, Zenith, a French Design Now Made in This Country; B, Krause, Possessing Unique Air Valve; C, D. B., with Conoidal Tube Around Fuel Nozzle; D, Stewart, with but One Moving Part Besides Float.

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D. B.

In the D. B. carburetor, manufactured by the Detroit Motor Casting Company, Detroit, the float chamber is arranged concentric with that of the mixing member, a conoidal strangling tube surrounding the nozzle and serving to give a high air velocity past it. The nozzle is adjusted from the bottom of the vaporizer, and the passage in which it is located is in line with the outlet passage in which is incorporated the butterfly throttle. The supplementary air valve is arranged with a vertical spindle at the outer end of a horizontally extending passage.

Stewart.

The Stewart Precision carburetor, brought out last year by the Alfred C. Stewart Machine Works, Los Angeles, Cal., remains unchanged for 1912 except that a hot air device is added for those who prefer this method of heating. There is but one moving part, aside from the float and throttle valve, and that is controlled by gravity. The float chamber is at the extreme bottom of the carburetor and concentric with it, and arranged somewhat above it is the guide for the air valve. The latter controls the entire amount of air used. The upper portion of the valve body is conical and seats upon the carburetor body. Formed with it are air passages leading past the nozzle in such manner that a portion of the air becomes carbureted. Suction of the piston lifts the valve.

KAISER'S SIGNAL ON VELIE.

A replica of the official automobile horn used by Kaiser Wilhelm of Germany has been presented to Harold D. Bornstein of the Velie Boston branch, and will be displayed by that company at the Boston show. This horn will be used on the official car of Prince Adelbert, the third son of the Kaiser, upon his forthcoming visit to Boston. It plays a distinct tune and is permitted to be used in the city of Berlin only on motor cars owned or driven by members of the royal family.

JERICHO HORNS IN COURT.

The experiences of two members of the Automobile Legal Assocation, which recently were haled into court for alleged violation of the Massachusetts law respecting the use of automobile horns which make a harsh, unreasonable or objectionable sound, will prove of interest to other motorists. Both owners utilized Jericho horns, made by the Randall-Faichney Company, Boston.

The cases were placed in the care of William A. Thibodeau, counsel for the association, who explained to the court the mechanical construction and operation of the Jericho, with the result that the court was convinced that its operation did not violate the statute. Both defendants were discharged.

A similar ruling was secured recently in the Roxbury district court, and it is now regarded by Mr. Thibodeau as definitely settled that the use of Jericho horns is not in violation of the Massachusetts law.

UNITED STATES MOTOR AFFAIRS.

According to a report of President Benjamin Briscoe of the United States Motor Company to the stockholders of that concern, the directors have decided to pass the dividend payable in February. It is explained that this action is taken in order that the working capital of the company may be devoted to taking care of the largely increased business.

The report states that during the first five months of the fiscal year the number of cars sold was 6512, as compared with 4483 for the corresponding period of the previous year. This is an increase of 45 per cent. The company also has contracts with 1503 dealers as against 1403 last year. The number of cars contracted for is more than 25 per cent. in excess of the number contracted for at the same time last year. In addition the accounts payable for merchandise are almost $1,500,000 less than it was six months ago. President Briscoe sees every reason to believe that the affairs of the company are in much better condition than ever before and that the action of the directors is wise under the circumstances.

HEATH'S AUTO AND TIRE SHOP.

Somewhat in the nature of an innovation is the auto and tire shop, recently opened at 2000 Massachusetts avenue, Cambridge, Mass., by S. Clark Heath. While automobile repair work occupies the attention of experienced repairmen, who make a specialty of producing work of the highest order, unusual attention is paid to the matter of tire replacement. In this field, casings or tubes are called for and delivered without extra charge, and the same degree of attention is paid to this part of the business as to the other. Included in the new equipment are a steam vulcanizing plant and other modern applicances for work on tires.

A SPLITDORF MAGNETO A MINUTE.

A magneto a minute is the record at the laboratory of C. F. Splitdorf, New York City, where special factories are devoted to the production of the functioning parts of the well known Splitdorf instrument. In one building hundreds of expert workmen are engaged solely in the manufacture and assembly of the finely micrometered ball bearings which enter into the making of the device of precision and ignition. Out of over 800 men employed, there are only nine to be found in the repair department, and when it is considered that the concern produces a magneto a minute, it is all the more remarkable that but three of the nine are engaged in repairing magnetos.

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WHILE many cars are sold with what is known as complete equipment, others are marketed without many of the devices and attachments regarded as necessary for the convenience and comfort of the owner. With use of an automobile it is natural that there be realization of needs by which the service value may be enhanced, and to meet the demand thus created many industries have been developed. It is customary to group as accessories hundreds of differing products, varying in quality and appearance, each of which may be utilized by the motorists. Because of the multiplicity of the productions it has been desirable to group them for the greater convenience in description and for the benefit of those who consult a reference, this affording opportunity for comparison.

SHOCK ABSORBERS.

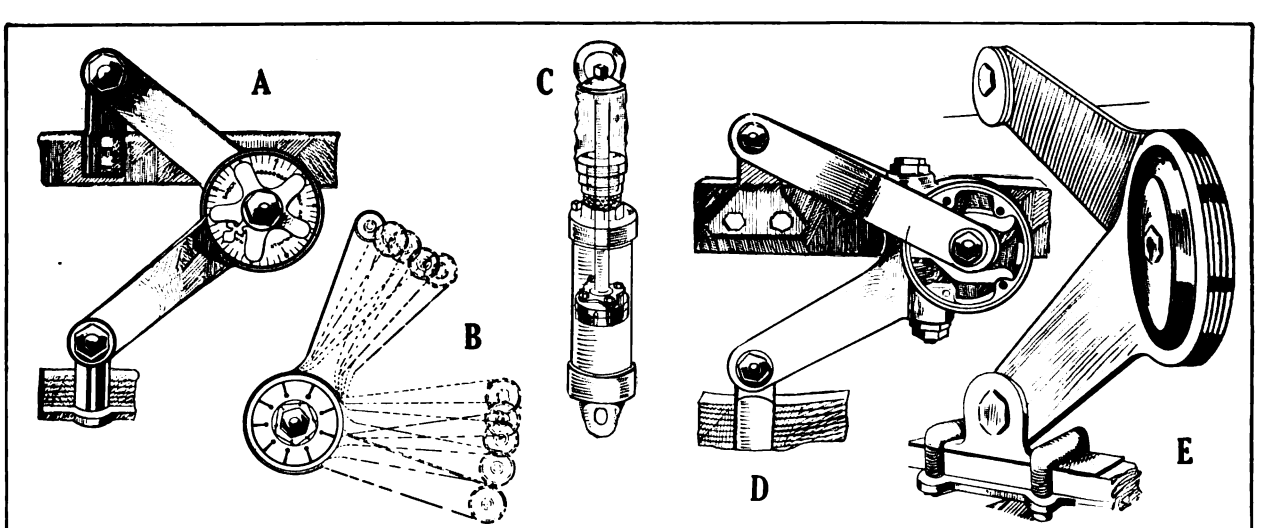
Among the advantages claimed for the use of shock absorbing devices, are those of comfort, safety and economy. There can be little question as to the additional comfort to be obtained from riding in a car equipped with some supplemental means of taking up jars and stresses resulting from the uneven road surface. In addition it is held that the elimination of vibration not only protects the occupants of the machine, but its mechanism as well. This factor enters into the economical view of the proposition, and it is further asserted that the use of shock absorbers diminishes tire bills. Many well known designs are offered, in some of which little change has been found necessary, and several new devices are marketed this year for the first time.

Peerless.

The Peerless shock absorber, made by the J. H. Sager Company, Rochester, N. Y., consists of two arms attached to the chassis frame and the axle, one arm terminating in a case in which are two levers retained by coiled springs, between which a double cam on the other arm is fitted. Two inches free action is permitted before the cam compresses the coiled springs by compression or recoil. The case is grease packed and all wearing parts protected. It is adjustable throughout.

Mondex.

The Mondex is sold by the Aristos Company, New York City. The principle of this absorber is two



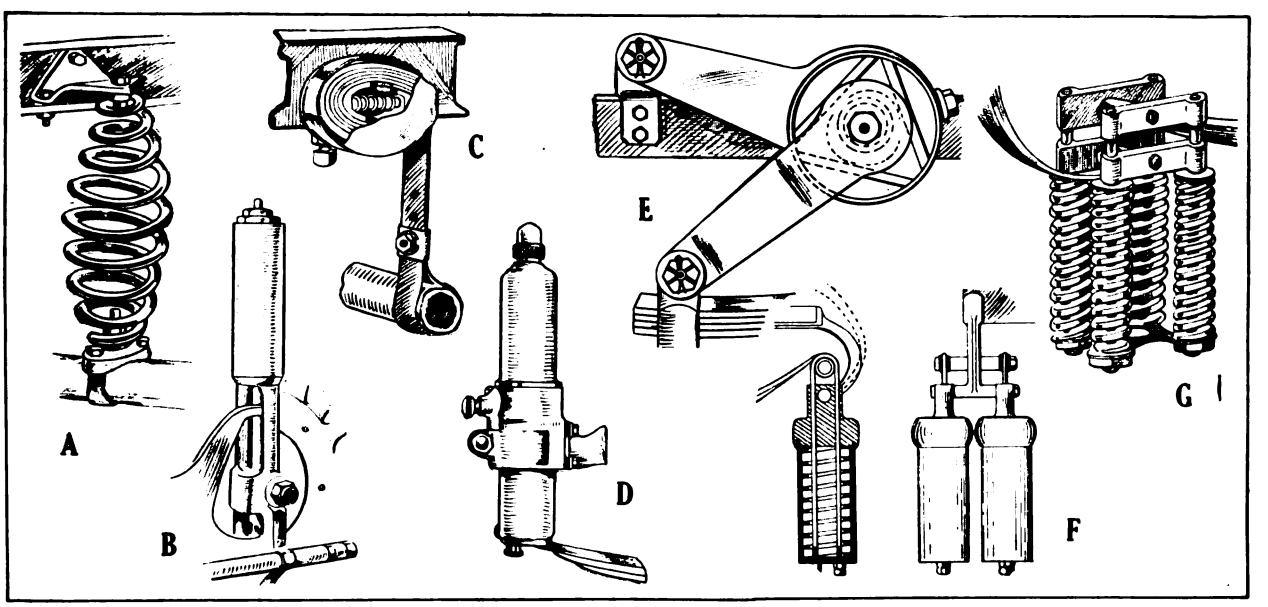
Shock Absorbers: A, Truffault-Hartford; B, Westen; C, Flentje; D, Peerless; E, Mondex.

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lever arms attached to the chassis frame and the axle, the ends being shaped to enclose alternate discs of metal and rubber. The discs are made to have faces with a series of inclines and the movement of the arms compresses the rubber between the discs, resisting any action of the spring proportionate to the force of the shock. The variance of resistance is established by the degree of the inclination of the faces.

Flentje.

Produced by Ernst Flentje, Cambridge, Mass., the Flentje is a hydraulic device in which a piston is actuated in an oil-filled cylinder by vehicle spring compression and recoil. The ports in the piston will permit easy movement and will restrain gradually and without shock, excess motion upward or downward. The piston is attached to the chassis frame and the cylinder to the axle. Ample protection is given to the working parts. The latest design has



Shock Absorbers: A, Sager; B, S & S; C, Gabriel; D, Westinghouse; E, Connecticut; F, J-M; G, Velvet.

several improvements to further perfect the action.

S & S.

The S & S, made by the S & S Shock Absorber Company, Washington, D. C., is attached to the front wheels only. It includes wheel spindles and steering pivots, the pivots being installed in the axle yokes, extending above the yokes. A right angle yoked extension of the spindles has a vertical movement on the shaft or upper end of the pivot, road shocks causing compression of a helical spring carried in a cage above the end of the axle yoke. The resistance is to all vertical movement of the vehicle body.

J-M.

Made by the J-M Shock Absorber Company, Philadelphia, Penn. The J-M shock absorbing attachment consists of two coiled springs enclosed in barrels fitted for installation to the rear or forward ends of the springs. The expansion of the coiled springs holds the vehicle springs normally and when subjected to road shock the compression of the coil springs in the barrels nullifies the jolt and jar. The absorber has special fittings for attachment. The design has been much used abroad.

Gabriel.

In the Gabriel, made by the Gabriel Horn Manufacturing Company, Cleveland, O., the friction of a belt wound about a device that is expanded by a spring is the method of checking the recoil of the vehicle, the circular case carrying the belt being attached to the chassis frame and the other end of the belt to the axle. As the spring is compressed the belt is automatically wound and recoil is restrained by the friction of the belt and the resistance of the coiled spring to compression.

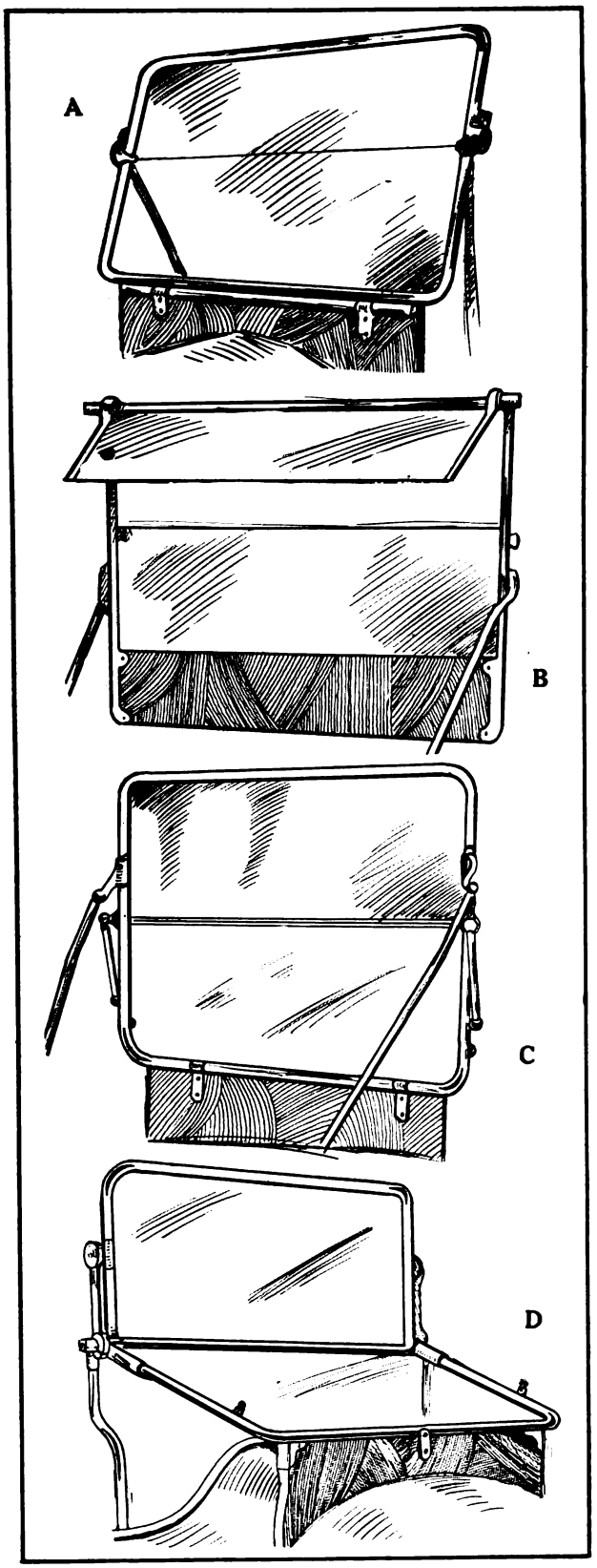
Connecticut.

The Connecticut, made by the Connecticut Shock Absorber Company, Meriden, Conn., consists of a central case in which are three straight springs set in triangular form. Within the triangle is a three-faced cam attached to a shaft. The arm carrying the case is attached to the chassis frame and the other arm carrying the cam is fitted to the spring clip. A limit is given to movement of the vehicle springs and compression or recoil in excess is resisted by the springs within the case surrounding the cam.

Westen.

Produced by the Westen Manufacturing Company, Newark, N. J., the Westen shock absorber is a device in which two discs at the ends of arms enclose frictional areas and are pivoted with means for adjusting the degree of frictional contact. The arms are attached to the chassis frame and the axle. The adjustment is made so that the resistence to movement becomes greater as the motion of the vehicle

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Windshields: A, Cox; B, Bean; C, Ackerman; D, Troy.

body is increased. The absorbers are made in three sizes.

Truffault-Hartford.

The well known Truffault-Hartford shock absorber, made by the Hartford Suspension Company, Jersey City, N. J., is with a double arm with a circular recess containing frictional discs and a single arm fitted between the recesses, the assembly being retained by a bolt and adjusting nut. The absorber may be adjusted to compensate for any excessive spring action. It is so enclosed as to be fully protected against all influence of moisture or abrasives. The device is made in four sizes to meet all requirements of light, medium and heavy vehicles.

Sager.

The J. H. Sager Company, Rochester, N. Y., also makes the Sager shock absorbing springs, which are of different strengths and are wound in oval shape instead of round, this form being believed to have better resistance to the road shocks. The springs are fitted by hangers to the chassis frame and clamp to the axle. As the springs are normally set they resist compression or recoil of the vehicle springs proportionate to the degree of movement. They are made in differing sizes and this form has been used for seven years with uniform success.

Velvet.

The Velvet springs, made by the J. W. Blackledge Manufacturing Company, Chicago, consist of a group of four helical springs mounted on four rods fixed in a base, at the top of which are two fittings, the upper attached to the lower spring half and the lower to the upper spring half. The lower fitting moves vertically on the rods with the compression or recoil of the vehicle spring, compensating the excess movement. These are made in five sizes for varying weights of cars, and for different forms of springs.

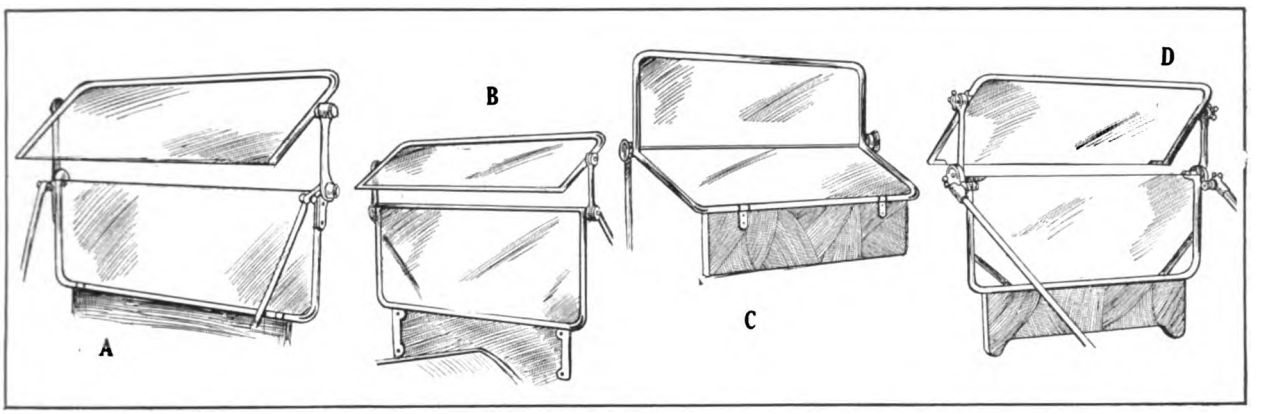
Westinghouse.

Made by the United States Rapid-Fire Gun & Power Company, Derby, Conn. This is a metal cylinder attached to the chassis frame that telescopes into a slightly larger cylinder attached to the end of the vehicle spring. By increasing or decreasing the internal area with oil in the base the air pressure is varied and the movement of the vehicle controlled. The mechanism is ingeniously developed to insure operation and to permit fine adjustment. It is regarded as being productive of excellent results during long experiments.

WINDSHIELDS.

The windshield is absolutely indispensable to the motor pleasure car driver. It is as desirable protection from the dust of summer as it is from the freezing blasts of winter air. In event of snow or rain it is equally as serviceable. Each year the experience has brought the creation of what makes for even greater comfort or convenience, and in the different

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Windshields: A, Polson; B, Boreas; C, Gemco; D, Sprague.

makes of windshields now offered in the market one has a wide range of design, quality and value.

Eagle.

In the product of the Eagle Company, Newark, N. J., three styles, Eagle, Standard Friction and X-L are included, the first in clear vision and rain vision types, and either in straight or zig-zag; the second in clear and rain vision designs, and the third in standard forms. These are of high class construction. The Eagle hinge is of the multiple disc type and the Standard is hinged with a combination of friction, and ratchet and pawl. The frames are of heavy brass and are strongly reinforced. As designed these shields may be installed to secure practically any effect.

Troy.

There are 10 models of Troy windshields, made by the Troy Carriage Sunshade Company, Troy, O., four of which are new this season. These are either clear or rain vision types and may be adjusted to any dash. The shields may be adjusted to six positions, even to the single form created for torpedo bodies. The frames are constructed of heavy brass tube and the locking devices are packed with hard grease, and are noiseless and dust proof. The double-arm joint is a patented device.

Bean.

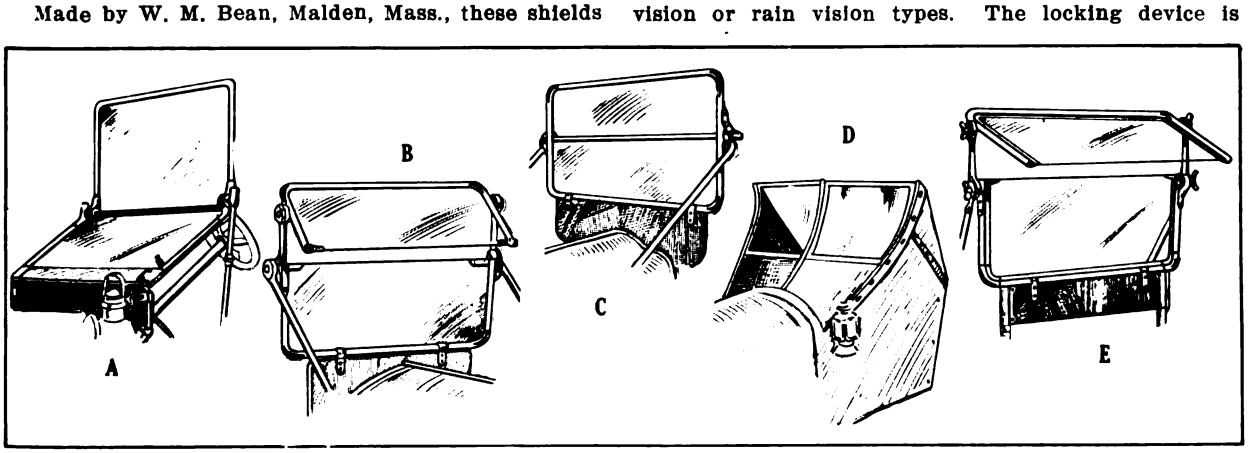
Made by W. M. Bean, Malden, Mass., these shields are designed to eliminate the danger of broken glass, the sashes being of non-breakable pyralin, .0625 inch thick and as clear as glass. They are framed in brass and aluminum, the latter type weighing but 15 pounds. They are made either curved or straight and the upper section telescopes into the lower, so the height is adjustable. With the straight form the upper section is held in any position by a friction device. The curved type is designed especially for the torpedo dash vehicle.

Auto.

Produced by the Auto Wind Shield Company, Cambridge, Mass., the curved form of the Auto windshield, which is of fabric leather and celluloid panels, is such that the driver looks over the shield and not through it, while the air currents are deflected above his head. It has nothing to break and it may be removed or replaced in five minutes. It has detachable side curtains and a roll front for summer use. It is strongly constructed and is water proof.

Polson.

The Polson windshield is made by the Polson Manufacturing Company, Buffalo, N. Y., in four styles and to order only. The construction is exceedingly durable, the frames being strong and the glass .25 inch in thickness. All styles are made in the clear vision or rain vision types. The locking device is



Windshields: A, Banker; B, Kinwood; C, Vanguard; D, Auto; E, Eagle.

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automatic. The shields may be furnished with base brackets to afford ventilation to the forward body of the car. The shields are furnished in brass, nickel or black enamel.

Vanguard.

Clear vision and self-ventilating, rain vision, zig-zag, torpedo and straight types are produced for the Vanguard line, by the Vanguard Manufacturing Company, Chicago. The self-ventilating design is new, this being adjustable on brackets at the top of the skirt board. The Vanguard ball lock hinge is employed for all of the folding shields and the side arm hinge is used for the rain vision types.

Sprague.

The Sprague Umbrella Company, Norwalk, O., makes four types, and of these one is a clear vision construction. They are designed for varying installa-



Storage Batteries: Edison, Adapted for Both Ignition and Lighting.

tions and have heavy brass tube frames reinforced with wood where necessary. The roller bearing lock is used for three types, this being of steel rollers and manganese bronze discs, insuring long wear. The latest type has an air cushion lock that is positive and especially effective.

Banker.

Made by the Banker Windshield Company, Pittsburg, Penn., Banker windshields are of the clear vision type and it is claimed that each shield is made to order for the car for which it is intended. The line now includes a straight rain vision shield for touring cars and zig-zag rain vision shield for roadsters. The shield hinges are ball ratchet construction. The tubular frames are fitted with rubber packing strips and the filler boards are made with ventilators.

Ackerman.

Innumerable positions can be obtained by the Ackerman design, made by Joseph N. Smith & Co., Detroit, which includes a divided shield with a lower rigid frame. The upper section is mounted with stay rod connections about three inches in length midway of the frame and from these arms ball and socket joint connection is made with side supporting members that slide up or down in guides on the lower frame.

Boreas.

Smalley Daniels, Boston, is factory sales agent for the Boreas windshields, made by the Page Woven Wire Fence Company, Adrian, Mich. These are in five types—zig-zag, clear vision, rain vision, ratchet torpedo and folding torpedo. The working members are steel stampings covered with drawn brass. Section joints are constructed with a pair of gears, one mounted in each section, which are automatically locked in any position by coiled springs. The hinge is said to be very enduring and noiseless.

Gemco.

The Garage Equipment Manufacturing Company, Milwaukee, Wis., produces five types in the Milwaukee adjustable, Gemco automatic, clear vision, rain vision and torpedo. The friction hinges of the Milwaukee are leather between discs. The brace rods telescope so that the lower section may be set at any angle to the dash. The Gemco is similar, save that the lower section is not adjustable. The shield may be mounted on brackets at the base to permit of ventilation of the body.

Cox.

The six styles made by the Cox Brass Manufacturing Company, Albany, N. Y., include the clear vision type. With practically all the shields the upper section is mounted on side arms which permit adjustment in many positions. The upper section is fitted on hinges which are retained by hinges of the spring plunger and ball design and the shields are locked automatically wherever set.

Kinwood.

Made by the Kinsey Manufacturing Company, Toledo, O., one of the features of the Kinwood line is the simplicity and substantial construction, the appearance being decidedly neat and pleasing. The sections are united by an automatic hinge that is enclosed in a plain brass cap. Among the designs are the clear and rain vision types, and the straight and zig-zag models.

IGNITION AND LIGHTING BATTERIES.

Considerable improvement has been made in ignition and lighting batteries during the past year, makers having incorporated features which make for efficient and reliable service as well as more constant voltage and longer life. Among the refinements may be mentioned lighter batteries with larger current capacity, devices for the prevention of corrosion, and

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methods of supporting the cells in the container. The growing demand for electric lighting has been responsible for a large number of high grade lighting storage batteries, these being made to meet the requirements of the purchaser.

Geiszler.

The Geiszler Bros. Storage Battery Company, New York City, makes several types of both ignition and lighting batteries in which the non-sulphating features are emphasized. These batteries are sturdily constructed, compact in size and of long life. The company makes a specialty of lighting batteries of different ampere-hour capacities and this type is suitable for ignition work as well. They are based upon the six-volt capacity although members of different voltages may be secured.

Edison.

A feature claimed for Edison storage batteries, the product of the Edison Storage Battery Company, Orange, N. J., is that they can stand indefinitely in a charged or discharged condition without injury. The construction is such that they may be charged at a high rate in considerably less time than some types. Corrosion is eliminated as acid is not employed, and the components of the battery are rugged. The lighting type is guaranteed to give its full rated capacity at the end of five years' service.

Salom.

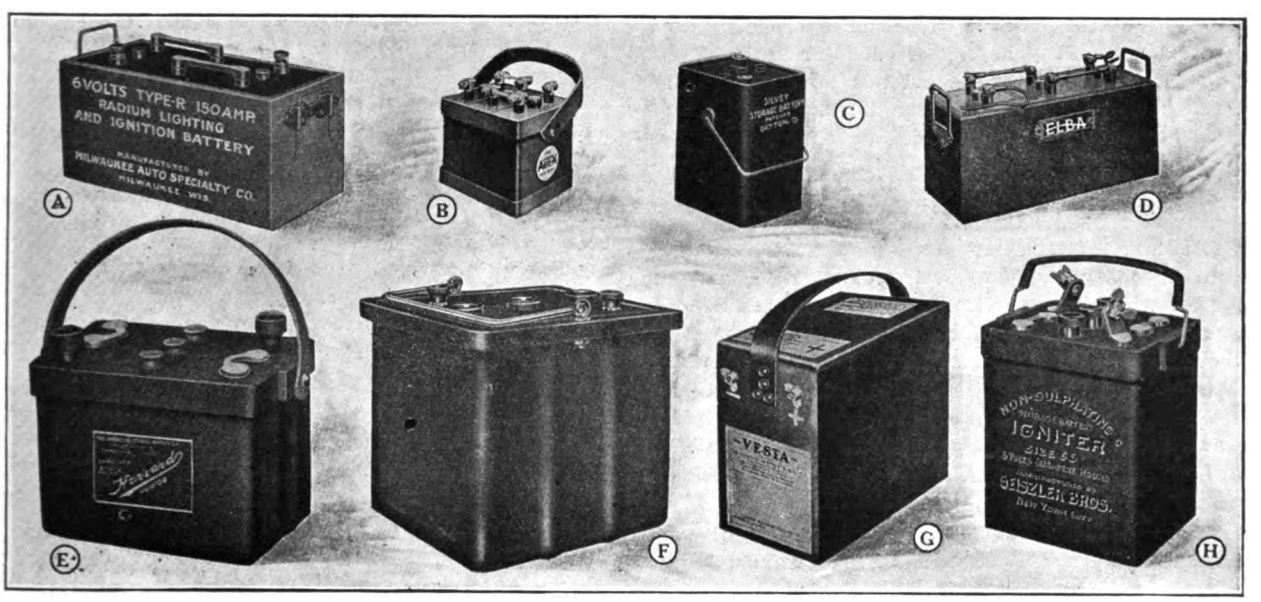
The mechanical method of applying the spongy and peroxide of lead to the plates is a feature of the Salom battery, manufactured by the Niagara Lead & Battery Company, Niagara Falls, N. Y., which concern produces batteries of several types and capacities. Besides saving in cost of maintenance and yielding rated capacity, swelling and shrinking of the plates are eliminated as well as short circuits by disintegration. Besides ignition and lighting batteries the company makes vehicle types.

Elba.

Utilizing the individual cell unit which permits the member to be inspected without disturbing the other cells, is a feature in the construction of the Elba storage batteries, which are suitable for ignition and lighting purposes. These vary in ampere-hour capacities, and are provided with non-corroding terminals. The Willard Storage Battery Company, Cleveland, O., maker, manufactures different types of battery boxes including a special member for attaching to the frame.

Vesta.

Vesta ignition and lighting batteries, produced by the Vesta Accumulator Company, Chicago, are specially made to stand the constant jarring and jolting of the motor car, and a feature of the members is the method of sealing to prevent the acid from creeping. The company produces various types, these ranging from two to eight volts, and with ampere-hour capacities from six to 160. The smaller types are adaptable for portable work. A special charging rheostat is also manufactured.



Storage Batteries: A, Radium; B and D, Elba; C, Silvey; E, Harvard; F, Witherbee; G, Vesta; H, Geissler.

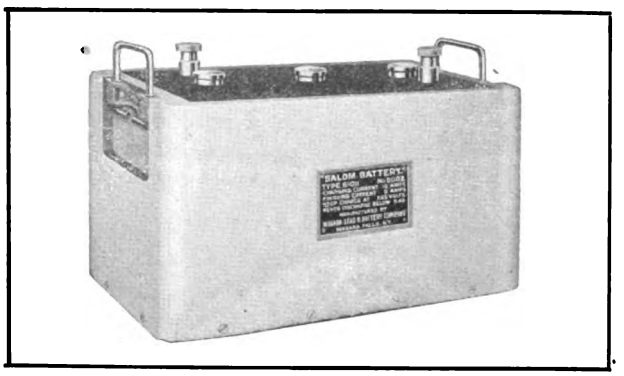
Witherbee.

A capacity in direct proportion to the combined area of the plates in each cell is the feature emphasized by the Witherbee Igniter Company, Springfield, Mass., maker of the Witherbee batteries, which are produced in different sizes and capacities to meet the requirements of the purchaser. The smaller ignition members utilize five plates in each cell while large batteries are fitted with cells having seven plates. Both ignition and lighting containers are produced.

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Silvey.

Interchangeable units, hard rubber jars with high ribs in the bottom for carrying the parts and providing ample space below the plates, are features of the Silvey batteries produced by the Silvey Electric Company, Dayton, O. The top of each jar is fitted with a projecting flange which extends above the sealed cover plates, and each of the latter has a central vent set in a recess so that if any of the electrolyte escapes it is returned to the cell. The connectors are acid proof.



Storage Batteries: Salom, Manufactured in Sizes to Meet Requirements of Purchaser.

Radium.

Radium batteries are produced by the Milwaukee Auto Specialty Company, Milwaukee, Wis., and the staggered design of plates is utilized, making for long life and providing for expansion and contraction. The number of cells varies from five to 15, and the ampere-hour capacities from 70 to 200. Hard rubber jars are employed, these being contained in a case of hard wood, which is treated chemically to withstand acid. Handles of the sliding type are fitted.

Harvard.

Harvard batteries, which are made for all kinds of electrical service, are simple in construction and rugged in design. A feature of this product of the American Storage Battery Company, Boston, is the non-spraying and non-leakable vent tubes, which enable the use of the batteries in boats, etc. The company makes a specialty of lighting batteries, these being made in 80, 100, 120 and 150 ampere-hour capacities. Hard rubber jars are employed and these are sturdily constructed.

DRY CELLS.

The dry cell type of battery finds favor with many motorists owing to their compact form and cleanliness. Not only are they inexpensive but they provide a source of electrical energy that is reliable. They make an excellent equipment for starting purposes where the automobile is fitted with a magneto, and are employed to operate signalling devices. Considerable service may be obtained by wiring in multiple series, thereby increasing their amperage.

Waite.

A hot, snappy spark, maximum mileage and consistent service are the emphasized features of the Waite dry cell, the product of the Waite Auto Supply Company, Providence, R. I. The cells are of standard design but their durable qualities are obtained by the compounds utilized in the electrolyte. The voltage of each member is 1.5 and the ampere capacity 30. They are made in square carton form, the cell being protected by a cardboard casing, an arrangement making for longer life.

Eveready.

Eveready batteries are manufactured by the American Ever Ready Company, New York City, and are produced in four different types with the same voltage, 1.6. The ampere capacity ranges from 17-20 to 30-35. They are made in cylindrical form, also in square carton, and it is claimed that the cells may remain idle for some time without depreciating. In addition to the Eveready, the company has brought out a new type known as the Aerco.

Columbia.

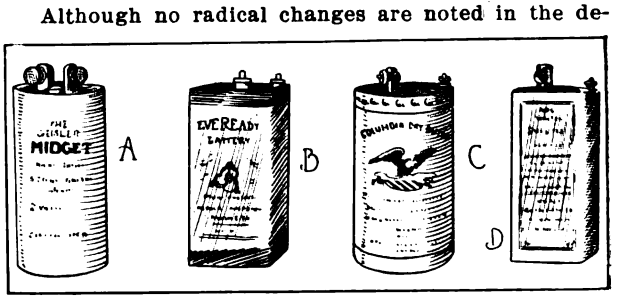
The National Carbon Company, Cleveland, O., maker of the well known Columbia dry cells, manufactures these in two forms of which the No. 6 is standard for ignition purposes. The company also markets a cell known as the Columbia igniter, this being designed for heavy service and with higher amperage capacity. These are made in different sizes

Geiszler.

A battery which is of the storage type inasmuch as it is constructed with a semi-dry electrolyte, entirely eliminating the spilling of acid, is produced by the Geiszler Bros. Storage Battery Company, New York City. It is known as the Geiszler Midget non-sulphating battery and is of the same size as standard dry cells. It is claimed that this type will outlast three of the usual form on each recharge. They are of two volts, have 30 ampere-hour capacity, and are designed for reserve ignition, motorcycle and other light work.

HEAD LAMPS.

Although no radical changes are noted in the design of the 1912 head acetylene lamp, many refinements have been made to conform with the new body designs of the motor car. Particular attention has



Dry Cells: A, Geiszler; B, Eveready; C, Columbia; D, Waite.

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been paid by the maker to lighting efficiency, and simplicity of design is a feature. Fewer parts and accessibility make for easy cleaning and adjustment, while better material provides for durability. Practically all makers bring out designs with a black finish, metallic lacquer-like lustre or black enamel finish. Some are combination, permitting the use of electricity, and a complete description of these will be found elsewhere in this issue.

Rushmore.

A high efficiency lens mirror is a feature of the Rushmore lamps, produced by the Rushmore Dynamo Works, Plainfield, N. J. No changes have been made during the past season, the product of this company having been such as not to warrant any departure from the accepted design. The head lamps are made in plain and flare fronts and in a variety of sizes. The company makes a specialty of dash searchlights.

Gray & Davis.

The 1912 designs of lamps manufactured by Gray & Davis, Amesbury, Mass., embody the latest ideas of lamp making, and few parts, high efficiency and absence of rattle are features emphasized. The close-coupled lamps provide a steady light, are easy to clean and the black enamel and brass finish add to their attractiveness. A feature that will appeal to motorists is that the set screw for securing the lamp to bracket is placed inside, so as not to catch in clothing when cranking the motor.

Solar.

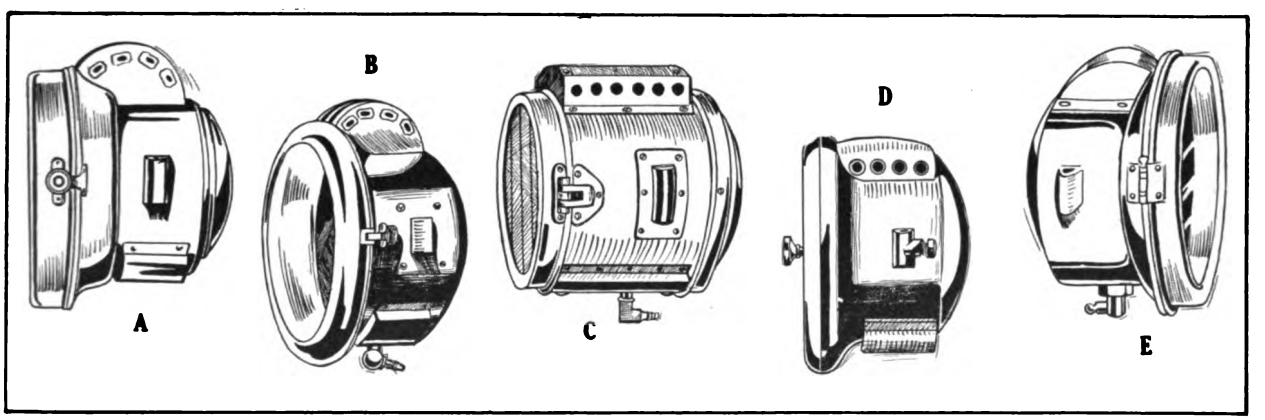
The Badger Brass Manufacturing Company, Kenosha, Wis., maker of the Solar lamps, presents a new form in a flat and high hood, the design making for simplicity. The body and flare are of a single piece of heavy brass with front aluminum reflector attached to the door, providing two fields of light. They are made in two sizes of the low hood type. The Solar lead glass lens mirror is fitted, which is claimed to provide a short focus and make for high efficiency in lighting.

Old Sol.

Old Sol lamps are made in a variety of forms, including those for motor car, motorcycle and carriage use by the Hawthorne Manufacturing Company, Bridgeport, Conn. The 1912 head lamp is of the close-coupled type, very compact and of it is claimed high efficiency in lighting. Mangin mirror lenses are fitted, and arrangement is made for focussing if desired. The motorcycle light is attached to the generator and fastened to the handle bars of the mount.

ELECTRIC TAIL AND SIGNAL LIGHTS.

An increasing number of electric tail lights and signalling devices lighted by electricity have been brought out during the past year and a wide variety of design is noted. Many consist of the tail member while others incorporate an arrangement for attaching the number plate and illuminating its surface. Several combination devices are being introduced, these consisting of different colored lenses which are employed for signalling a vehicle in the rear that the machine is about to turn or stop. These are operated by a switch on the dash convenient to the driver.



Acetylene Headlights: A and B, Gray & Davis; C, Rushmore; D, Solar; E, Old Sol.

Gray & Davis.

The Gray & Davis tail light, made by Gray & Davis, Amesbury, Mass., is very neat and compact and is fitted with a red lens 3.5 inches in diameter. A silver reflector inside the lamp, magnifies the light and throws it out of an oblong square opening upon the number plate. The white beam is clearly defined, so that the operator by merely glancing around may ascertain if the lamp is lighted. It is air and dust tight, and made with round, tapered or flat holder.

Couch & Seeley.

The Couch & Seeley device, manufactured by the Couch & Seeley Company, Boston, is a combination tail lamp and number plate holder. It is attached easily to the usual lamp bracket, and the number plate is fitted to an adjustable clamp, operated by a screw. The lamp box is attached to the clamp member and is removable. The usual red lens is provided, and also a white light for illuminating the number plate, any size of which may be utilized.

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Neverout.

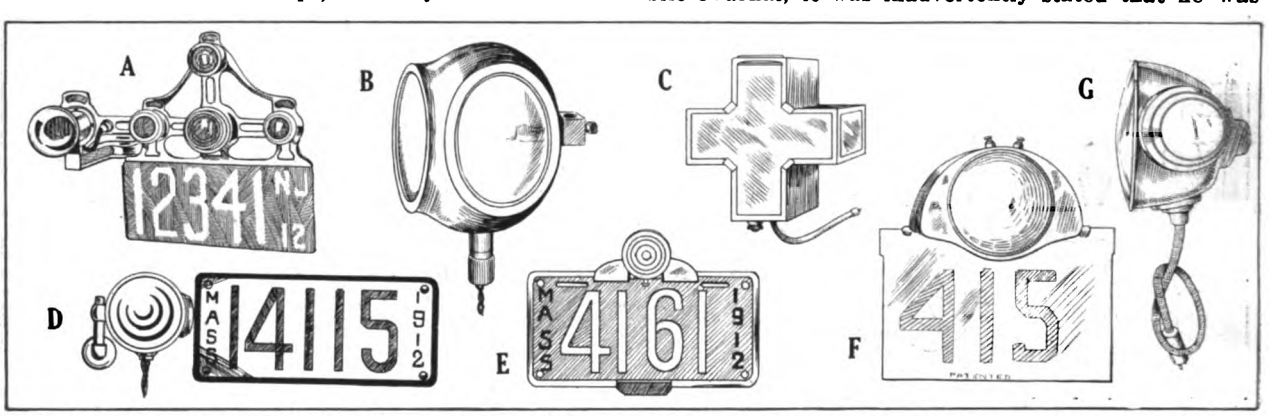
The Neverout, produced by the Rose Manufacturing Company, Philadelphia, is a combination of tail light, license bracket and signalling device. The latter is operated by a special switch fitted with three buttons. The lights are four in number. A red disc shows constantly while a white illuminates the license tag. The latter and another are utilized for signalling as is a green disc. An electric horn is incorporated which sounds whenever any of the signal lights are flashed.

Guide.

A neat and compact electric tail light has been brought out by the Guide Motor Lamp Manufacturing Company, Cleveland, O., it being of the torpedo type and fitted with a clear lens for lighting the license number and semaphore red lens for the tail light signal. It is attached in the usual manner to the bracket, and is designed to operate a two candlepower six-volt lamp.

Electric Star.

Electric Star tail lamps, made by the Milwaukee Bronze Casting Company, Milwaukee, Wis., are manufactured from a one-piece aluminum casting five inches in diameter, this making for sturdy construction. The exterior of the light is finished in black with polished nickel plated rims around the lenses. The bullet shape provides a liberal sized white and red lens and is cleaned easily. They are made in two forms, one for attachment by set screw and the other for fastening to body.



Electric Rear Lights and Signalling Devices: A, Neverout; B, Electric Star; C, Fowler; D, Gray & Davis; E, Couch & Seeley; F, Holt & Beebee; G, Guide.

Holt & Beebee.

An electric tail light which also serves to illuminate the license tag is made in two forms by Holt & Beebee, Boston. It is attached to and above the number plate, and its position brings the light a little forward of the license tag. The white light is thrown upon the plate. When desired it may be attached to the body of the car. It is made in brass, black or white nickel. The light is said to meet with all of the requirements of the authorities.

Fowler.

The Fowler Lamp & Manufacturing Company, Chicago, is marketing a novel form of tail lamp, it being in the form of a maltese cross and designed especially for use by physicians. The usual red lens forms the cross, providing a noticeable signal. A white light is thrown upon the number plate through a white lens fitted to one of the projections of the design. It is attached to the regular tail lamp bracket.

(To Be Continued.)

Ed. Note—Space does not permit of describing in detail all of the prominent accessories made or sold in this country, and the subject will be continued along the same lines in a succeeding issue.

WILLIS NOW WITH NATIONAL.

P. P. Willis of Indianapolis, Ind., formerly advertising manager of the Mais Motor Truck Company of that city, is at present associated with the National Motor Vehicle Company, maker of National cars, in the same capacity. In a recent issue of The Automobile Journal, it was inadvertently stated that he was still engaged in exploiting the Mais truck. However, he has been with the National company for the past three or four months.

BRUNNER COMPANY IN NEW PLANT.

The Brunner Manufacturing Company, Utica, N. Y., has moved into its new plant, which is equipped with the latest improved machinery specially adapted for the production of small air compressors, in capacities of from one to 15 cubic feet a minute. The Brunner line is most complete and up-to-date, and while the compressors are small they are very heavily constructed and will withstand severe usage. D. G. Caywood, until recently vice president and sales manager of the Gleason-Peters Company of New York City, has been appointed sales manager of the Brunner concern, and will locate his headquarters in New York.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

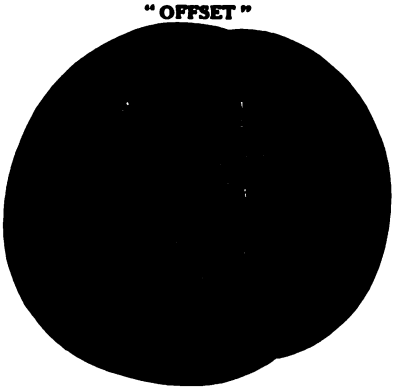
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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3⅛ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

		"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA"	2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
	3½-in. Auto Clock.....	28 00	30.00	45.00	Only made in
	3⅛-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—Add $3.00 to above Price Lists. (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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BOSTON'S TENTH ANNUAL SHOW.

Located in the heart of the greatest motor vehicle and accessory market in the world, and within easy riding distance of an immense district deeply interested in the modern methods of commercial transportation, Boston offers an exceptional opportunity for those who desire to do business. Coming as it does at the very beginning of the active motoring season, the Boston show always has been the biggest, best and most largely attended display in the country. More sales are closed here annually than at all the other exhibitions combined. This explains its importance to the industry, an importance fully appreciated by the manufacturers, albeit they have never cared to dignify it by the name of National.

The results at New York and Chicago indicate that this is a year of refinement in pleasure car construction, and the distinctive beauty of the machines displayed in those cities will be combined in the forthcoming show at Boston. It is the one exhibition of the country in which all makers are represented under one roof, where the fullest opportunity is given to make comparison of the merits of the various models. Those who are interested in selecting a new machine cannot afford to overlook this feature.

Ever since the automobiles were separated from the motor boats, there has been a growing demand for space. Each year there has been a long waiting list, months in advance of the opening date. The time has arrived when it has been deemed advisable to provide distinct shows for pleasure and commercial lines, and what has been said with respect to the pleasure vehicle exhibit applies even more fully to the industrial transports.

In the matter of accessories, supplies, parts and fittings, the Boston show always has excelled, principally because of the fact that these are represented by agents, who often carry more than one line, each of which is shown by a display arranged by the manufacturer. Although it is certain that some pleasure and commercial cars will be seen at this exhibition for the first time, the new things will by no means be confined to the finished vehicles.

The Boston show reflects the importance of the district it serves. While other sections of the country have become interested in the automobile within the past two years, New England still remains the great motor vehicle and accessory market it was during the early days of the industry. There is every reason to believe that the 10th annual display in Mechanics' Building will be the same big business producer as all of its predecessors.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

PREPARING FOR SPRING.

Every thoughtful motorist will agree that the car should undergo a systematic and thorough overhauling, at least once a year. Most owners decide to have this done just previous to the opennig of the active driving season in the spring. In these days, when it is no longer considered necessary to lay up the automobile at the approach of the first cold weather, it is somewhat difficult to determine upon this step in plenty of time.

It may be pointed out that repair shops are less busy during the winter months, and the possibility of obtaining good work is thereby en-

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hanced. Many repairmen complain that motorists wait until the last minute before deciding to have work done, and continually demand the car again before the necessary overhaul and adjustment is properly completed.

The motorist who desires to start the driving season with a car which presents the best appearance will decide to have the work done early, and give the repairman sufficient time. In case it is necessary to give the chassis and body a new coat of paint, it will be found that a much better piece of work will result if the workmen have plenty of opportunity to let the different coats dry before applying the next. This is a subject which may be considered with profit by the owner.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

RADICAL AUTOMOBILE LEGISLATION.

It has been pointed out in these columns that motoring offers abundant opportunity for the legislator who feels he must evolve some form of radical legislation. Heretofore it has more often taken the nature of increasing the fees or limiting the speed, but a new note has crept in this year. Massachusetts, which has borne an enviable reputation for conservatism, even in the matter of automobile laws, presents a long list of amendments, some of which must be classed as decidedly radical.

Limiting the size and shape of an automobile top, unless it be of a certain color, ought not to take a great deal of time from the proper consideration of more important matters. Restricting the weight of vehicles using the highways has a direct personal interest not only to those in the industry but to all citizens who are studying modern methods of transportation and their bearing upon the economic side of life. Recent developments indicate that this law will not be passed without considerable revision.

One other important piece of proposed legislation is that requiring owners of motor vehicles to file a bond of $5000 when making application for license. The evident purpose of this bill is to provide some means of reimbursing those who may be injured through the improper operation of the automobile. In reality it would have the effect of increasing the cost of motoring and perhaps of decreasing the number of cars operated.

An analysis of the accidents in which motorists are to blame reveals the fact that in nearly every instance the owner, who usually is the operator, is abundantly well able to satisfy any claim upon him. The man of moderate means drives carefully, both because he has the price of his automobile at stake and because he is not given to the excesses which make operators careless. As has been suggested before, a better way to guard against such accidents is to refuse licenses to men who ought not to have them, and it should be easy enough to determine a man's qualifications in this regard before the application is acted upon.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

THE AMERICAN MONOPLANE.

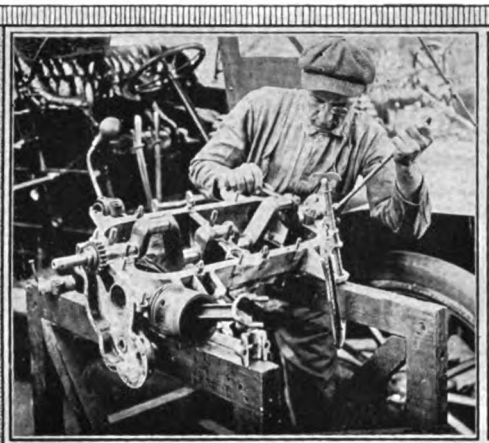
American aeroplane constructors appear to have given rather more attention to the development of the biplane, and such monoplanes as have been brought out really have been little more than copies of the successful Bleriot design. Reference is had especially to those machines which have demonstrated their practicability in satisfactory flight.

There is considerable difference of opinion among those who have given much study to the new science with reference to the relative merits of the two types. The Wright brothers always have maintained that there was no evidence that the monoplane was faster than the biplane, and after all this is the most pronounced claim of its adherents. French constructors appear to differ with the Wrights, since many of the so-called pioneers have been neglecting their biplanes for the production of monoplanes within the past year.

The success of the monoplane in the recent French military trials seems to have had its effect upon United States army and navy officials. As a result, at least one American manufacturer practically has been commissioned by the government to work out a monoplane design with the help of army and navy experts. Students of aviation will await its appearance with much interest, particularly with reference to the effect foreign practise may have upon the completed machine.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

HEATING THE AUTOMOBILE.

In these days of refinement in automobile construction, the operator, as well as the owner, desires comfort, and the modern machine is equipped with numerous devices which appeal to the progressive motorist. The more general use of the car in winter has resulted in an attempt to provide some method of heating its interior, and several appliances are marketed for this purpose. The majority of these are intended primarily for keeping the occupants of the tonneau or limousine warm, although some of them may also be employed by the driver.

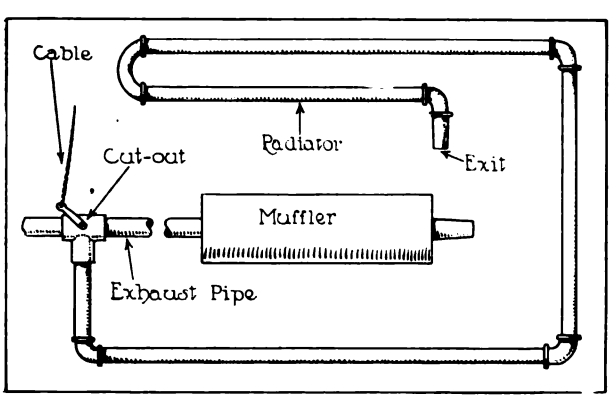


Fig. 1—Suggestion for Utilising the Cut-Out to Convey Heat to a Pipe Radiator.

Many modern cars of the fore door type are equipped with openings in the floorboards or dash through which the heated air from the motor may pass, but unless arranged properly more or less cold atmosphere finds its way through the openings in the radiator and thence to the other apertures. Where the power plant is protected fully by a pan, the heat of the engine may be utilized successfully by fitting a shield back of the radiator to deflect the air currents downward so that they will pass under the power plant and out at the opening in the rear.

Some devices provide for the use of hot water, the fluid being taken from the circulation system, but the average motorist hesitates to install this method owing to tapping the manifold and the trouble involved in securing tight connections. A suggestion for utilizing the heat from the exhaust of the motor is outlined at Fig. 1. It consists of attaching a pipe to the cut-out device and continuing the tube to the part of the vehicle to be heated.

It will be noted that the upper section of the pipe is constructed in the form of a radiator. The size of the piping employed will depend upon the cut-out, this varying according to the design of the motor. Standard piping is practical and this is attached to the lower section of the cut-out; that is, the opening through which the exhaust gases pass. The latter is threaded to take a section of the pipe, and if necessary a fit may be obtained by employing a reducing member.

An elbow is next attached to the part leading from the cut-out and another section of tubing continued to a point under the front seat or tonneau, thence upward through the flooring to radiator. The latter may be placed in the tonneau near the seat partition, where it will occupy but little room, or may be located in front for the benefit of the operator, or one may be used in each place.

Where the pipes pass through the floor, it will be well to employ a plate which may be fastened to the floor by screws. This arrangement will keep the radiator from moving. The free end may be held securely by a strap of metal.

In connecting the sections of the piping it is an excellent plan to cover the threads with a liberal coating of graphite and oil as the combination will assist in making a gas tight joint, as well as preventing the connections from rusting when the heater is removed in the spring. A smart appearance may be given the radiator by painting with aluminum paint.

While more back pressure will be exerted upon the engine by the use of this device, it should not be noticeable in operating the car. The heat may be

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controlled to a certain extent by attaching a cable to the cut-out lever and holding the latter more or less open. While the radiator may become too warm to hold the hand upon it for any length of time, it will not be hot enough to do any damage to the clothing, and will be appreciated in extreme cold weather.

ACETYLENE PRIMING DEVICE.

Acetylene is a highly explosive hydrocarbon when mixed with air, and the mixture when exploded produces a greater force than gasoline similarly employed. The proper proportions are about one part of acetylene to 10 of air, although with larger quantities of the former, it is said that it is ignited even more easily than a gasoline mixture under the same conditions.

Unfortunately, acetylene gas cannot be stored in an ordinary can and the cylinders primed as with gasoline. If this were possible it would facilitate the starting of a motor in extreme cold weather when the vaporization of a liquid fuel is retarded by low temperatures.

A method of employing acetylene for starting and one that does not require any other fitting than a petcock for priming, is depicted at Fig. 2. A feature of the arrangement is that the ordinary acetylene generator may be used without disturbing its operating mechanism.

Assume that the motor refuses to respond to the usual cranking, having been exposed to the cold for a considerable period, and that priming with acetylene gas is desired. A rubber tube is attached to the generator and led to a petcock installed in the intake manifold as illustrated in the drawing at A.

The generator is turned on and when acetylene is produced it will flow through the tubing to the petcock and thence into the intake pipe. By cranking the motor a certain amount of air will be drawn through the carburetor, and mixing with the acetylene flowing into the intake pipe, will be drawn into the cylinders and exploded by the usual methods. The acetylene may be fed until the engine becomes warm and its flow may be regulated by the petcock, which is closed when not in use.

At B is suggested a method of priming the cylinders through the priming cup. The latter is opened, the tube connected and the gas allowed to pass into the combustion chamber. Each cylinder is similarly treated, and with the switch turned on and spark lever retarded, the motor should start. If not, a turn of the starting crank will usually bring about the desired result. A gas tank might be employed but care should be taken in turning on the acetylene because of the pressure at the container.

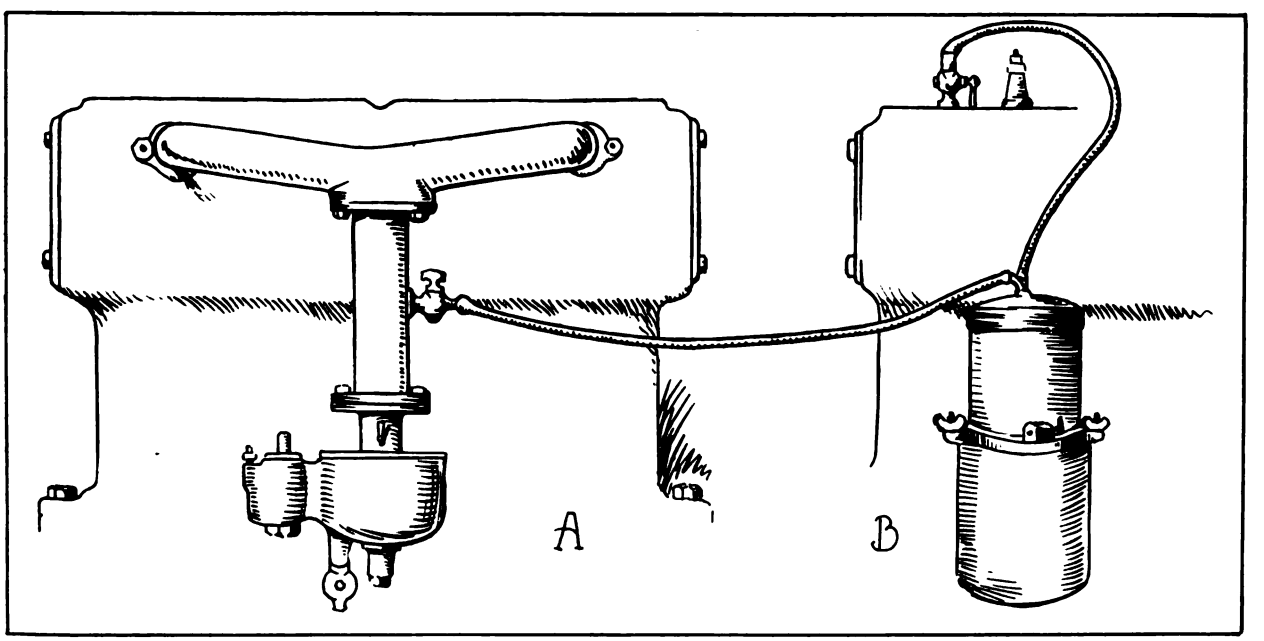


Fig. 2—Depicting the Use of a Generator to Facilitate Starting Cold Motor: A, Introducing Gas to Intake Manifold; B, Priming the Cylinder with Acetylene.

OIL CAN HOLDER.

The majority of operators do not drive on a cold day without carrying in the car a small oiling can filled with gasoline for priming purposes. Usually the container is stowed away in the tool box or in some convenient place in the body. It frequently happens that the can is overturned and its contents spilled unless it be fitted with some form of cap, which should be gas tight so that the fluid will not escape.

An excellent location for the priming member is inside the hood, where the fuel will be kept more or

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less warm. Some cars are equipped with holders for both oil and priming vessels, but where the machine is not thus fitted, they may be installed easily and without expense.

Usually an old lamp may be picked out from the scrap heap and the lower part, the fuel container, will make an excellent holder. The member may be heated to separate the lower section from the main body and the former fitted with a bracket, made from a piece of stout brass and riveted to the tray. Holes are next drilled in the strip for attachment to the dashboard. To strengthen the angle bracket the brass strip may be soldered. A feature of such a device is that when employed for an oil can, should the latter leak, the lubricant will be caught in the tray and not drip, as is the case with some holders.

COMPLETING THE TOOL OUTFIT.

Although the manufacturer is liberal in the matter of tool equipment with the new car, it is rare in these days that a motorist is able to keep the outfit intact. Tools are mislaid, broken, and frequently loaned and not returned. With the annual overhauling season approaching, when the use of the tools will be needed, it is a good plan to look over the kit and note if new ones are required.

During the winter months many large and even small hardware stores hold special sales and excellent tools may be purchased at considerably less than their usual price. The second hand stores and pawn shops offer similar opportunities, where tools in good condition may be bought for a low figure. By picking up a wrench here and there, for instance, a good outfit may be accumulated at very little expense.

SOLDERING RADIATORS.

Some drivers effect their own repairs to a leaky radiator and the success of the work depends largely upon the skill of the operator. Usually the amateur believes in quantity when applying solder, and the result is an unsightly cooler. The following suggestion is made by a tinsmith who has had considerable experience in stopping radiator leaks: Clean the parts thoroughly, scraping the metal until a bright surface is obtained. Next cut a small piece of fairly heavy sheet brass to fit snugly in the opening to be stopped, and utilize a blowpipe with the solder and acid, taking care not to burn the metal. When soldering, the radiator should be laid perfectly flat.

CARE OF BALL CONES AND RACES.

Where the wheels of the car are fitted with ball bearings of the cup and cone type, unless these and the balls be hardened nearly alike, considerable wear is likely to take place, especially if the machine has been operated for any great length of time without the members having been given attention. It is a good plan to jack up the wheels and test for lost motion and when it is necessary to take up so much that the wheel will not revolve freely before the play is eradicated, the bearing should be disassembled and examined for wear. If the cone or cup shows recesses a new one should be installed.

TIRE PUMP HINT.

Constant use of the tire pump results in wear and in time slight leaks will develop in the air coupling. It is particularly annoying to discover that the action of the device is faulty when attempting to inflate a tire after a puncture and when one is some distance from a garage where a good pump may be secured.

A simple kink and one that will prove of value when the coupling leaks, is to utilize a handkerchief as follows: Take one corner of the handkerchief and make a single wrap between the coupling and valve stem. Then make a number of turns toward the rubber tubing, making each wrap as snug as possible.

VALVE SPRINGS CAUSE MISSING.

Intermittent missing of the motor may be caused by faulty ignition, but it also may be due to the valve springs. A peculiar skipping of a model T Ford bothered the operator for some time and even the repairman failed to entirely eliminate the trouble. An expert finally solved the problem by removing the valve springs and stretching, when the motor ran perfectly.

A PISTON RING KINK.

In overhauling the motor the piston rings should be examined carefully and thoroughly cleaned before replacing. The carbon should be scraped from the recesses in the piston as well as from the rings themselves. In replacing the members it may be noted that they do not expand enough to perform their proper function. New ones should be fitted, but when this is not desired the old members may be improved by fitting a thin strip of tin or brass in the recess of the piston. This will expand the ring slightly.

AFFILIATED AUTOMOBILE ENGINEERS.

As a result of a recent amendment to the constitution of the Society of Automobile Engineers, an affiliated grade of membership has been created, to which firms or corporations engaged in the manufacture of automobiles, parts and accessories are eligible. Concerns thus represented have the right, subject to the approval of the council, to designate personal delegates to the number of six. It is felt that the grade will fill a distinct need, in that concerns who desire the benefit of the proceedings of the society, may do so whether or not their employees may be eligible for full membership.

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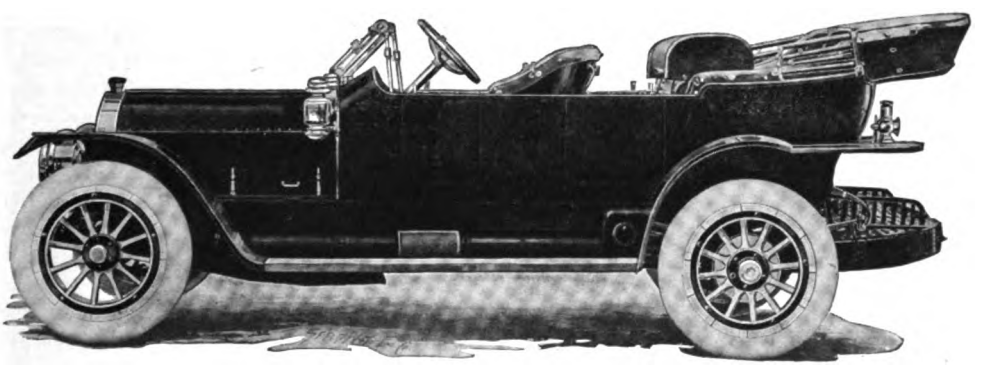
Cars May Come and Cars May Go!

But There's The Knox BEST BY TEST **For Over**

12 Years in the hearts of its countrymen

Built in New England. **In limited quantity.**

But of a quality which makes every owner conscious of the keenest motor satisfaction and pride.



Knox Model "S" 6-cylinder, 60 H. P. Touring Car, Series B, 7 passenger.
Price completely equipped. $5000

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Back Pressure of Muffler.

(1339)—What is the percentage of horsepower lost, due to back pressure in the muffler? I have been informed that it runs as high as 37 per cent. with high efficiency mufflers. Will you kindly enlighten me on this point? RALPH M. PEARSON.

Chicago, Feb. 10.

According to the chief engineer of a leading pleasure car maker, the back pressure caused by the muffler is about 1.5 per cent. of the maximum output of the motor; that is, if the car be fitted with a standard type of silencer.

There are a number of conditions which must be taken into consideration, such as the motor, design of exhaust manifold, size of piping leading to the muffler, shape of the former, and the muffler itself. If the latter be new it is obvious that less back pressure will be exerted than if it be full of soot. The writer does not know of any general rule which would apply, owing to the different designs of motors, mufflers, etc. It is stated, however, that by utilizing a cut-out the efficiency of the motor is increased about five per cent., and that racing cars lead the exhaust pipes almost directly from the cylinders. The percentage of back pressure might range from almost zero to a point whereby the operation of the engine would be seriously affected.

Cylinders Miss Explosions.

(1340)—I have a model ——— two-cylinder ——— car and experienced trouble upon the arrival of cold weather. It misses explosions on the rear cylinder when I use a little gas and if I give it more the rear explodes but the front cylinder misses. There are no leaks in the intake pipes, both cylinders have good compression and the valves are tight. When I use a medium amount of gas the missing jumps from one cylinder to another. In warm weather both cylinders operate perfectly.

PETER MICHAELSON.

Tilden, Neb., Feb. 11.

The fact that the motor operates successfully in warm weather and gives trouble in the winter would indicate carburetion difficulty. Vaporizers of the type with which your car probably is equipped might be responsible for the missing, because the motor is being given too rich a mixture at low speeds and too thin at high, or vice versa. The intake pipes should be tested carefully for auxiliary air, but as these are stated to be correct the trouble is more likely to be with the carburetor. If adjustment fails to bring the desired results the vaporizer should be examined to note if in working order. Sometimes a pipe led from the air intake of the device to the cylinder or exhaust pipe for the purpose of taking warm air will facilitate carburetion under such circumstances.

Lost Power and Hot Motor.

(1341)—I have a 40 horsepower ——— car, which until recently has been giving perfect satisfaction. Have always been able to reach 60 miles an hour on the third speed and climb hills easily. The motor was thoroughly overhauled a short time ago and ran nicely for a while, but upon taking it out of the repair shop where some small repairs were made, the engine acted dead. The carburetor was adjusted but conditions were not improved. I was advised to put on a new carburetor and bought a leading make, but with the new one the motor was just as dead and the exhaust manifold became red hot. I can run the spark both on the battery and magneto up to the top of the wheel without getting a knock. Formerly this advance would cause the motor to knock badly on the level and at speed. The battery and magneto are independent of each other. I bought another carburetor but conditions are not improved. Was informed by a fellow motorist that the ignition timing was out, but cannot see how this can be, as the motor was overhauled a short time ago and the car has been run but little since. Can you advise me as to the cause of trouble? S. K. WHITNEY.

Jacksonville, Fla., Feb. 11.

The friend was correct, as the motor has every indication of not being timed properly with respect to the ignition. The fact that the car heats badly and has no power, either when operated by the battery and coil system or the magneto, shows that the spark is taking place too late in the cylinder. This may be tested easily with the battery system, by throwing the switch to battery and with the spark lever fully retarded listen for a buzz of the coil. If the coil does not buzz, gradually advance the spark lever until the noise is noted. It probably will be possible to move the lever nearly to its limit before the buzz is heard, denoting that the spark takes place too late. The buzz of the coil should be heard with the lever almost fully retarded.

A better way is to check the lead of the piston. Bring cylinder No. 1 up on the compression stroke, then insert a rod through the priming cock, and turn the starting crank slowly with the switch off until the rod moves upward and stops. This indicates the top of the compression stroke or dead centre. Remove rod and throw the switch to battery. The coil should buzz, and if it does not with a slight advance of the spark lever, the timer or distributor should be moved backward until a contact is made; that is, begins to be made, which will be denoted by the sound of the vibrator.

If upon testing out the machine the motor operates efficiently with the battery, and upon switching to the magneto, does not develop its power, the magneto is not timed properly. If not familiar with this operation it is performed best by an expert, However, if the generator be shaft driven with an Oldham coupling, the driving gears will have to be remeshed; that is, set a tooth or more ahead as needed. Usually the

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gears are marked at the factory, and an examination will probably show that the repairman in assembling was careless in replacing these members.

Rebuilding the Car.

(1342)—I have a model ——— four-cylinder ——— machine, the motor of which is in excellent condition, having plenty of power. The rear system has always given me trouble as the cones and races were out, although I have had special members made. Am considering rebuilding the car into a roadster, fitting a new rear construction and replacing the planetary transmission with a sliding gear. Those with whom I have talked the matter over do not agree as to the feasibility of the plan. Some say I will not get good results and that the expense will be too great. Can you give me any approximate estimate as to the cost and whether or not it is advisable to rebuild? WILLIAM DOOLITTLE.

New Haven, Conn., Feb. 15.

Reconstructing a car sometimes is very costly and the expense is not always warranted, this depending largely upon the general condition of the machine and how it is to be redesigned. Then again, unless a price can be secured for the entire work and parts, by the firm estimating the job, it usually happens that many incidentals will increase greatly the supposed cost. A good rear system and transmission, aside from the work of installation, would mean an outlay of several hundred dollars, and it is reasonable to presume that special fittings would have to be made and that the machine work would be considerable. The better way would be to sell the automobile and use the proceeds towards buying a new one, or trade the old car in part payment for a new machine. A new rear system can be obtained from the maker for about $100 and as these are fitted with roller bearings the former trouble will be eliminated.

KISSELKAR'S NEW ENGLAND BRANCH.

Work will begin shortly on the erection of a handsome new building on Commonwealth avenue in Boston, which will be occupied by the New England branch of the Kissel Motor Car Company, Hartford, Wis., maker of KisselKar pleasure and commercial cars. Manager Pruden anticipates that it will be one of the finest equipped service stations in the country.

The building will have a frontage of 74 feet on Commonwealth avenue and a depth of 200 feet. The salesroom will be on the first floor, extending back 70 feet from the street. The office force will be located on a balcony across the front of the building. The service shop will be on the second floor, while the garage will be in the rear of the salesroom.

BAY STATE CLUB'S COMMITTEES.

President E. A. Gilmore of the Bay State Automobile Association, Boston, has appointed the following committees for the ensuing year: Show, Russell Green, F. W. Nichols, R. A. Dobyns, M. E. Lebon, A. P. Teele; revision of bylaws, A. P. Teele, A. P. Underhill, R. R. Ross; runs and tours, W. H. Stevens, Chase Langmaid, W. H. Williams, M. E. Lebon, R. A. Dobyns; contests and races, H. H. Knepper, E. L. Vail, F. Shirley Boyd; house, Chase Langmaid, A. H. McIntyre, H. H. Knepper; entertainment and annual dinner, A. B. Henley, F. P. O'Brien, Fred F. Swett, N. H. Halliday, R. R. Ross.

LEGISLATION IN NEW YORK.

According to information from Albany, N. Y., a number of amendments to the existing automobile laws will be introduced during the present session. Among the more important changes suggested are the following: Lights on all vehicles from one hour after sunset to one hour before sunrise; prohibiting the use of muffler cut-outs in cities and incorporated villages; Connecticut provision for non-resident tourists; uniformity in local ordinances; filing daily records of owners registered and chauffeurs licensed with the police authorities in all cities requesting such action; pro-rata reduction in fees for all applications for licenses filed after Feb. 1 in each year, and provision for transferring the automobile bureau from the office of the secretary of state to the department of highways.

GLIDDEN TROPHY IS SECOND BEST.

Additional information concerning the national automobile tour of 1912, indicates that the Glidden trophy is not to be dropped altogether, although the new A. A. A. cup is to become the chief award. The older cup is to be retained as a team prize, while the new one will be offered for the best individual score. Charles J. Glidden, donor of the trophy bearing his name, has the following to say about the matter:

"I have no personal feeling over the action of the American Automobile Association in voting to discontinue the Glidden tours. The Glidden trophy has seen service for eight years, and has done the good work for which it was intended. I wish the association the utmost success in the new programme and shall do all I can to assist. In accordance with that purpose I sent Chairman Batchelder the following telegram:

" 'Please accept my personal entry for the 1912 tour to compete for the new trophy. Will drive my own car.' "

COVENTRY CHAINS IN AMERICA.

Announcement is made by the Sarco Engineering Company, 116 Broad street, New York City, that the exclusive selling agency for Coventry chains, made by the Coventry Chain Company, Ltd., in England, hitherto carried on at this address by S. Hoffnung & Co., Ltd., has been transferred to it, dating from Feb. 1. The Hoffnung company has given up its New York offices, and the management of this line will continue to remain in charge of Herbert F. L. Funke. In addition to Coventry chains, the Sarco company also is the sole American representative for White & Poppe carburetors and Fastnut lock washers.

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Tire-by Satisfied thank you

UNITED STATES TIRES ARE GOOD TIRES

The amount of service a tire gives is directly proportionate to the amount of strength built into it.

There can be no argument about that. The same is true of the engine, the carburetor, or the magneto.

And to select the strongest tire on the market is no longer a difficult task. It is merely a matter of selecting the maker who has the most thoro knowledge and the best facilities for putting strength into his tires.

Suppose the four leading shoe manufacturers of the country should unite to produce one line of shoes.

Suppose one maker had worked out and controlled a series of machines that were an improvement over those used by other makers—another had devised a method of construction that was a distinct advance over all his competitors. The other two makers likewise possessed manufacturing secrets that had for years back distinguished their particular brands.

Would not the product of the combined knowledge and facilities of these four makers, to your mind, be a shoe of better quality and design than if made with the limited experience and facilities of any single maker?

There is only one answer possible.

Precisely this same condition exists today in the automobile tire industry.

UNITED STATES TIRE COMPANY

New York

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You can actually buy tires that combine the strength of four



—four makes which for years were leaders in the industry—Continental, G. & J., Hartford and Morgan & Wright.

You can buy tires that are made by four corps of tire making experts from these four famous factories, working together—tires into which have been put all the good points which served to make these four brands famous.

Every business man in the country who has anything to do with the manufacturing of goods, if he will consider a moment, will readily understand why tires made under these extra favorable conditions must necessarily possess strength and endurance which other brands cannot hope to equal.

Yet you can buy United States Tires for the same price you are asked to pay for other kinds.

Dealers, you cannot deny the fact that tires made as United States Tires are made are not only the easiest and most profitable tires to sell now but are the tires which are bound to be increasingly

America's Predominant Tires

Tire-by Satisfied thank you

UNITED STATES TIRES ARE GOOD TIRES

UNITED STATES TIRE COMPANY

New York

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



FOR LOADING LUMBER QUICKLY.

It is accepted as truth that a motor truck best demonstrates its economy when it is on the road, and in many lines of work it is something of a problem to prevent long waits at one or both ends of the line. This applies particularly in the lumber business, and many attempts have been made to solve the problem of quick loading and unloading. In fact, almost as much effort has been expended along this line as in the handling of coal or other materials which must be dumped.

An accompanying illustration presents the arrangement employed by the Curtis & Pope Lumber Company of Boston, which concern maintains a fleet of White trucks, made by the White Company, Cleveland, O. The device was produced by W. A. Havens, one of the members of the firm, and has been in constant use for a period covering more than a year.

As will be noted, one of the old horse drawn wagons is utilized for loading the lumber, which is packed on a false bottom. The workmen in the yard may be employed thus while the truck is delivering the previous order. Upon the return of the motor vehicle, the horse wagon is manipulated into position beside it, until the runways register properly, when it is the work of but a moment to shift the false bottom with its load from one wagon to the other.

KENTUCKY ELECTRIC DELIVERY WAGON.

In view of the continued demand for electric vehicles in light delivery work, unusual interest attaches to the new models brought out in this field. Herewith is presented an illustration of the light delivery chassis recently placed in the market by the Kentucky Wagon Manufacturing Company, successor to the Electric Vehicle Company of Louisville, Ky. It may be stated that two models are produced, one of 600 pounds capacity and the other of 1000. The view



Lumber Loading Device Utilized in Connection with White Truck by Well Known Boston Firm.

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shown is that of the lighter vehicle chassis.

The motor is a General Electric, 60 volts, and is suspended from the main frame just forward of the rear axle. Power is transmitted to the countershaft by a silent chain enclosed in a dust proof case, and final drive is by roller side chains. The countershaft is of the enclosed type, carried on ball and roller bearings. Annular ball bearings are employed in the motor shaft mounting and roller bearings of ample size in the rear wheels.

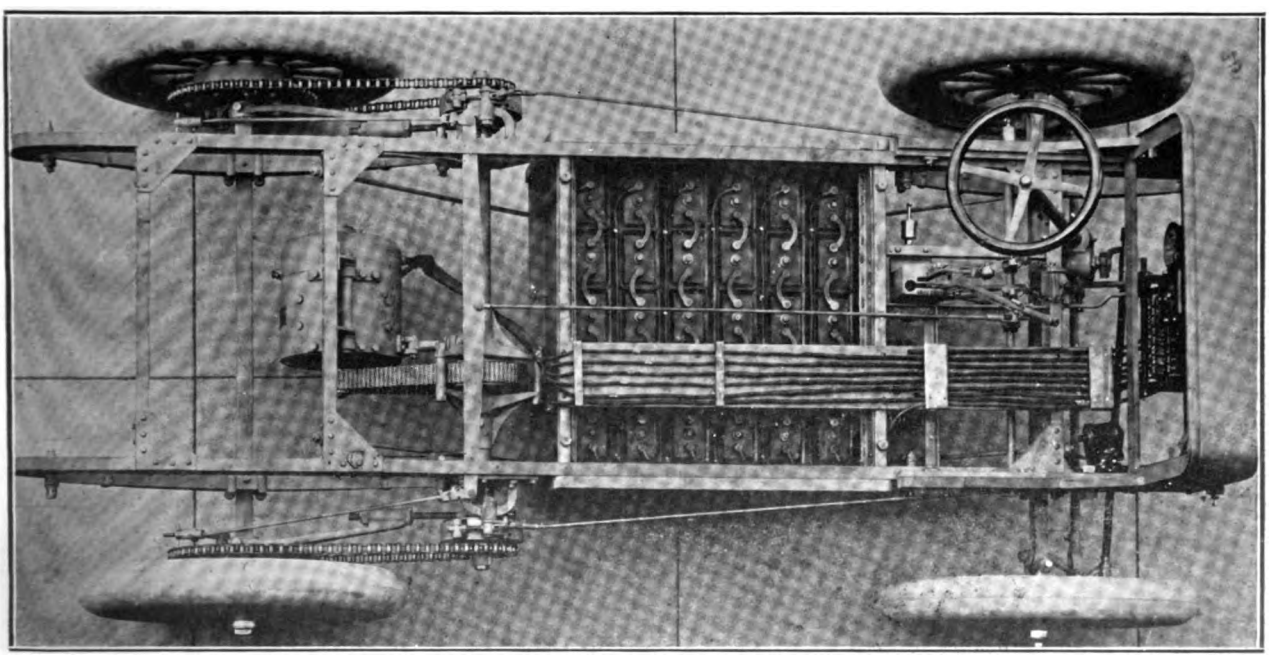
The battery is mounted on a sub-frame, immediately in front of the countershaft. The vehicle shown is equipped with 30 cells of the lead plate type, while the larger chassis has 50 Edison A-4 cells. This equipment is said to give a mileage of from 40 to 50 under normal service conditions. Should a higher mileage be required, a larger battery equipment may be had upon special order.

The controller is of the continuous torque type, affording three speeds forward and two reverse. Its location is a departure from ordinary practise, in that it is bolted to the dash and protected by a short hood. This part of the system with its wiring is easily accessible by the removal of the light dash panel, which is held in place by four thumb nuts.

Brakes are two in number and of liberal friction surface. The service member is of the contracting type, operating on drums riveted to the countershaft sprockets and actuated by a pedal through a flexible equalizer. The emergency is of the expanding type, operating on the rear wheels by a latched lever through an evener, which extends through the frame just above the countershaft.

The frame is of channel section pressed steel, with three well gusseted cross members of the same section. Truss rods running from the forward cross member beneath the sub-frame and up to one of the rear cross members, prevent the frame from sagging, and permit a light frame section.

Axles are of I beam section, and the forgings are weldless from end to end. The steering knuckles are of the reversed Elliott type. Springs are semi-elliptic, both front and rear. Wheels are of selected hickory, artillery type, and fitted with solid tires, 34 by 2.5 inches, though pneumatics may be had at an extra cost. Wheelbase is 86 inches and tread standard. A Sangamore ampere-hour meter is attached to the dash. Steering is accomplished through a semi-reversible worm and gear mechanism, and the steering column is raked at an angle of 25 degrees from the vertical, the usual wheel being provided. In the matter of control, the firm has decided upon the left hand location for the driver with the levers in the centre.



Chassis of Kentucky 600-Pound Electric Delivery Wagon, Notable for Accessibility of Mechanism.

MOTOR TRUCK STANDARDIZATION.

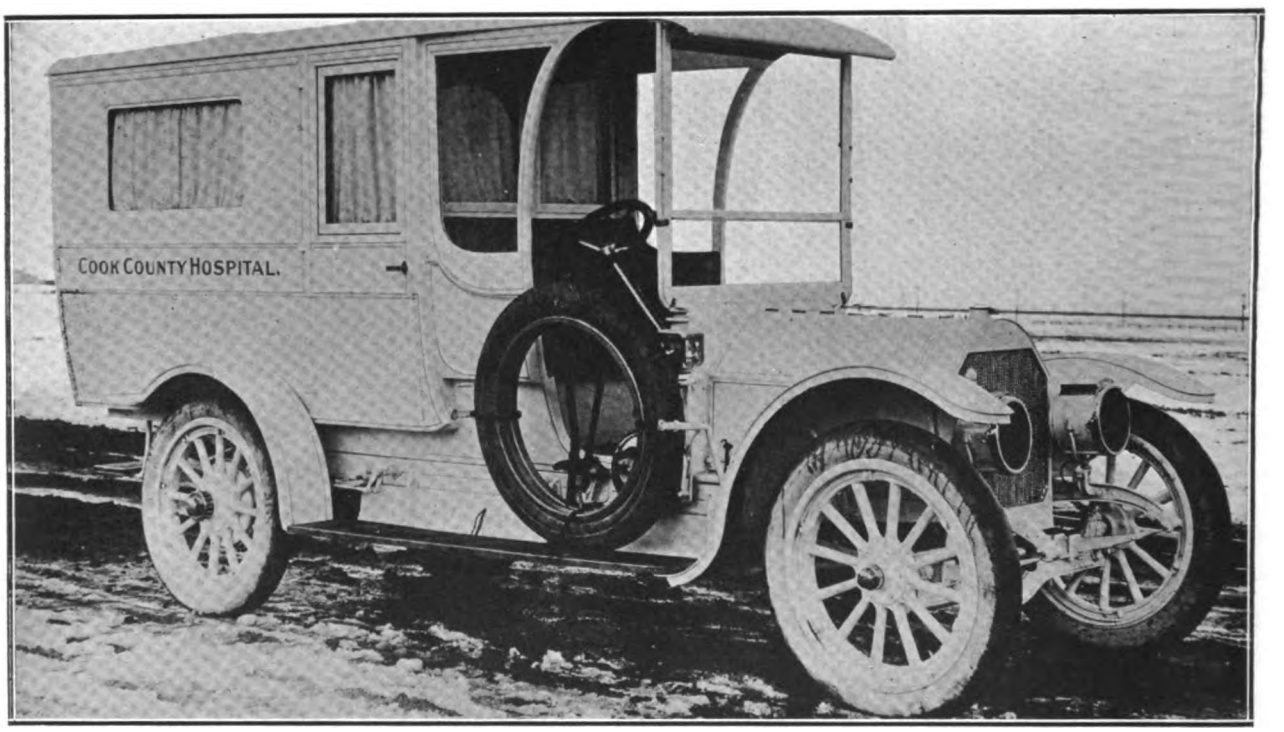
Recently the Society of Automobile Engineers appointed the following committee, to consider the matter of motor truck standardization: William P. Kennedy, American Locomotive Company; Eugene F. Russell, Locomobile Company of America; A. H. Ehle, Baldwin Locomotive Works; Bruce Ford, Electric Storage Battery Company; John M. Mack, International Motor Company; P. H. Breed, United States Motor Company; F. W. Trabold, J. H. Williams & Co.; E. R. Whitney, Commercial Truck Company of

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America; H. F. Donaldson, president, and Coker F. Clarkson, secretary; Robert McAllister Lloyd, General Vehicle Company; W. A. Frederick, Continental Motor Manufacturing Company; Charles B. Whittelsey, United States Tire Company; Charles L. Schwarz, steel manufacturer.

In the preliminary consideration of the matter, it was first decided to attempt to standardize the sizes or capacities of trucks from the purchaser's or user's standpoint, and afterwards to extend the work in the direction of aiding the manufacturers in standardizing design. The next proceeding was to determine the specification of normal load and the overload of trucks from one to five tons, and it was generally decided by vote that each truck should be capable of rendering normal or continuous service under its tonnage rating and have an overload capacity for temporary or emergency service of 25 per cent. of its normal tonnage capacity.

Next, an attempt was made to determine the desirable speeds for various sizes and the following was the result: One-ton trucks, 15 miles an hour; two-ton, 12; three-ton, 10; four-ton, nine, and five-ton, eight.



KisselKar Ambulance Fitted to 50 Horsepower Chassis, in Use by the Cook County Hospital in Chicago.

NEW KISSELKAR AMBULANCE.

In addition to its full line of pleasure and commercial vehicles, the Kissel Motor Car Company, Hartford, Wis., has specialized to a considerable degree in the designing and equipment of municipal service wagons, ambulances, etc. An accompanying illustration presents the new KisselKar ambulance constructed recently for the Cook County Hospital, Chicago.

The interior of the vehicle, which was designed especially for this institution, is equipped with the latest appliances for the care and comfort of the occupants, and all the most modern sanitary features have been incorporated. The exterior is painted white, and is thoroughly in keeping with the use to which the wagon will be put. The best of material has been used throughout and the workmanship is of the highest order.

The chassis is fitted with a four-cylinder, four-cycle, water-cooled motor having bore of 4.875 inches, and stroke of 4.75, rated at 50 horsepower. The cylinders are cast in pairs, and ignition is by a high-tension magneto. The clutch is a leather faced cone member, and the selective transmission provides four speeds forward and reverse. Drive is by shaft. Two sets of brakes are employed on the rear wheels, being of the internal and external contracting type. The wheelbase is 124 inches, and this with well designed springs and large pneumatic tires, makes for easy riding qualities. The shoes are fitted to demountable rims.

DETROIT ELECTRIC IN GROCERY SERVICE.

The practicability of the 1000-pound electric commercial delivery wagon has been demonstrated fully by the Detroit electric, made by the Anderson Electric

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(Quality of a Master)

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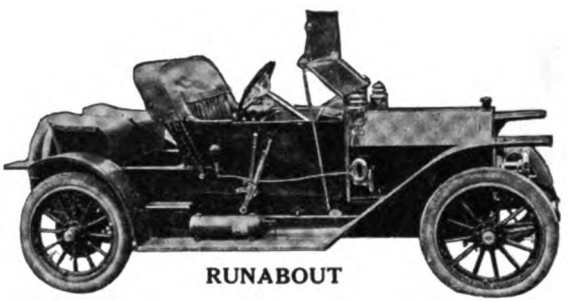
Made on the best plan.

Made of the best material.

Made by the best skill.

It is beyond question the best value offered in 1912 cars.

So secure is the Lenox in the Premier position in the field of middle priced cars, that competition has given way to imitation.



RUNABOUT

$1800 Fully Equipped

SPECIFICATIONS AND EQUIPMENT.

Motor 4 Cyl., 35 H. P., 4 1-8x5 1-4; Force Feed Lubrication; Parsons' white bronze bearings; Heavy crankshaft; three speed transmission (selective type); brake drum 14 in.; rear axle chrome nickel steel, heat treated; wheelbase 116 in.; top, silk mohair; GLASS FRONT--Central Vision Whirlwind; speedometer, Hoffecker; gas tank, Prest-O-Lite; tire irons foot rest, robe rail, tonneau mat and lamps.

SERVICE One of the most important considerations in automobile life is service, and in this department the Lenox affords full factory service to all Lenox buyers. The factory located at 3368 Washington Street, Boston, is always ready to supply any attention needed without the loss of time and large expense necessary to the cars built at distant points.

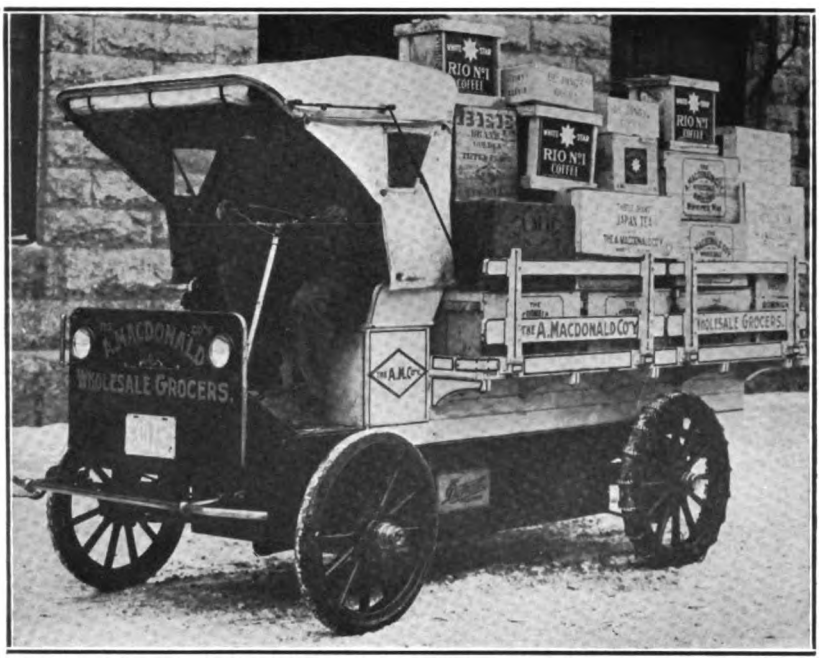


TOURING CAR, $1800

LENOX MOTOR CAR CO. Sales Office, 222 Eliot Street
Factory and Main Office, 3368 Washington St. **BOSTON, MASS.**

WRITE FOR CATALOG

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Detroit Electric Delivery Wagon in Grocery Service in Winnipeg, Man.

Car Company, Detroit, in service with the A. Macdonald Company, Winnipeg, Manitoba. The machine has been in use for six months and given the best of satisfaction, despite the fact that it has been compelled to operate some of the time in weather as low as 20 degrees below zero. The battery equipment is 60 Edison cells, on which the machine has averaged 40 to 50 miles a day, even in the coldest weather.

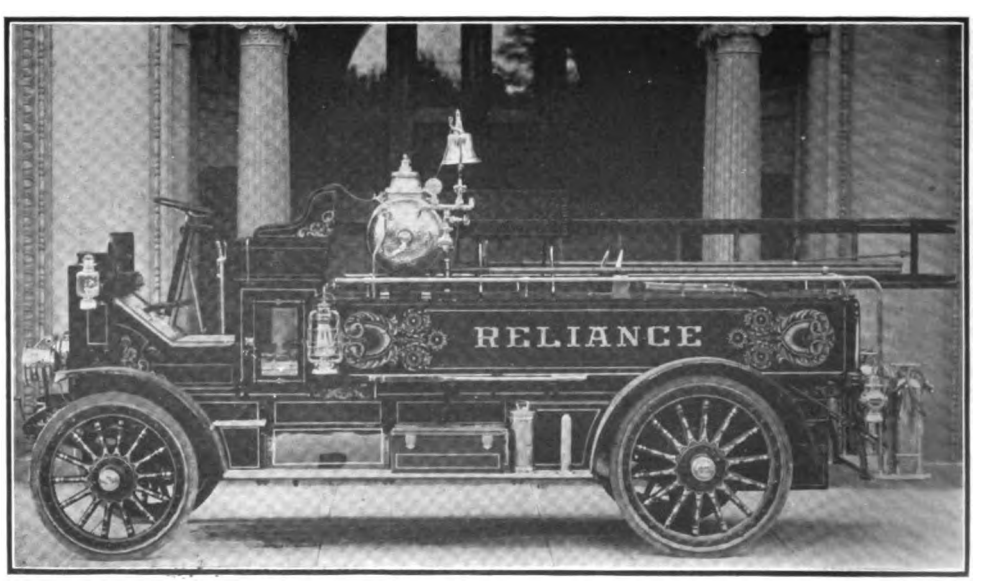
PROTECTING THE RADIATOR.

While nearly all of the American motor truck manufacturers continued to protect the radiator with some form of bumper, the recent shows demonstrated that there is a tendency toward the foreign practise of locating the cooler back of the engine. The most distinctive examples of this are to be found in the Lippard-Stewart, Adams and Universal. In connection with this departure from what may be regarded as standard design in this country, it will prove of interest to note the arguments presented by the makers of these particular vehicles.

The Lippard-Stewart Motor Car Company, Buffalo, N. Y., says: "In placing the radiator at the dash and doing away with the water pump, we have again followed the system in use on high grade foreign cars. As a delivery machine is used mainly in the city, where traffic is heavy, the radiator is in constant danger of damage, if placed in front. If a hole be punched in the radiator, it means that the car is out of service until it can be repaired. By placing ours at the dash, and hanging it in coil springs, to reduce vibration, we practically eliminate another source of trouble. This construction also makes the Lippard-Stewart motor easily accessible for oiling or adjustment, or removal from the car without disturbing other units."

The Adams Bros. Company, Findlay, O., maker of the Adams, utilizes practically the same method of mounting as the Lippard-Stewart, which is shown herewith. The argument used is very similar, being summed up as follows: "To prevent casual injury to Adams trucks, the radiator is placed behind the engine. It is readily filled from either side."

The Universal Motor Truck Company of Detroit, maker of the Universal, carries the matter still further locating the radiator back of the motor and under the seat, where it is cooled by a direct current of air thrown from a Sirocco type fan, contained in the flywheel. Another illustration herewith shows the mounting of the radiator in this machine.

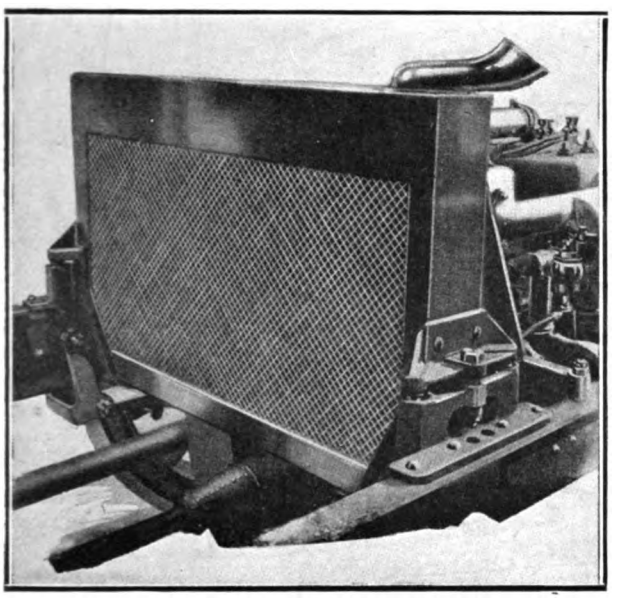


Martin Combination Chemical and Hose Wagon for Department in York, Penn.

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NEW MARTIN FIRE APPARATUS.

A new combination chemical and hose wagon has been placed in the market by the Martin Carriage



Radiator Mounted Under Driver's Seat on Universal.

Works, York, Penn., a well known maker of commercial vehicles for some few years. As will be noted by the accompanying illustration, the vehicle carries a large chemical tank and hose, as well as the usual fire fighting equipment in the nature of ladders, axes, and other appliances. The body is designed to accommodate a full crew of men.

The chassis is fitted with a four-cylinder, four-cycle, water-cooled motor, with 4.5-inch bore and five-inch stroke. This is rated at 36 horsepower and is located under the seat. Ignition is by magneto with a battery in reserve. A multiple disc clutch is employed, and a selective sliding gear affords three speeds forward and reverse, with direct drive on the third. Final drive is by side chains, and two sets of brakes are utilized, one on the jackshaft and the other on the rear wheels. The springs are semi-elliptic in front and half-platform in the rear. The wheelbase is from 132 to 140 inches, and the tires are solid.

TO AMEND MASSACHUSETTS BILL.

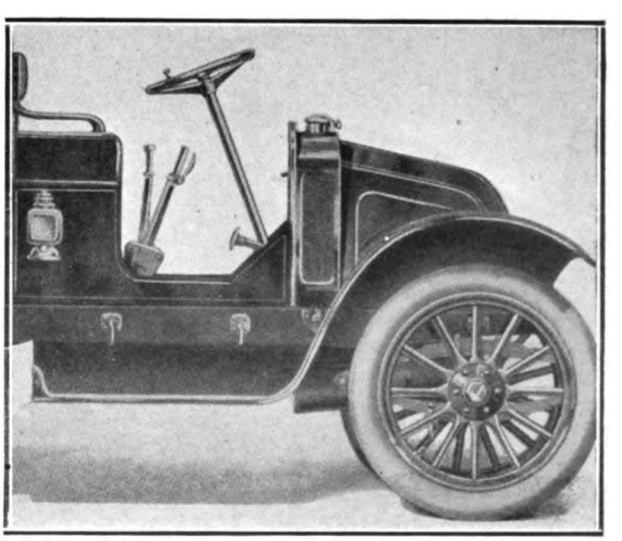
Since the original announcement of the proposed legislation in Massachusetts, seeking to limit the weight of vehicles utilizing the highways in that state, motor truck manufacturers and owners have been decidedly active. A meeting of those interested was held in Boston, Feb. 10, at which steps were taken to secure an amendment to the bill, increasing the weight limit from six to 12 tons. In this amended form, if the legislators take kindly to the suggestion, trucks of five and six tons capacity will be allowed the free use of the highways without a special permit.

There is a strong feeling that the proposed act is much in the nature of class legislation, and that the horsed vehicles were included solely for the purpose of avoiding the question of constitutionality. Another item also has entered into the more recent consideration of the subject, and this has to do with the width of tires on which the heavier loads are carried. While this would have little effect upon the bridge side of the question, it undoubtedly would have a bearing upon the matter of road deterioration. There seems to be every reason to feel that the act will not pass in its original form, although it is expected that some legislation will be adopted with reference to the matter.

PIERCE-ARROW DEMONSTRATION TOUR.
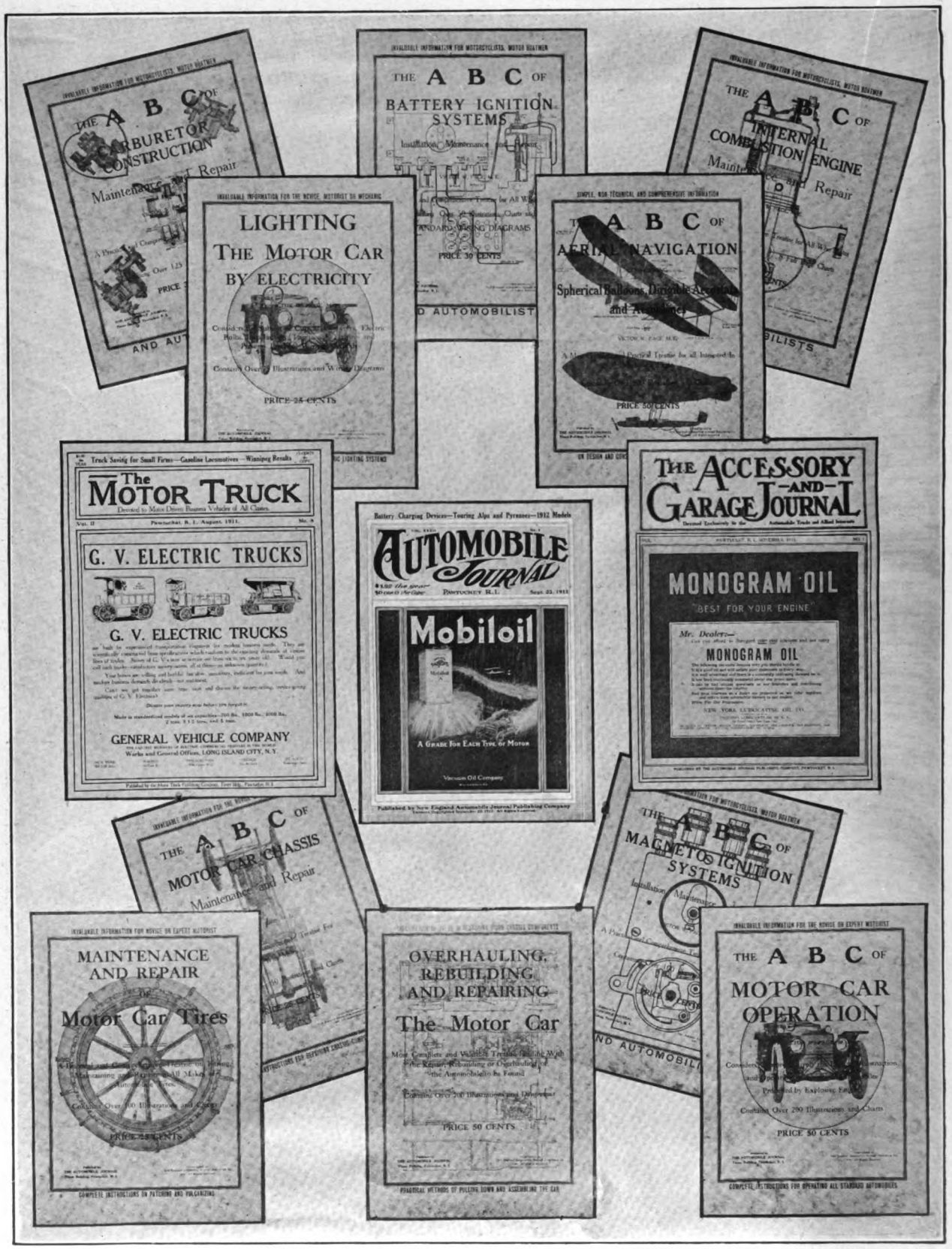
An unusual demonstration trip was undertaken recently by J. E. Cunningham and Fred Bradbury of the J. W. Maguire Company, Boston agent for the Pierce-Arrow worm driven truck, made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y. The tour included central and western Massachusetts and Vermont, and proved a decided test for the five-ton vehicle, although it seemed to have no difficulty in completing the schedule as planned.

From Boston the party drove to Worcester, over heavy snow and much ice the greater portion of the way. This continued to Springfield and Greenfield, and in many places sheet ice was encountered, although the truck was able to keep to the road without the use of tire chains. The outward trip ended in Brattleboro, Vt., 163 miles distant from Boston. The running time was 24:18:00, and 39 gallons of gasoline and five pints of oil were utilized.



Foreign Mounting of Radiator on Lippard-Stewart.

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TIMES BUILDING **PAWTUCKET, R. I.**

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Inasmuch as there is to be no Prince Henry tour this year, a number of the Continental organizations are planning events of this character. The Imperial Austrian Automobile Club has planned a seven-day endurance test over the Alpine roads for June 16-23. The rules provide that only cars equipped with internal combustion motors are qualified to enter.

The cars must have complete, open, four-seated touring bodies, with hood. All integral parts of the engine must be confined within the bonnet, thus preventing the fitting of exterior pipes. No reserve water tanks on the radiators or elsewhere may be carried, unless such are a part of the standard equipment. The bonnet and the inner dustshield will be sealed at the start. Each machine will be required to carry at least three persons, or two persons and ballast, in addition to the official observer and a specified weight of luggage for him. Time occupied in filling tanks, etc., will be added to the running time.

The route covers 1488 miles, with the following itinerary: June 16, Vienna, Semmering, Tauren Pass, to Spittal; 17, Spittal, Jauffen, Mendal Pass, to Madonna di Compiglio; 18, Madonna di Campiglio, Procene, Rolle, Falzarego, to Toblach; 19, Tolbach, Wurzen Pass, to Trieste; 20, rest day; 21, Trieste to Laibach; 22, Laibach, Ridli Pass, to Graz; 23, Graz to Vienna.

Entries at single fees close May 20, and at double fees, June 5. The chief award is to be the Grand Alpine Challenge cup, given by the club, which will become the permanent possession of the competitor who finishes the runs of 1912, 1913 and 1914 with the best average score.

★

Twenty-eight entries have been made for the Tour de France, which is scheduled to start from Paris, March 1, representing the following makes: Barre, Hurtu, Crespelle, Doriot-Flandrin-Parant, Alcyon, Gregoire, Hupmobile, Corre-la Licorne, F. L., Benz, Ronteix, Luxior, Violette, Ford and Delage.

★

Each year the motorists of Continental Europe spend much time in experimenting with motor sleighs or sledges, although very few of these designs are put to practical use, judging from such information as is received in this country. In some of the northern nations, such as Russia, Sweden and Norway, these vehicles have been utilized more or less during the winter months and with comparatively good success. However, the experimentation is more largely confined to the Swiss mountains, where the results are in the nature of sport rather than utility.



Remisi Motor Sleigh with Novel Driving Arrangement, Recently Tested at Chamounix, Switzerland.

Recently a new vehicle termed a Remizi automobile sledge, was tried out at Chamounix with much success. The machine is presented in an accompanying illustration, and the principal feature is the driving means, which may be considered as entirely new.

Two metal cylinders, around which run spiral plates, are disposed underneath the rear of the chassis. Power is transmitted from

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the motor by means of a cardan shaft and suitable mechanism, so that the cylinders are made to revolve in opposite directions. In revolving, the spiral plates are caused to dig into the snow and force the runners ahead. It is claimed that speeds up to 31 miles an hour have been attained over hard snow and ice.

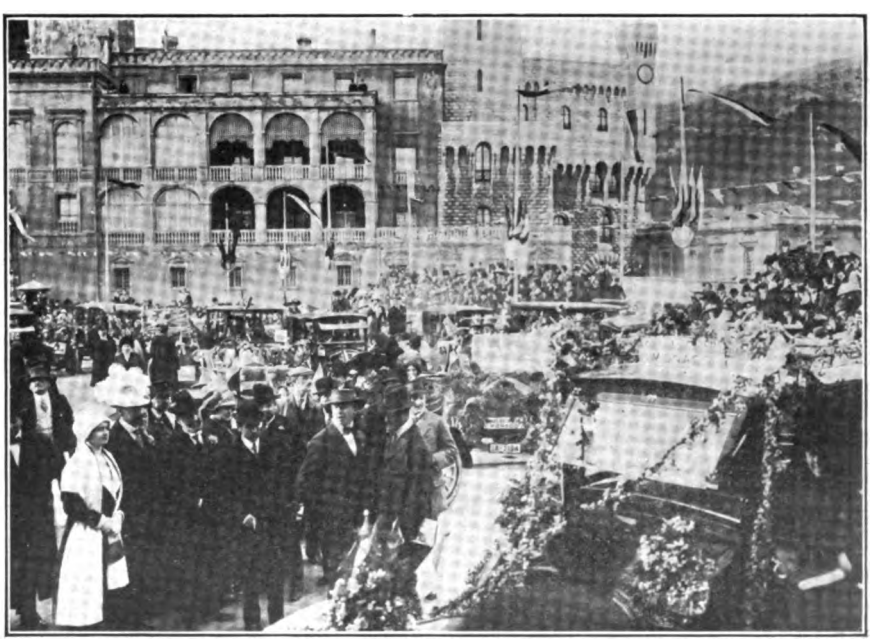
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Switzerland is still passing regulations restricting the use of automobiles. The cantons of Glarus and Zurich have before them orders prohibiting the use of motor vehicles Sunday afternoons and to allow night traffic only during certain hours, except within the city limits of Winterthur and Zurich. As is well known automobiles of every description are excluded entirely from the canton of Graubunden (Grisons).

★

The annual rally of Continental motorists at Monte Carlo, Jan. 28, brought together some 58 cars, although 66 owners entered in the contest from various capitals. Officially, the event was in the nature of an economy run, the highest score going to the cars which maintained an average speed of 15.5 miles an hour. In fact, it was a series of road races, in which nearly all of the competitors tried to cover the intervening distance in the shortest possible time.

Motorists started from Paris, Vienna, St. Petersburg, Berlin, Havre, Boulogne, Brussels, Amsterdam and Geneva at the same time. Twenty-two cars left Paris, one of them being an American Ford. Robert Donocin in a 40 horsepower Gobron drove right through from Paris to Monte Carlo in 24:41:00, or at an average speed of 25.5 miles an hour, only about 40 minutes behind the fastest express train running between the two cities. The Ford averaged 16 miles an hour throughout the entire distance. The only other American car was an E-M-F, which was driven from Vienna, 818 miles, at an average of 10 miles an hour.



Arrival of Continental Motorists at Monte Carlo During the Annual Rally at Monaco.

★

The Imperial Russian Automobile Club will hold its fourth international motor car exhibition in St. Petersburg, early in 1913.

★

A consular officer located in northern Africa has been requested by a leading firm in his district to be placed in touch with an American manufacturer of a low priced, well made automobile, costing the purchaser from $750 to $1500. It is stated that the concern has extensive capital and would like to secure the agency for such cars in this territory. The address may be secured from the bureau of manufactures, Department of Commerce and Labor, at Washington.

★

The first automobile club run ever held in Japan took place early last month, under the auspices of the Nippon Automobile Club. The owners of 37 cars were represented, and the distance covered was nearly 70 miles, from Hibiya Park to the foot of Mount Takao and return. The round trip was made in 3:45:00, and a social stop was made at the turning point.

Fifteen of the cars were owned in Tokyo, while the remainder were from Yokohama. Kihichuro Okura in a 100 horsepower racing machine acted as pacemaker. Three drivers lost their way before getting outside the city limits, but so soon as the country districts were reached the vehicles were all in line. Fully 50,000 men, women and children lined the route throughout the entire distance, and the event took on something of the nature of a national holiday, in consequence.

The result was very similar to a contest covering this distance in America. There was some tire trouble, but practically no accidents. The success of this first venture was such that it already is determined that numerous other runs will be held during the coming season.

★

The three-ton Gramm truck which was shipped from the factory of the Gramm Motor Car Company, Lima, O., to St. Petersburg, Russia, for demonstra-

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tion purposes last September, has been sold to the Russian government and will be used by the army. For the past two months, the vehicle has been in constant daily service in charge of soldier chauffeurs, and during that time has needed no repairs or adjustments. This is said to be the first American truck to appear in Russia, and now that it has been adopted by the Russian army it is anticipated that a splendid market for American vehicles will result.

★

The Saskatchewan Motor League was organized recently at Regina, the objects being to secure reasonable automobile legislation, promote good roads and seek the enforcement of existing laws. Among the first duties of the official board will be that of working in conjunction with the legislators for the passage of the proposed act regulating the speed and operation of motor vehicles.

The following officers have been elected: President, R. Loney, Moose Jaw, first vice president, Sheriff Calder, Saskatoon; second vice president, Sheriff Cook, Regina; third vice president, E. Williamson, Indian Head; secretary-treasurer, H. V. Bigelow, Regina; executive committee, R. Loney, J. C. Coe, Moose Jaw; Sheriff Calder, W. H. Coy, Saskatoon; H. V. Bigelow, Sheriff Cook, Regina; E. Williamson, Andrew Dickson, Indian Head.

★

The annual meeting of the Ontario Motor League held in Toronto last month, indicated that the affairs of the association were in excellent condition. Substantial progress and growth were noted in the report of President Paul J. Myler. Much time and effort has been expended upon legislative matters, and it was announced that satisfactory results had been obtained for the most part. The election of officers resulted as follows:

President, F. E. Mutton; first vice president, W. G. Tretheway; second vice president, Oliver Hezzelwood; secretary, Main Johnson; honorary secretary, E. M. Wilcox. Mr. Wilcox has been secretary of the league since its organization five years ago, and has worked untiringly for its success. Largely through his efforts the annual shows in the Dominion have become of immense importance to the industry both at home and in the States. At his own request he was relieved of the active work, because of the pressure of private business, but he will take much the same interest in the league's progress.

★

The minister of agriculture in Uruguay is organizing a motor plow competition, which will be held some time during the coming summer.

★

According to returns from 10 different European countries, based upon the licenses and taxes collected, there is a total of 223,882 motor cars owned and operated in these countries, distributed as follows: United Kingdom, 75,600; France, 64,209; Germany, 53,000; Belgium, 11,600; Italy, 6300; Austria, 5900; Switzerland, 3670; Sweden, 2950; Luxemburg, 153.

★

Good roads appropriations will be increased materially in western Canada during the 1912 season, if present reports may be accepted. Twenty-eight representatives of Canadian highways associations recently waited on Thomas Taylor, minister of public works at Victoria, B. C., who told them that a big appropriation would be made by the provincial government for the construction, improvement and maintenance of highways throughout British Columbia.

Hazelton, about 40 miles from the Alaskan boundary, is more than ever anxious to secure a portion of the roads appropriation, since the arrival of P. E. Sands in the Flanders car from Seattle, Wash. Large deposits of coal have been discovered in this immediate vicinity, and improvement of the highways will permit of working these mines at a decided profit.

★

Calcutta furnished 120 cars for the Durbar festivities at Delhi, India, among which were 25 Fords (American), supplied by Kilburn & Co. The other concerns represented were: Taxicab Company with 40; T. R. Pratt & Co., with 30, and French Motor Company with 25.

★

The committee which organized the agricultural motor trials at Melun and Laon, France, last year, has decided to hold another competition, Feb. 25-29. Additional tests of a similar character will be held at Bourges, Sept. 26-Oct. 6.

★

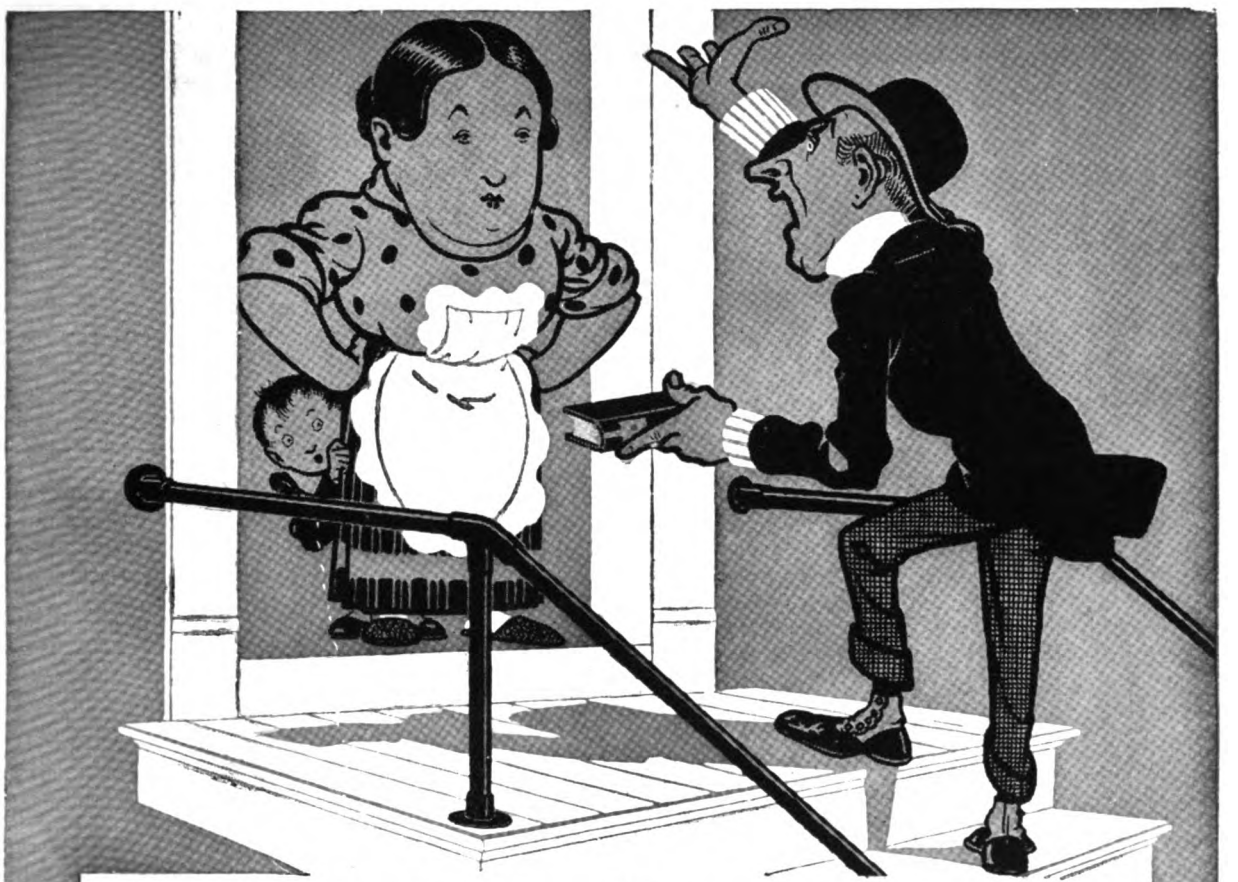
The city of Wellington, New Zealand, has been experimenting with wood block pavement, and has come to the conclusion that it is more economical than the older method of utilizing crushed stone. The new pavement costs about $4.38 a square yard, as against $1 to $1.25 for the older, but it is estimated that it will withstand the heaviest traffic for at least 20 years, whereas the crushed stone has demonstrated that it will last no more than three or four. The blocks are made from jarrah wood, imported from western Australia, and are laid on a concrete foundation. The only care is an occasional coating of tar, sprinkled with sand.

It is intimated that American manufacturers might find a market in New Zealand and Australia for motor driven street sprinklers and sweepers, although this subject has been given only casual consideration as yet.

DINGLEY IN 500-MILE RACE.

Bert Dingley will drive a Simplex racing car, entered by W. H. Carlson of Los Angeles, Cal., in the 500-mile race on the Indianapolis speedway, Memorial Day. He also will drive this car, a 50 horsepower model, in the road races at Bakersfield, Cal., May 4.

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We have always credited the *other man* with just as much common sense and just as much commercial judgment as we possess.

We had a *business* training before we had a *speedometer* training and it taught us that the way to make a *lot of money* is to make a *lot of goods* and a *very little* on each sale.

So we aimed at *output* from the very outset.

We built a *factory* that would give us output.

We believed that the automobile business would *grow* and that there was no *risk* in planning to grow with it.

We installed the *finest* machinery that money could buy, and when we could not find it good enough we had it made special.

We calculated that the day would come when speedometers would *have* to be *sold* at a *normal margin*, and when we found the exorbitant profits that were being charged, we figured that the time to start figuring down to bedrock was the *first day* that we went out for orders.

That's why *four cars* out of five carry *Stewart Speedometers*. Eighty per cent of car owners are so level-headed that they make sure they are getting the utmost for their money.

If the *Stewart* were not more accurate—were not built *stronger*, were not more *reliable*—somebody else would be selling *four* speedometers to our one.

There's no *test* like the test of *sales*.

Magnetic principle—jewel bearings—wearing parts hardened and polished—open dial—large figures—easily read—absolutely accurate—100,000-mile season odometer—100-mile trip register, can be reset to any tenth of a mile—guaranteed for five years—strongest flexible shaft drop forged swivel joint—noiseless gears.



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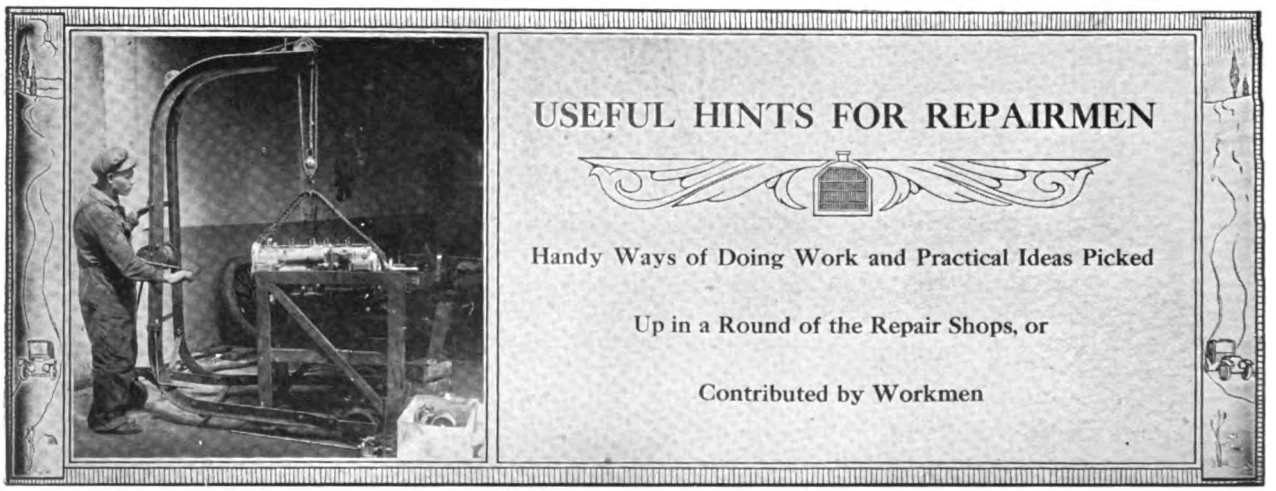
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IXION TWO-CYCLE MOTOR.

A two-cycle, single-cylinder, water-cooled motor which presents an unusual feature inasmuch as no valves are utilized in connection with the induction of the mixture, is presented in the Ixion, an English product, depicted at Fig. 1. The mixture from the carburetor obtains access to the crank chamber or base of the motor by means of a crankshaft port, as will be noted in the drawing. The terminus of this port registers with the opening of the inlet lead when the piston is making its upward stroke.

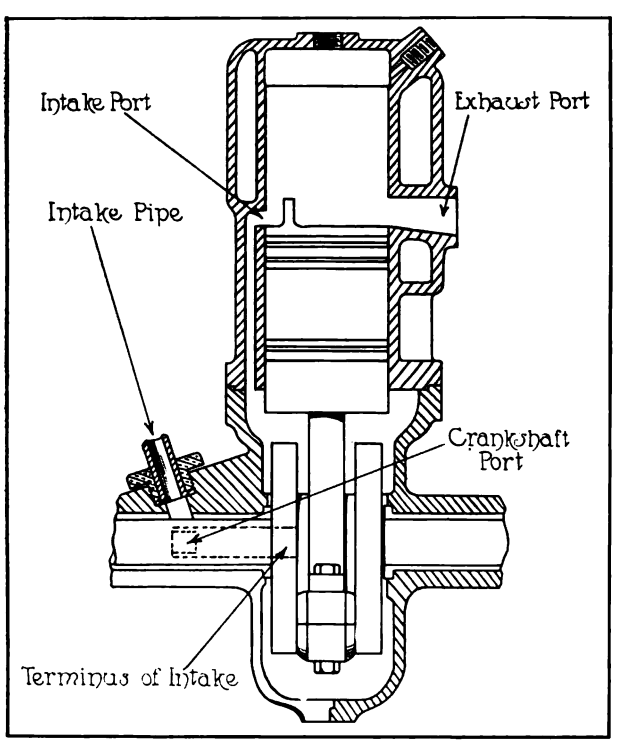


Fig. 1—Two-Cycle Motor the Design of Which Dispenses with Valves in the Induction of the Mixture.

In other respects it is similar to the ordinary two-cycle motor, as the mixture is drawn into the crankcase and compressed to some extent by the downstroke of the piston. The gas escapes from the engine base by an opening formed in the walls of the cylinder, and enters the latter by the intake port which is uncovered by the piston in its movement. The piston head is fitted with the usual baffle plate for deflecting the gas, and the exhaust passes out through another port.

LOCATING CYLINDER CRACKS.

Sometimes a flaw in a cylinder casting will allow a slight amount of water to percolate into the combustion chamber, and when the cracks are not perceptible to the naked eye they may be located by using pressure. The water outlets should be stopped up with one exception, which is coupled to a pipe from the steam vulcanizer and the steam turned on at about 20 pounds or so, when the leak will be detected readily. This may be reached by cutting away the water jacket, and the latter repaired by welding.

GLASS CEMENT.

To cement glass, melt some resin and stir in calcined plaster until reduced to a paste, to which add boiled oil of a sufficient quantity to bring it to the consistency of honey. Apply warm. An alternate method is to mix in the following proportions: Melted resin 180 parts, burnt umber 30 parts, calcined plaster 15 parts, and boiled oil eight parts.

INSTALLING STORAGE BATTERIES.

One of the chief causes of injury to storage batteries is the jolting they receive when the car is passing over rough roads. The cases containing the cells frequently become strained or chafed, allowing some of the solution to leak out, or the active material in the plates becomes dislodged. These troubles may be overcome when fitting battery boxes to the machine

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by making the container larger than the battery and forcing between the latter and the walls of the box small air tight rubber balls, such as children play with. These will hold the battery in place firmly and absorb all shocks.

PISTON RING DEVICE.

Removing and fitting piston rings requires care upon the part of the workmen as the members are fragile and broken easily. Various devices are made for this work and these range from strips of metal to forms of clamps. A piston ring manipulator has been brought out by an English concern, and it is claimed for the device that rings may be removed and fitted easily without liability of damage, and that the work is much simplified. The instrument is manipulated by turning a wing headed screw, illustrated at Fig. 2 A, and expansion is brought about by a similar operation, the screw drawing up a grooved circular disc which in turn bears upon the inner sides of the sloping toggles. The latter are in duplicate and secured, as shown, to the outer plates, so keeping these vertical and parallel.

UTILIZING OLD HACKSAW BLADES.

In the average repair shop broken hacksaw blades are consigned to the scrap heap although the members may be new and may have snapped near the end, frequently at the first cut or two of the tool. While saw frames are adjustable they usually will not take the broken members, and there also is no provision for clamping the blade.

At D is shown an easily made device for utilizing the broken blades. It consists of a frame made of .75-inch brass or copper tube which is bent into shape as shown. The under corners are flattened to hold the blade, and all sharp edges are smoothed up. Two small set screws are placed in convenient positions to hold the blades.

FILING STEPPED KEYS.

In filing stepped keys for an accurate fit, sometimes it is difficult to obtain correct alignment. At B is presented a jig for this kind of work and the loose top may be adjusted to guide a file as required.

SECURING HAMMER HEADS.

Broken hammer handles are not uncommon, and in fitting a new shaft the following method is employed by a repairman: Turn the end to be inserted to a driving fit, saw a fairly long V slot in it lengthways, and make a wedge that will fit snugly. Next bend a piece of .03125-inch sheet iron to fit over the wedge, and punch a few holes in it with a centre punch, making the outside edges rough as shown at C. Place the sheet iron in the slot, insert wedge and drive both in firmly. It is a good plan to soak the wooden handle in water a few hours before attaching the hammer.

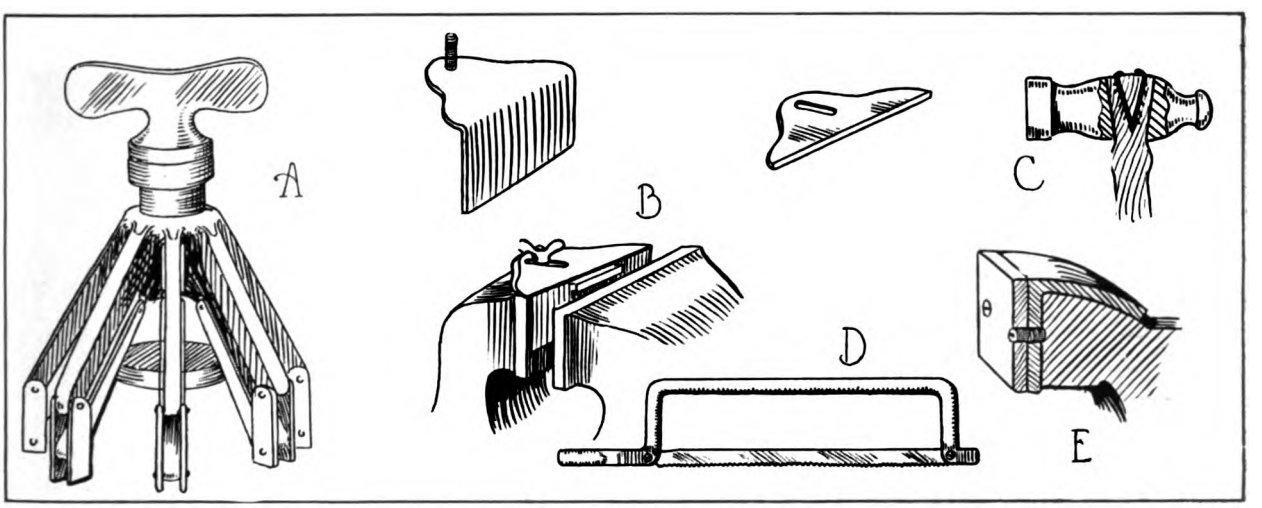


Fig. 2—Some Repair Shop Hints: A, Piston Ring Manipulator; B, Jig for Filing Stepped Keys; C, Wedge for Fitting Handle to Hammer; D, Hacksaw Frame Made of Tubing to Take Short Blades; E, Substantial Vise Clamp.

SOLDERING ALUMINUM.

Small surfaces of aluminum may be soldered by the use of zinc and venetian turpentine. Place the solder upon the metal together with the turpentine and heat very gently with a blowpipe until the solder is entirely melted. Large surfaces cannot be soldered easily because the solder will not flow gently.

Another method is to clean the aluminum surfaces by scraping, and cover with a layer of paraffine wax as a flux. Then coat the surfaces by fusion, with a layer of an alloy of zinc, tin and lead, preferably in

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the following proportions: Zinc five parts, tin two parts, lead one part. The metallic surfaces thus prepared may be soldered together either by means of zinc or cadmium, or alloys of aluminum with these metals. Any good soldering preparation will answer the purpose.

A good solder for low grade work is the following: Tin 95 parts, bismuth five parts. A good flux in all cases is either stearin, vaseline, paraffine, copaiva balsam, or benzine. In the operation of soldering, small tools of aluminum should be used, which facilitate at the same time the fusion of the solder and its adhesion to the previously prepared surfaces. Tools made of copper or brass should be avoided as they form colored alloys with the aluminum and the solder.

A SIMPLE VISE KINK.

Frequent use of the vise results in the knobs on the handles becoming roughened and when considerable filing is done the hole fills with chips and dirt. This can be prevented by fitting a couple of rings, such as come on mineral water bottles, and placing them just under the knobs of the vise handle.

STURDY VISE CLAMP.

Vise clamps which present a square edge for holding small work and which wear considerably longer than the usual members, may be made from a piece of .1875-inch sheet iron by hammering them to shape in the tightened vise. Next rivet on the inside face of the clamps a squared piece of brass and copper, as shown at E, and trim off the edges with a file.

CARE OF GRINDING MACHINES.

The durability of a grinding machine depends largely upon the care of the operator, and will soon become unreliable if not looked after, no matter how well it may have been constructed. All wearing surfaces should be guarded carefully and kept well supplied with oil. The use of a good quality of machine oil is recommended in preference to cheap grades. Oil holes which are closed with screws usually have the words "oil hole" stamped around them, and care should be used when inserting lubricant to prevent dirt and emery grit from entering the oil.

Grinding machines should be kept as clean as possible and care should be taken that the bearings do not gum up. When opened or exposed for any purpose whatever, they should be wiped carefully before being closed again to eliminate any grit that may have lodged upon the surfaces. The spindle boxes should be clean when assembled and before tightening the caps the oil space should be filled with a good lubricant, not lard oil, and the wheel turned slowly while first one cap and then the other is screwed down until quite tight. The felt that supplies the oil to the spindle also should be kept clean.

Water should always be used on such classes of work as are affected by a change of temperature caused by grinding. It also should be used upon work revolving upon centres, as in this instance a slight change in temperature will cause the wheel to cut on one side of the piece after it has been ground apparently round. In very accurate grinding, water is especially useful, for the exactness of the work will be affected by a change in temperature which is not perceptible to the touch. It is well to use the water over and over again, as there is less difference between the temperature of the fluid and the work than if fresh water be used. Work that will grind smooth with water will often develop minute vibrations when ground dry. There is, apparently, a rapid fluctuation of temperature, which causes the work to approach and recede from the wheel very rapidly, thus leaving a rough or mottled surface.

Emery wheels always should be kept true. This can be done easily by using a diamond tool, known as the black diamond or carbon point, held in the hand or in the fixture furnished with the machine. A new emery wheel should be started slowly and trued gradually. In mounting this, elastic washers always should be placed between the wheel and the flanges. Sheet rubber is recommended for this purpose, but soft leather will answer. In some cases manufacturers attach thick, soft paper washers to each side of the wheel. When this is done it is all that is necessary. A satisfactory emery wheel is an important factor in the production of good work. Too much, however, must not be expected of one wheel. A variety of shapes, sizes and grades is necessary for the grinding machine, the same as are necessary to obtain the best results from the lathe or milling machine.

PRESERVING INNER TUBES.

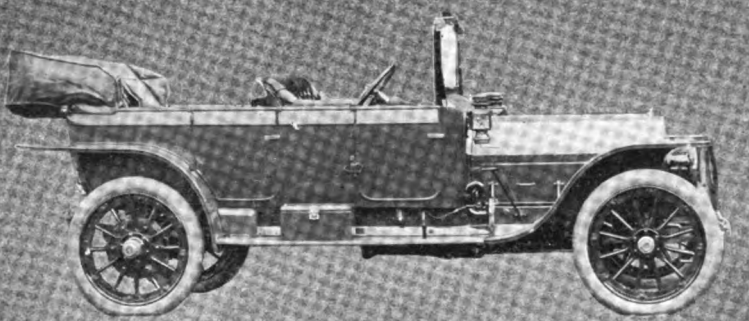
A repairman with considerable experience in storing machines recommends the following treatment for keeping the spare inner tubes soft: They are taken from the car and immersed in hot water for about 10 minutes, then removed and carefully dried. Another method, which is said to prevent the deterioration of the rubber is to utilize a solution of alcohol and turpentine. The latter is poured into the alcohol, and when applied to the tube the spirit will evaporate, leaving a thin protective coating of turpentine. Tires may be treated similarly.

NO CHANGE IN CALLAN LAW.

Secretary of State Lazansky of New York said recently that he would make no recommendation for a change in the present law, believing that it should be given a fair trial before making any amendments.

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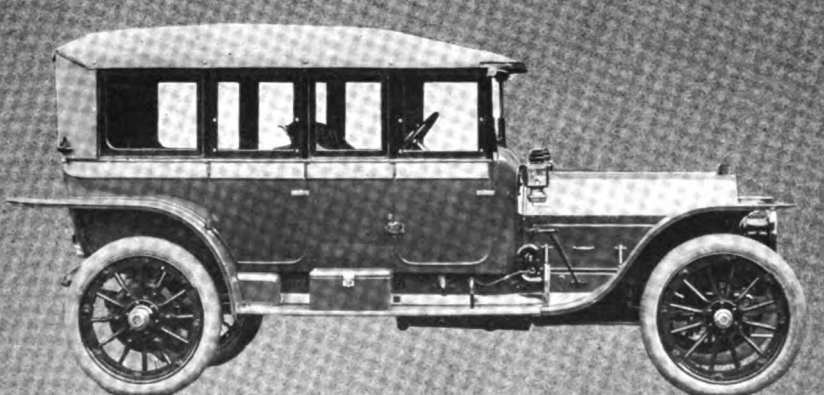
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Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
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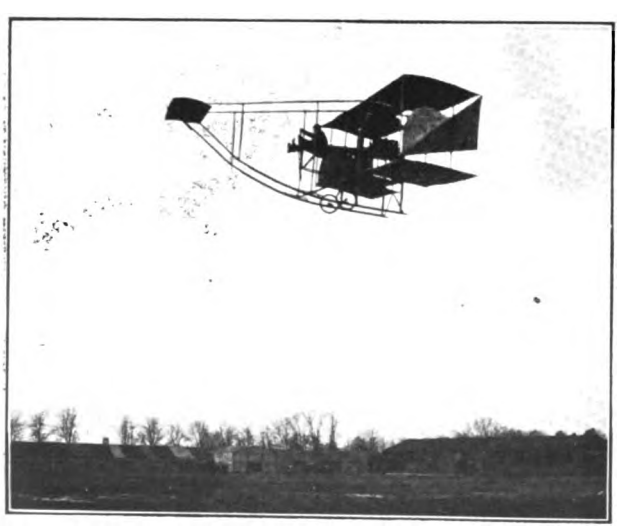
SPRINGFIELD, MASSACHUSETTS.

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Inglis M. Uppercu, manager of the Cadillac Motor Car Company of New York City, has become the head of a manufacturing concern which will produce the Boland biplane, recently invented and flown with success by Frank E. Boland of Rahway, N. J. It is understood that the plant will be located in New Jersey. Boland, who is shown at the wheel in the accompanying illustration, not only designed the machine but the power plant as well.

The Boland biplane has no tail or rudder, being chopped off immediately behind the main planes and the propeller. The elevator is in front. Steering is accomplished by a triangular device termed a jib, two



Frank E. Boland Flying the New Boland Biplane at Mineola, L. I.

of these being fitted on each side between the wing extremities. All the controls are concentrated in a wheel, which is handled exactly like an automobile steering wheel.

The principle of the jib is as follows: Shifting it on its diagonal hinge banks the machine, and makes it turn to whichever side the shift has been made. Whenever a tendency to tip to one side is noted, a corresponding change in the jib restores an even keel, immediately. It is claimed that it is possible to make much more acute angles than have been accomplished with other designs.

The motor is an eight-cylinder, four-cycle, V shaped unit, capable of developing a speed of 60 miles an hour.

For the second time the American Continent had been crossed by aeroplane, when Robert G. Fowler alighted at Moncrief Park, Jacksonville, Fla., Feb. 8. The first transcontinental flight was accomplished by Calbraith P. Rodgers in a Wright biplane. Fowler's machine was of the same make, although it was fitted with a Cole automobile engine, made by the Cole Motor Car Company, Indianapolis, Ind.

It will be remembered that Fowler left San Francisco, Cal., Sept. 11, bound for New York, but found the air current at Emigrant Gap too powerful for his machine, although he made a strong fight for a number of days. He started a second time from Los Angeles, Oct. 21, and met Rodgers on the latter's western trip in Arizona. He covered 1700 miles in 18 flying days to Houston, Tex., arrived in New Orleans, Dec. 31, left that city Jan. 4, and arrived in Brantley, Ala., Jan. 20, having flown but five days in that time on account of storms.

Although the Harvard Aeronautical Society has announced its intention of not holding any further aviation meets at Squantum, Mass., it is stated that a series of competitions has been arranged for this flying field under private management, June 29-July 7. It is understood that the meet will have the sanction of the Aero Club of America, and that the following aviators will be among those who will take part: Lincoln Beachey, Charles Willard and three other Curtiss flyers; Miss Blanche Scott, Miss Mathilde Moisant, Miss Harriet Quimby, and at least two operators of Wright machines.

The Burgess Co. & Curtis, Marblehead, Mass., maker of the Burgess-Curtis and Burgess-Wright biplanes and hydro-aeroplanes, is at work on three new types of military machines in conjunction with army and navy experts. Evidently, this well known concern is to depart materially from its former designs in these craft.

The first type is to be a high speed monoplane, although but little additional information is available.

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Experiments have been made with a view to determining whether the revolving Gnome or the Renault engine will be utilized.

The second machine is to be a biplane, but with special ability for carrying heavy weight. This also will be equipped with a foreign motor of either 50 or 70 horsepower, giving a speed of 40 to 50 miles an hour while carrying 450 pounds in addition to fuel, water and other supplies.

The third is to be a special navy hydro-aeroplane. The specifications call for a machine that can be taken on board or launched from a ship with ease, and at the same time will permit of being stowed away compactly between decks and quickly assembled.

Announcement is made by the Aero Club of America that the Wright Company, which holds the Wright patents, has granted permission for the use of any and all foreign machines during the international meet of 1912, and particularly during the race for the International cup. It is anticipated that this information will be welcome news to foreign aviators, and that many will make entry who otherwise would have refrained from doing so.

Two German army aviators flew from Doeberitz, near Berlin, to Hamburg, a distance of some 150 miles, without making a landing and at a speed of 66 miles an hour, according to a recent dispatch from the latter city. This speed is a trifle better than that made by Maurice Tabuteau at Pau, France, in January, when he covered 155 miles without alighting at 65.5 miles an hour. Of course, Tabuteau's record was made over a closed circuit, and probably will remain as the official speed mark.

Jules Vendrines, the noted French aviator, has been covering a lecture tour throughout France, his subject being "Aviation," and as becomes a man of his profession, he has been making the journey by aeroplane. Utilizing his Deperdussin monoplane, he flew from Pau to Toulouse, where he filled his first engagement, thence to Castelnaudray, Marseilles and Carcassonnee, at each of which places he was fortunate in not being obliged to disappoint his audience on account of weather conditions.

The first Japanese biplane to be constructed is shown in an accompanying illustration. Recently, a monoplane was brought out in that country, and gave decided satisfaction. The machine under consideration here was designed and built by Baron Schigueno, and is said to have been sold to the Japanese army.



First Military Biplane of Japanese Construction, Built by Baron Schigueno for the Japanese Army.

It is a military biplane, in every sense of the word, and is expected to carry at least one passenger, beside the operator.

In the main, it differs but slightly from accepted standard design as exemplified by a number of French machines although its construction is of steel tubing throughout. The upper main plane has a spread of 29.5 feet, while the lower has but 19.6 feet. The width is about six feet. It will be noted that the trailing edge is more or less flexible, although it is impossible to go into minute details, because of the limited information at hand.

The weight of the complete machine, minus the operator, is 660 pounds. The power plant is a Gregoire Gyp, rated at 30-40 horsepower. The original tests were made in France, where the biplane was constructed under the direction of Baron Schigueno, and it is said to have performed very creditably.

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Baroness de la Roche, the first woman aviator, who was so severely injured in an accident at Rhiems, France, in July, 1910, that it was feared she never would be able to walk again, to say nothing of flying, was a passenger with Rene Simon in his new Bleriot monoplane over the city of Paris last month. It will be remembered that the Baroness was flying her Voisin biplane near the ground when Lindpainter in a Sommer flew over her so closely as to set up counter currents of air which dashed her machine to earth before she could right it. One of the results of the accident was the establishment of new rules by the Federation Aeronautique Internationale, defining the distance which must be maintained between two machines in flight. It is not announced whether or not Baroness de la Roche will resume the operation of flying machines.

Mail advices from France give the exact figures of the new records secured last month by Leon Bathiat in a Sommer monoplane at Douzy. The old marks were set earlier in the month by Jules Vendrines in a Deperdussin monoplane. Both sets of figures are given below:

Distance		New Record	Old Record
Kilos	Miles	Bathiat	Vendrines
10	6.2	4:08.2	4:13.4
20	12.4	8:13.2	8:26.6
30	18.6	12:25.2	12:40.6
40	24.8	16:33.2	16:53.0
50	31.0	20:43.2	21:04.0
100	62.1	41:29.6	41:56.8

Additional information concerning the proposed aerial tour for the Prince Henry trophy over the upper Rhine circuit in Germany this year, indicates that an effort will be made to limit the speed of the machines. No engine of more than 100 horsepower may be fitted, and each competitor must be accompanied by a passenger.

The first hydro-aeroplane meet ever held will take place at Monte Carlo, Monaco, March 24-29. At present it does not appear that there are sufficient machines of this type being made to warrant the holding of such contests, but the idea seems to be to inspire more attention to this subject. It is understood that military and navy authorities are much interested in the subject, and it is hoped that several constructors who have not given the matter consideration in the past will bring out hydro-aeroplanes at this time.

Louis Paulhan, who has done very little flying during the past two years, except when it has appeared necessary to try out a new machine of his construction, has made entry and will fly a Curtiss hydro-aeroplane, made in America. The only other entrant thus far is Eugene Collieux, who will operate a Voisin canard. It is possible that America will be still further represented by Hugh Robinson in a second Curtiss machine, inasmuch as he is at present at Nice, where he has been giving demonstrations.

A. V. Roe of England, who will be remembered as having taken part in the first Harvard-Boston meet at Squantum, Mass., in 1910, although at that time he was demonstrating his Roe triplane, which was discarded soon afterward for the Avro biplane, has brought out the first Bleriot hydro-aeroplane. This machine consists of an Avro biplane to which has been fitted a pair of floats under the forward end of the fuselage and two smaller floats near the tips of the lower main planes. E. W. Wakefield has been giving the new machine several successful tests at Lake Windemere, and an effort will be made to interest the British naval officials.

Jan. 27 being the birthday of Kaiser Wilhelm of Germany, he announced a prize of 50,000 marks to be awarded the maker of the best aviation motor in Germany previous to his next birthday. The victor will be decided by a commission consisting of representatives of the Imperial Automobile Club, Imperial Aero Club, Association of German Aeroplane Manufacturers, Charlottenburg University, and the ministers of the interior, navy, army and public instruction.

Louis Bleriot has produced another new Bleriot monoplane, this being known as Type XXVII. It was given its initial trials at Etampes, France, last month, and performed so satisfactorily that Rene Barrier has purchased one to use on his forthcoming American tour. The new machine is denominated a "Baby" Bleriot. The fuselage is entirely covered, and with a 50 horsepower Gnome engine is said to be able to attain a speed of 80 miles an hour.

Frank Coffyn made a number of flights over, on and in the Hudson river at New York City early in the month, utilizing a Wright biplane with hydroplane attachments. This machine, or at least the hydro-aeroplane feature, was constructed in the shops of Russell A. Alger at Detroit, and is believed to be the first Wright biplane to be thus equipped. It seemed to matter little whether the aviator was driving it through the open water, over frozen ice or in the air, and Coffyn was satisfied that the new aerial craft was a decided success from every viewpoint.

Clifton O. Hadley in a Baldwin "Red Devil" biplane raced Fred Koenig in a Mercedes automobile from New York City to Tarrytown, Feb. 12, the motor car running over the ice and the aeroplane in its natural element. The latter won easily, and later Hadley raced with the Empire State Express for a considerable distance, arriving in Tarrytown ahead of both of his competitors.

Following the example set by the Connecticut Legislature last year, Senator McManus has introduced a bill in New York for the licensing of aviators in that state. Previous to registration the applicant must be examined under supervision of the secretary of state.

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COMING EVENTS.

February.

Feb. 24-March 2—Show, Brooklyn, N. Y.
Feb. 26-March 2—Show, New Haven, Conn.
Feb. 26-March 2—Show, Paterson, N. J.
Feb. 26-March 2—Show, Elmira, N. Y.
Feb. 26-March 2—Show, Davenport, Ia.
Feb. 26-March 2—Show, Quincy, Ill.
Feb. 29-March 2—Show, Fort Wayne, Ind.

March.

March 2-9 —Pleasure car show, Boston, Mass.
March 2-9 —Show, Norfolk, Va.
March 4-8 —Reliability run, Houston, Tex.
March 4-9 —Show, Des Moines, Ia.
March 4-9 —Show, Reading, Penn.
March 6-9 —Show, Tiffiin, O.
March 6-9 —Show, Louisville, Ky.
March 11-16—Show, Cedar Rapids, Ia.
March 12-16—Show, Denver, Col.
March 13-20—Commercial car show, Boston, Mass.
March 16-23—Show, Syracuse, N. Y.
March 25-30—Show, Indianapolis, Ind.

April.

April 27—Speedway meet, Los Angeles, Cal.
April 27—Roadability run, Philadelphia, Penn.

May.

May 4—Road races, Bakersfield, Cal.
May 15-17—Commercial car run, Chicago, Ill.
May 30—500-mile race, Indianapolis, Ind.
May 30—Track events, Salem, N. H.

June.

June 20—Algonquin hill climb, Chicago, Ill.

July.

July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach meet, Old Orchard, Me.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Road races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

MASSACHUSETTS' LEGISLATIVE PROGRAMME.

No less than 15 proposed amendments to the motor vehicle laws of the commonwealth are before the Massachusetts Legislature for action at the present session. Perhaps the most important is that limiting the weight of vehicles using the highways and bridges, although this is so worded that it does not become an amendment to the motoring law. Some of the others may be outlined briefly as follows:

Requiring all owners of motor cars to file a bond of $5000 as security for any judgment obtained against them for injuries caused by the operation of their cars; requiring motor cars to be run at all times at such speed as to avoid accidents; making owners responsible for all accidents caused by their cars; adopting a uniform signalling device; eliminating the eight miles an hour clause with reference to approaching curves and corners; limiting the size of the top or cover of a motor vehicle unless it is of a certain color; providing for a physical examination of all applicants for licenses; arranging the gearing of motor cars so that they cannot be operated at a speed greater than 30 miles an hour.

ARMY TRUCKS ON ENDURANCE TEST.

Three army motor trucks left Washington, D. C., recently on a 1500-mile endurance run to Fort Benjamin Harrison, Indianapolis, Ind. The route lay through the following cities: Richmond, Va.; Raleigh and Charlotte, N. C.; Atlanta, Ga.; Chattanooga and Nashville, Tenn., and Louisville, Ky. The machines were operated by soldiers and each carried a load of 3000 pounds.

WITHDRAWS INSURANCE ORDER.

Urgent protests from the motorists of St. Louis and Kansas City have induced Supt. Blake of the insurance department in Missouri to withdraw his somewhat drastic order prohibiting insurance companies from writing liability business in that commonwealth. It was pointed out that an uninsured automobile is not only a constant liability to the owner, but imposes unnecessary hazard upon persons who may be injured accidentally by its operation.

DECATUR TRUCK TO MOVE.

A dispatch from Decatur, Ind., announces that the Decatur Motor Car Company, maker of Decatur trucks, will remove to Grand Rapids, Mich. It is understood residents of the latter city have promised to take $100,000 worth of stock in the concern, providing the business is removed as stated.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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THE TRANSCONTINENTAL OAKLAND.

E. V. Shaw and Clarence B. Partridge of Augusta, Me., left that city Jan. 1 at 1 in the afternoon bound for Los Angeles, Cal., in a 1911 40 horsepower Oakland car, made by the Oakland Motor Car Company, Pontiac, Mich. The machine already had been driven more than 46,000 miles, and this trip was undertaken largely as a matter of pleasure, although incidentally, when it is completed the total mileage will have been increased by some 4000.

Six inches of snow had fallen the night previous to the start, and proved something of a foretaste of what was in store for the party before Boston was reached. After spending some little time at the show in New York City the Oakland left for Washington, St. Louis and Kansas City, where the old Sante Fe trail was taken. When last heard from the party was in Galveston, Tex., and had made an average of approximately 140 miles a day.



E. V. Shaw and Clarence B. Partridge of Augusta, Me., on Transcontinental Tour in 40 Horsepower Oakland Car.

The car is fully equipped for touring purposes, particularly at this season of the year. A unique canvas canopy with drop curtains provides sleeping accommodations, which are expected to be needed while travelling through Arizona and New Mexico. Baggage boxes on either side of the tonneau make it possible to attach a slat bed. Shovels, axes, etc., complete the touring equipment.

At Galveston provision was made for crossing the 600 miles of desert in Arizona, although the necessarily increased quantities of water, gasoline and supplies were not to be taken on board until later. The method of return will be decided upon after arrival at Los Angeles. The accompanying illustration presents the party en route.

BURMAN TO DRIVE CUTTING.

Announcement is made that Robert Burman, who holds the world's straightaway record, made in a Benz at Daytona, Fla., last year, will be at the wheel of a Cutting car, made by the Clarke-Carter Automobile Company, Jackson, Mich., in the 500-mile race on the Indianapolis speedway, Memorial Day.

CHURCH-FIELD ELECTRIC CARS.

Two hundred and forty acres of land have been acquired at Wyandotte, Mich., by the Church-Field Motor Company, on which will be erected a plant for the manufacture of Church-Field electric cars. This model was first seen at the recent Detroit show and made a decidedly favorable impression.

E-M-F OWNERS FOR ROAD IMPROVEMENT.

Those who are familiar with road conditions in Alabama, Louisiana, Mississippi and lower Missouri appreciate that it practically is an impossibility to operate any but the sturdiest automobiles in some districts except in the best of weather. In an effort to stimulate interest in the motor car and at the same time establish passable through routes, a large number of E-M-F and Flanders owners have banded informally under the leadership of Maj. Lee Richardson, representative of the Studebaker Corporation in Vicksburg, Miss.

It is Maj. Richardson's idea that the key to the situation lies in the levee which stretches along either bank of the Mississippi river from the northern states to the Gulf. High, dry, and of ample width, he believes that it would be possible to utilize this for through travel, without in any way affecting the rights of the United States government, which exercises supervision over these extensive embankments.

Some improvement will be necessary, and Maj. Richardson proposes a grand E-M-F and Flanders tour over the route in the near future to determine just what work of this nature must be done. He urges motorists to write their congressmen and senators to secure an appropriation sufficient to construct a suitable highway on either bank of the river.

PRESIDENT TO USE A VELIE.

When President W. H. Taft visits Boston to attend the dinner of the Charitable Irish Society on March 18 he will have a Velie six-passenger car placed at his disposal by Harold D. Bornstein, manager of the Boston branch of the Velie Motor Vehicle Company, Moline, Ill.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



Next Year's Shows.

Motorcycle manufacturers and riders are considering the show proposition with considerable interest just at present. It is well known that the only exhibitions in which the members of the Motorcycle Manufacturers' Association now take part are those which are held in New York and Chicago. Until last year they were represented at Boston. It is possible that they will not be seen in connection with the automobile displays in the other large cities next year.

The space assigned to the two-wheeled mounts at the Madison Square Garden this year was very acceptable, but at the Coliseum they were classed with the motor trucks as was the case in both cities last season. With the announcement that there will be but one display in New York in 1913, the motorcycle makers are beginning to wonder what plans will be made for their benefit.



Members of the Los Angeles Motorcycle Club on One of Their Recent Runs in the Orange Country.

So far as Chicago is concerned there will be decided objection to exhibiting the mounts in connection with the commercial vehicle show. At present there is a movement on foot to hold a separate show for motorcycles, under the joint auspices of the Motorcycle Manufacturers' Association and the recently organized Chicago Motorcycle Dealers' Association. Whether or no this plan will materialize and extend to take in New York and other cities remains to be seen. It is morally certain that there will be no Chicago motorcycle show during the commercial car display in 1913, whatever the final outcome of the present discussion relative to a separate exhibition.

Manufacturers on Cut-Out.

Action was taken with reference to the use of the muffler cut-out at the meeting of the Motorcycle Manufacturers' Association in Chicago, during the progress of the show. Secretary Cox was instructed to forward a resolution condemning the unreasonable use of this member to the mayors of the principle cities throughout the country. The association decided to hold meetings every two months in the future, and the next one will be held in the Hotel Statler, Buffalo, N. Y., April 10.

Among those present at the Chicago session were: President A. B. Coffman, Consolidated Manufacturing Company; W. G. Schack, Emblem Manufacturing Company, T. W. Henderson, Henderson Manufacturing Company; E. W. Jackson, K. R. Jacoby and Joseph Merkel, Miami Cycle & Manufacturing Company; C. W. Mason, New Era Autocycle Company; A. W. Mitchell, R. W. Gould and Geo. H. Meiser, Black Hawk Motor Company; L. J. Carling, Schickel Motor Company; W. A. Johnson, Pierce Cycle Company; E. J. Knight, Aurora Automatic Machinery Company; George M. Hendee and F. J. Weschler, Hendee Manufacturing Company; Arthur Davidson, Harley-Davidson Motor Company; W. F. Remppis and W. B. Glasser, Reading Standard Company; F. W. Starr, Pope Manufacturing Company, and Ignaz Schwinn, Excelsior Motor Manufacturing & Supply Company.

Los Angeles Club Holds Run.

The members of the Los Angeles Motorcycle Club,

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Los Angeles, Cal., frequently hold runs covering long distances, but it is seldom that it is possible to present a photograph of the riders enjoying the balmy air of southern California. The illustration herewith depicts some 40 members on the return trip from a 90-mile ride to Pomona, during a stop at one of the orange groves in Covina. About this time the East was well covered with snow, and oranges were by no means so plentiful that visitors were invited to eat their fill and take home all they could carry.

Western Tourists Get Certificates.

Some little time ago announcement was made by Secretary G. B. Gibson of the Federation of American Motorcyclists, that certificates of performance had been issued to the members who took part in the eastern district tour to the national convention in Buffalo, N. Y. At that time the list of tourists in the western district had not been filed by Tourmaster P. B. Whitney of Chicago. These were filed this month, however, and certificates have been awarded to the following:

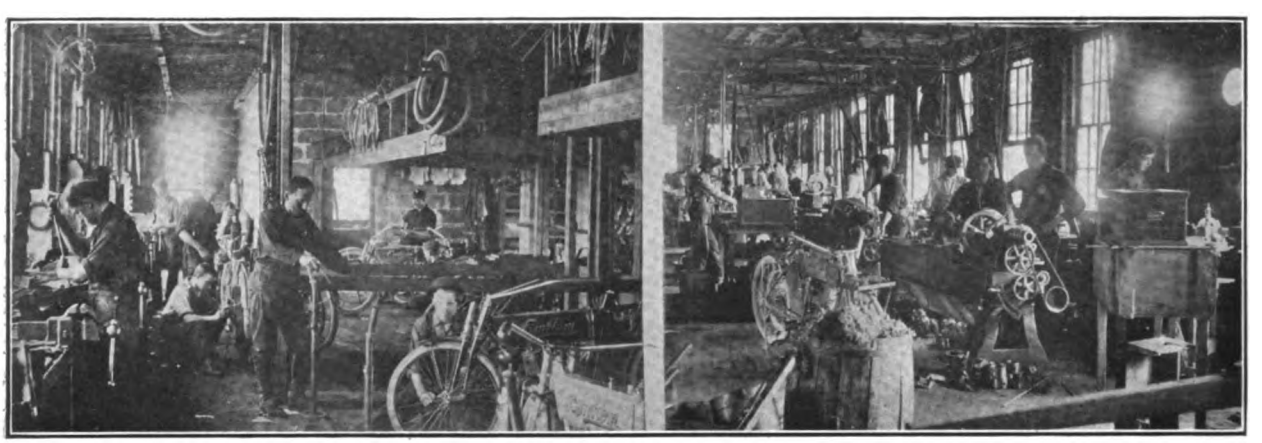
S. T. Barlass, Harry Jacobs, S. W. Nicholson, Edward Schadde, Sam Brown, M. A. Held, J. R. Keif, J. C. Hosman, Alfred Born, N. T. Back, F. M. Reder, E. L. Drummond, P. E. Haller, A. H. Crocker, H. P. Reynolds, F. A. Wilhelm, O. Persons, Roy Bowser, J. R. Purdy, P. B. Whitney, R. D. Wickwire, Thomas Monroe, George Hedges, H. H. Hedges, G. H. Crocker, Charles A. Wellman, Chicago; C. S. Hinckley, R. W. DuSell, Aurora, Ill.; Paul E. Kottowlski, Indianapolis, Ind.; P. A. Heierman, South Bend, Ind.; Emil Perkowitz, Evanston, Ill.; C. J. King, Lewiston, Ill.; E. L. Russell, A. Weitzman, A. F. Gregor, D. E. Miller, Detroit; A. R. Oberwegner, H. Dimke, S. J. Chubbuck, Toledo, O.; E. H. Tracey, H. H. Huntsberry, Cleveland, O.; J. J. Blank, H. A. Waltz, Akron, O.; R. Bouton, Lakewood, O.; R. T. Phillips, Conneaut, O.; W. G. Lauterbach, Mendotta, Ill.; George Kohlhardt, Cudahy, Wis.; Frank Ollerman, Walter Davidson, C. A. Carpenter, George Puls, Milwaukee, Wis.; R. A. Croon, Axel Kling, A. L. Johnson, Alvy Anderson, Rockford, Ill.; W. C. Beeman, San Francisco, Cal.; Edward Harmer, Kenosha, Wis.; H. C. Marquard, Burlington, Ia.; H. W. Cuddington, Peru, Ind.; J. H. Poisson, Roy O. Chipman, Grand Rapids, Mich.; Lynn Jordan, Wilmette, Ill.; R. T. Lantz, La Grange, Ill.; H. Bernard, Oak Park, Ill.; G. W. Williams, Lorain, O.; A. J. Lewis, Alliance, O.; R. E. Underhill, Glendore, Cal.; W. W. Ingram, Rutland, Ill.; J. Speropoulis, Pullman, Ill.; Albert Hanson, Kansas City, Mo.

Emblems in Canada.

Fred T. Kerr of London, Ont., recently secured the agency for the Emblem mounts, made by the Emblem Manufacturing Company, Angola, N. Y. Immediately after receipt of his initial shipment, he was called upon to demonstrate the power of the machines in pulling through snow drifts, and so well did they perform that he booked several sales as a direct result.

Short Grass Planning Tour.

The annual tour of the Short Grass Motorcycle Club in Kansas will be much larger in 1912 than ever before. Already plans are under way looking toward an itinerary that will cover at least four states. In fact, it would appear that the event is to become a district affair, according to information from Dr. B. J. Paterson, vice president of the Central District, F. A. M. The riders will visit the leading cities in western Kansas, western Nebraska, Colorado and Wyoming, during a trip occupying at least 15 days. Two automobiles, carrying full camping equipment, will accompany the tourists.



Two Views of the Emblem Factory: At Left, Assembling the Completed Mount; at Right, Where the Machine Work Is Done.

Motorcycles for Mail Carriers.

C. P. Grandfield, first assistant postmaster-general of the United States, has recommended that motorcycles replace the horse drawn delivery wagons in collecting the mail in Los Angeles, Cal.

Quick Rural Mail Delivery.

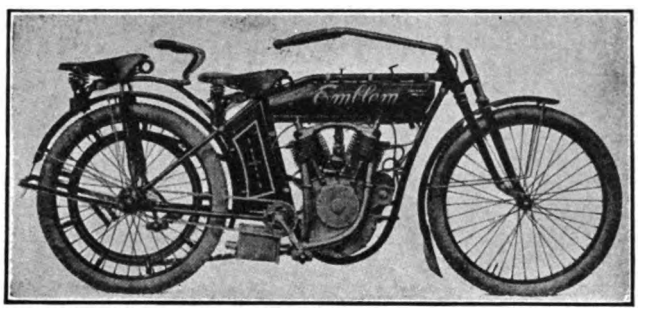
According to William Shauger, rural mail carrier and farmer at Elyria, O., it costs him only 15 cents a day and takes him but three hours to deliver mail to the 99 boxes on his route with a motorcycle.

Long Distance Touring Champion.

John Hogan of Saginaw, Mich., announces that he will make a motorcycle trip to the capital of every state

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THE EVER ECONOMICAL EMBLEM



HERE'S THE KIND OF DAY IN AND DAY OUT SERVICE YOU EXPECT OF A HIGH GRADE MACHINE AND *GET* WITH AN EMBLEM

Western & Southern Life Insurance Co.

Gentlemen: Kenton, O., Jan. 28, 1912.

I purchased from your agent here a 4 H. P. Emblem motorcycle June 10, 1911, and have used it in my life insurance business to the extent of better than 5,000 miles. My total repair bill was 25 cents for one platinum point spring and packing for left fly wheel. I still have a **new** machine and wouldn't trade my machine for anything I have seen in the motorcycle line up to date.

Signed J. E. PELKIE, Asst. Supt.

"EMBLEM SERVICE IS SATISFACTORY"

Write today for territory and terms, DEPT. D,

EMBLEM MANUFACTURING COMPANY

(Member M. M. A.)

ANGOLA ERIE CO. NEW YORK

in the Union next summer. Apparently, he is looking for the long distance touring championship. It ought to take a rider pretty nearly all summer to make a round of every capital city in the country.

News from Emblem Agents.

F. W. Sandruck of Baltimore, Md., had a number of Emblem mounts on display at the recent Baltimore automobile show. One of the features of the exhibit was the identical Emblem racing machine with which George Evans created the world's record for 100 miles on a dirt track at Cleveland, O., last summer.

Mr. and Mrs. J. W. Kidd, who are well known as long distance tandem tourists, have removed from Oklahoma to Illinois, where Kidd recently took the exclusive agency for Emblem motorcycles in Fisher.

Fred P. Ames, who has done much to popularize the Emblem in Kansas City, Mo., has moved from 1835 Benton boulevard to more commodious quarters at 2112 East 15th street. This action is coincident with the renewal of his contract with the Emblem Manufacturing Company for another year.

Buffalo Dealers Organize.

Following the example of the motorcycle dealers in New York, Chicago and some other cities, the representatives of motorcycles and bicycles in Buffalo, N. Y., have organized the Buffalo Cycle Trade Association with the following officers: President, E. Young; secretary, H. Krigbaum; treasurer, F. D. Barton; directors, A. F. Schwegler, A. Nabinger and George Ferrand.

Reward Works Two Ways.

To apprehend a motorcycle thief in California, find he is an escaped convict from New Jersey, and cause his return to the state prison in the East, is the accomplishment of A. C. Banta of San Jose, Cal. Incidentally his efforts resulted in returning the motorcycle to the owner, O. E. Chase. In compliance with the offer of the Federation of American Motorcyclists for the apprehension of motorcycle thieves, Secretary-Treasurer Gibson has mailed Banta a check for $25.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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This is the fourth reward paid for the conviction of a person taking a mount belonging to a member of the F. A. M.

New Records for Indian.

Ed Hasha, riding an Indian, created three records on the new stadium in Los Angeles, Feb. 11, these being for two, three and four miles respectively. The former marks were held at 1:24.2, 2:05 and 2:47 by Jack De Rosier on an Indian. That is, De Rosier held the official records, and it remains to be seen whether or not Hasha's figures of 1:19.6, 2:01.6 and 2:40.8 will be accepted by the competition committee. The summary of the meet follows:

Two miles, amateurs—First, Montgomery, Excelsior; second, Johns, Indian; time, 1:58.

Two miles, professionals—First, Ward, Indian; second, W. Samuelson, Indian; third, T. Samuelson, Indian; time, 1:30.

Two miles, professionals—First, Hasha, Indian;



Indian Riders Trying Out the Stadium at Springfield, Mass.

second, Wolters, Excelsior; third, Balke, Excelsior; time, 1:19.6.

Two miles professionals—First, Kittle, Merkel; second, Allbright, Indian; time, 1:31.

Three miles, professionals—First, Hasha, Indian; second, Balke, Excelsior; third, Wolters, Excelsior; time, 2:01.6.

Five miles, professionals—First, Ward, Indian; second, Allbright, Indian; third, W. T. Samuelson, Indian; time, 3:53.

Four miles, professionals—First, Hasha, Indian; second, Balke, Excelsior; third, Seymour, Indian, time, 2:40.8.

Four miles, handicap—First, Allbright, Indian; second, Hasha, Indian; third, Wolters, Excelsior; time, 2:39.2.

Incidentally, it may be remarked that the three records were created with an Indian, on which the ignition was supplied by a Bosch magneto, made by the Bosch Magneto Company, New York City.

Club Notes, Here and There.

The San Jose Motorcycle Club, San Jose, Cal., has decided to hold weekly runs to different points in California during the coming summer.

The Rochester Motorcycle Club, Rochester, N. Y., has adopted as its motto for the coming membership campaign, "Make It a 500 Club."

Four members of the Jacksonville Motorcycle Company, Jacksonville, Fla., have made what they consider a record ride from St. Augustine to that city in 1:45:00.

The Ontario Motorcycle Club, Ontario, Cal., which was organized recently, has adopted as one of its first bylaws one providing for a committee to observe whether or not its members are violating the city and county speed laws.

A new motorcycle club with 51 charter members at Augusta, Ga., has scheduled an endurance contest on the Georgia-Carolina fair grounds track.

Pittsburg, Penn., has a new motorcycle club which is preparing to affiliate with the F. A. M. It has been named the Happy Days Motorcycle Club.

The Bakersfield Motorcycle Club, Bakersfield, Cal., is considering the matter of calling a state convention of clubs for the purpose of arranging an annual race meet.

In order to increase its membership, the Marion Motorcycle Club, Marion, Ind., has selected two teams which will compete until April 1, and the losing team is to pay for a banquet to the winners.

Two new clubs have affiliated with the Federation of American Motorcyclists, as follows: Hercules, Chicago, 220, A. J. Foote, secretary, 410 West Adams street, 16 members, and Newark, N. J., 221, Edward Freeman, secretary, 40 Newson street, 12 members.

The following officers have been elected by the Newark Motorcycle Club, Newark, O.: President, W. B. Kinney; vice president, E. R. Francis; secretary-treasurer, L. G. McCormick; captain, Wilbur Parks.

In connection with its annual banquet, the Camden Motorcycle Club, Camden, N. J., elected the following officers for the ensuing year: President, Charles Kenfer; vice president, William Smith; secretary, Robert Smith; treasurer, William T. Reed; captain, George Hardy; first lieutenant, W. Harris; second lieutenant, R. Ward.

Officers have been elected by the Concourse Motorcycle Club, New York City, as follows: President, W. A. McClellan; vice president, George Heining; recording secretary, V. T. Nydrle; financial secretary, L. Herberger; corresponding secretary, C. L. Frobisher; captain, M. P. Sullivan.

The Cedar Rapids Motorcycle Club, Cedar Rapids, Ia., has elected the following officers: President, Dr. C. B. Whelpley; vice president, Frank R. Mason; secretary, Fred Smeten; treasurer, Ben Kubias; assistant secretary, John Stobla.

Officers have been elected by the Poughkeepsie Motorcycle Club, Poughkeepsie, N. Y., as follows:

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President, Thomas Jordan; vice president, Charles Senk; secretary, Harry English; assistant secretary, Eugene Davis; treasurer, Emmett Andrew; captain, Clinton Price; press agent, William Dahoney; assistant press agent, Fred Osborne.

The Riverside Motorcycle Club, Riverside, Cal., has sent a communication to the city council, thanking it for the improvement of a local road.

Few Changes in N. S. U. 1912 Models.

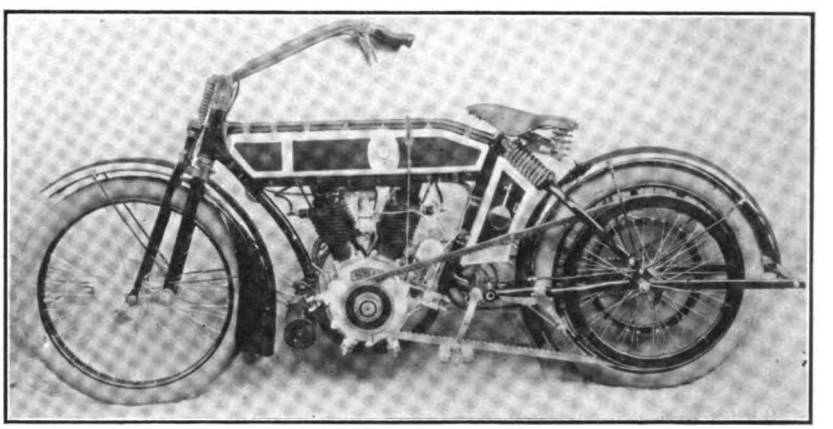
Few changes are noted in the 1912 models of the N. S. U. for which mount the Sun Motor & Supply Company, New York City, is American agent. The light single and twin-cylinder machines are practically unaltered with the exception of a few details which are in the nature of refinements. The two heaviest types, the 3.5 horsepower single and seven horsepower twin, touring models, however, are presented with loop frames, a design heretofore utilized in the lighter machines.

The magneto has been placed on top of the crankcase behind the cylinder, and the carburetor is placed behind this member underneath the fuel tank, a position protecting it from rain and dirt. A new arrangement has been incorporated for operating the inlet valve, the lower angle piece having been superseded by an overhead lever device.

Attention has been given to the steering head, this being constructed to withstand strains of driving at a high rate of speed, and the balls, cups and ball races are of larger dimensions. Considerable improvement has been made in the foot rests, these members now being constructed with aluminum coverings and adjustable in a forward or backward direction so that they may be made narrow or wide as desired to suit the taste of the customer.

Refinement in valve design is noted, these being adjustable. The inlet is operated by a steering rod actuated by a camwheel and steering lever with roller, the latter being located inside the gearcase. The automatic carburetor has undergone a slight change. The port in the piston of the device for the admission of air has been altered so that the correct proportions of air and gas are obtained. The stand has been improved, the arms on which the chain stays rest being constructed of pressed steel, and reinforced throughout.

In addition to the N. S. U. two-speed gear and free engine utilized in 1911, a reinforced pattern two-speed and free engine device of more sturdy construction is being manufactured. This is intended for use with the 3.5 horsepower single and seven horsepower twin when the latter are utilized in connection with a side car attachment. It is fitted with an adjustable pulley, the inside and outside flanges of which are both movable. The gear is equipped with a large metal cone clutch provided with oil grooves and three discs for engagement with the low gear.



Seven Horsepower De Luxe N. S. U. Twin, the Latest Product of the N. S. U. Motor Company.

Police Are Converted.

The police department at Indianapolis, Ind., has been converted to the use of the motorcycle. A two months' trial on a maintenance cost of 90 cents, during which time the officers covered 50 miles a day on each machine, appears to have been the convincing argument.

Shippee in California.

James H. Shippee, until recently manager of the F. N. branch in Providence, R. I., is now in Los Angeles, Cal., where he has taken the outside salesmanship for the Pope mount, represented in southern California by C. L. Smith.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head, as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON

296 Blackstone St., Cor. Prairie Ave. Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY Boston, Mass.

Branches: 49 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Eastern Sales Company, Belfast, Me.; capital, $10,000; president, E. F. Littlefield; treasurer, Howard Cheney; clerk, H. T. Field.

Colyear Motor Sales Company, Los Angeles, Cal.; capital, $50,000; incorporators, Curtis C. Colyear, Florence Colyear, Arthur T. Neeley.

Los Angeles Automobile & Taxicab Company, Los Angeles, Cal.; capital, $75,000; incorporators, Belle F. Lewis, Harry Jones, Evelyn E. Jones, Charles M. Lewis, William H. Lewis.

The Judd Automobile Company, Cleveland, O.; capital, $20,000; incorporators, Harry E. Davis and others.

High Point Motor Company, Raleigh, N. C.; capital, $3000; incorporators, George Wilson, S. L. Davis, J. E. Kirkman, Raley Stone.

Hatfield Auto Truck Company, Elmira, N. Y.; capital, $1,500,000; incorporators, D. H. McConnell, A. D. Henderson, G. G. Brown.

The Cleveland Metal Products Company, Cleveland, O.; increase of capital stock from $200,000 to $1,000,000.

Clearfield Automobile Company, Clearfield, Ia.; capital, $5000; incorporators, J. V. Wright, A. B. Clewell, H. W. Young.

Requa European Motor Company, New York City; capital, $10,000; incorporators, Leonard F. Requa, Frederick Charavay, Edward S. Beach, 149 Broadway, New York City.

National Auto Spring Tire Company, New York City; capital, $200,000; incorporators, R. J. Lackner, A. H. Karr, F. A. McCloskey.

The Hudson Automobile Exchange, New York City; capital, $100,000; incorporators, Alexander Aragona, Abraham Shulman, William F. Burke.

Victor Buggy & Auto Top Company, St. Louis, Mo.; capital, $2000; incorporators, Oliver E. Carter, Roscoe Perdue, Frank Roband.

Auto Shop Company, Paterson, N. J.; capital, $50,000; incorporators, W. McKee, F. Beggs, G. F. Wright.

Amerital Manufacturing Company, New York City; incorporators, William O. Turrell, Salvatore Seognamillo, Lester W. Schwarz, 100 Morningside avenue, New York City.

The Prospect Stable & Garage Company, Brooklyn, N. Y.; capital, $10,000; incorporators, Dennis P. Healy, Dennis P. Healy, Jr., Mary Healy, 752 Sterling place, Brooklyn.

Standard Tire & Rubber Company, Springfield, Mass.; capital, $10,000; incorporators, William P. Cronin, James S. Waddell, Wayne S. Hughes.

Copithorn Demountable Rim Company, Natick, Mass.; capital, $100,000; incorporators, Walter E. Copithorn, Harry M. Ferguson, Louis C. Smith.

Ramsaur Bros. Company, Fayetteville, N. C.; capital, $25,000; incorporators, Hubert Ramsaur, Allen Ramsaur, Carl Ramsaur.

St. Louis Alco Automobile Company, St. Louis, Mo.; capital, $10,000; incorporators, Barton R. Ford, George Parsons, Charles E. Darrow.

Transportation Sales Company, Inc., New York City; capital, $550,000; incorporators, H. Walter Webb, James L. Breeze, Andre de Magnin, Broadway and 56th street, New York City.

The N. S. W. Motor Company, Indianapolis, Ind.; capital, $60,000; incorporators, Charles Nesom, Louis Sagalowsky, Frederick W. Wellman.

Available Truck Company, Chicago; capital, $500,000; incorporators, Edward F. King, Alfred H. Widhafft, Robert C. Blume.

Hydraerocraft Corporation, Chicago; capital, $500,000; incorporators, Horace P. Keane, Robert Middlekauf, Hugo S. Grosser.

The M. M. Automobile Automatic Safety Signal Company, New York City; capital, $50,000; incorporators, John C. McGee, Wilbur F. Rawlins, Ira Black, 419 10th street, Brooklyn, N. Y.

Englewood Motor Car Company, Chicago; capital, $1000; incorporators, C. A. Londelius, A. Eugene Jackson, John F. Wagner, 7253 Emerald avenue, Chicago.



Special Train Load of Overland Cars Arriving at New York City from the Willys-Overland Company's Factory at Toledo, O.—The Machines Were Transferred to Steamers for Shipment Abroad.

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Kaplan Auto Supply Company, Newark, N. J.; capital, $25,000; incorporators, Abraham Kaplan, T. A. Kaplan, Louis Unstatter, 40 New street, Newark.

Automobile Forgings Company, Detroit; capital, $100,000; incorporators, George W. Strelinger, David E. Van Derver.

Swastika Oil Company, Bay City, Tex.; capital, $5000; incorporators, G. C. Hamill, M. Thompson, A. M. Anderson.

Shirvin Auto Livery, Oklahoma City, Okla.; incorporators, H. M. Little, R. L. Backus, J. F. Pribyl, Clifton Johnson, P. E. Little.

Alhambra Garage Company, New York City; capital, $10,000; incorporators, Joseph C. Graveur, Martha Graveur, Gordon W. Kenney, 1921 Seventh avenue, New York City.

Standard Motor Car Company, New Bedford, Mass.; capital, $5000; president, T. F. O'Brien, Una Moriarty, Harry B. Wing.

Efficiency Supply Company, Boston; capital, $5000; president, William H. Murphy; treasurer, Francis J. Coughlin, 18 Boylston street, Boston.

Eastport Garage Company, Eastport, Me.; capital, $10,000; president, Fred P. Gilson; treasurer, Charles E. Martin; clerk, L. H. Newcomb.

The Motor Truck & Auto Company, Portland, Me.; capital, $10,000; president, Lewis A. Goudy; treasurer, George W. Merrow; clerk, Edward S. Anthoine.

United States Motor Company, New York City.

The Leyman Motor Company, Louisville, Ky., has moved its salesrooms to Third and Breckenridge streets. The concern is local distributor of the Buick line.

Earle C. Anthony, owner and manager of the California Motor Company, Los Angeles, Cal., is erecting a reinforced concrete and steel structure, and plans a house warming upon the completion of the building, which will cost about $150,000.

The Cheeseman Automobile Company, Salt Lake City, Utah, which was organized recently to handle the Stoddard-Dayton, made by the Dayton Motor Car Company, Dayton, O., expects to occupy its new building at 45 South State street shortly. The concern will conduct a service station.

The A. Elliott Ramney Company, Brooklyn, N. Y., is making extensive alterations to a three-story building on Putnam avenue, which will be utilized as a service building for Hudson cars, made by the Hudson Motor Car Company, Detroit, Mich.

W. H. Halliwell, president of the Halliwell Company, Los Angeles, Cal., announces that the concern will occupy new quarters in the near future.

The Corbin Motor Car Company, 1019 South Olive street, Los Angeles, Cal., is under new management, Frank L. Greene and W. B. Goode having purchased the Corbin agency and will represent the car made by the Corbin Motor Vehicle Corporation of New Britain, Conn.



Sales Branch of the Abbott Motor Company, on East Jefferson Avenue, a Prominent Location in Detroit.

The New Columbia Garage Company, West End, N. J.; capital, $10,000; incorporators, Arthur J. Seeney, Stephen C. Fiero, George Feinberg, all Brighton avenue, West End, N. J.

Seymour Auto Company, Seymour, Conn.; capital, $4000; president, Maurice L. Warner; vice president, Thomas S. Coleman; treasurer, Ernest S. Clark.

Fishback Motor Company, New York City; capital, $3,000,000; incorporators, J. J. Wittenberg, Brooklyn, N. Y.; P. R. Galligan, J. W. Ebbs.

GARAGE AND DEALER.

Newton D. Holbrook, president of the Litchfield County Automobile Association, and a director of the Connecticut state association, has resigned as sales manager of the Union Hardware Company of Waterbury, Conn., to become manager of the Ames Motor Company of Owensboro, Ky.

Albert G. Hamer, North Adams, Mass., has sold his business and equipment to the Tower Motor Company, 51 Main street, that city.

The Scott County Mercantile Company, Davenport, Ia., is occupying new quarters at Fourth and Riley streets, formerly occupied by the Buck Carriage & Implement Company. The concern is agent for the Maxwell and Columbia cars, made by constituents of the

The Southwest Auto Company, which maintains its business offices at El Paso, Tex., and which has a large number of agencies, will establish a branch agency in Phoenix, Ariz.

The Reo Pacific Company, San Francisco, Cal., distributor for the Reo and Premier lines, announces the completion of its new three-story building on Fulton street, near Van Ness avenue. The entire lower floor of the structure will be devoted to a spacious show room and offices of the president, Norman Devaux, and the sales manager, H. E. Gilley. In the rear of these rooms will be located the machine shop, access to which is by a small street.

Ketchum & Co., Ltd., Ottawa, Canada, is erecting a new garage on Sparks street, which when completed will be one of the most modern structures of its kind in Canada. The plans call for a 66-foot frontage, while the whole building will be 200 feet in length. Steel will be employed largely. The repair ship will be located on the second floor while the ground floor will be devoted to offices and supplies.

The Universal Auto Repair Company, High and Allyn streets, Hartford, Conn., is planning to enlarge the present quarters to take care of its increasing business. W. J. Langdon is manager of the accessory and supplies department.

The George Grede & Brothers Company, 240 Reed street, Milwaukee, Wis., has been appointed agent for the E-M-F and Flanders lines in Milwaukee and vicinity.

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The Albany Garage, Albany, N. Y., one of the largest and oldest in that state, will erect shortly a three-story building on Howard street to handle commercial vehicles. The concern has taken the agency for the White line, made by the White Company, Cleveland. Chauncey D. Hakes, who has had considerable experience in the automobile industry, is manager.

The Highland Garage, Birmingham, Ala., has leased the building formerly occupied by Drennen & Co., and will convert it into a show room. This concern also purchased a garage located at Five Points recently.

A. E. Hunter, well known to the automobile men in northern California, has taken the agency of the Firestone-Columbus, made by the Columbus Buggy Company, Columbus, O., for San Francisco, Cal., and will carry a full line including the electric automobile.

Jack Payment and Arthur C. Wagner have formed a company which will be known as the Estarado Auto Company and which will represent the Hupmobile in Denver, Col. A service station will be maintained where the owners of the machine made by the Hupp Motor Car Company of Detroit will be served.

WITH THE MANUFACTURER.

The Willys-Overland Company, Toledo, O., recently made a shipment of 99 Overland automobiles to New York City, whence they were consigned to foreign ports. A special train was made up consisting of 31 flat cars, each laden with three machines. In the accompanying illustration is depicted the train pulling into New York City, where the boxed vehicles were transferred to steamers.

Fred J. Titus, who for the past year has been connected with the retail department of the American Locomotive Company, New York City and Providence, R. I., is now associated with the wholesale department of that company.

The Velie Boston Branch of the Velie Motor Vehicle Company, Moline, Ill., announces the following appointments of agencies to handle Velie pleasure and commercial vehicles: J. T. Curtis & Co., Hartford, Conn.; C. H. Sawyer Company, Manchester, N. H.; Robert Kayser, Concord, N. H.; Walter Velie Johnson, Burlington, Vt.

The Texas Company, New York City, is issuing a neat booklet which tells about motor lubrication and how to remedy oiling troubles.

The Abbott Motor Company, Detroit, maintains a sales branch in that city on East Jefferson avenue, and in the accompanying illustration is presented the structure in which the Abbott-Detroit is displayed. The branch is in charge of E. C. Thomas, who looks after the many cars of that make in service in the city.

The Havoline Oil Company, 17 Battery place, New York City, announces the appointment of new agents as follows: W. A. B. Worley, Jacksonville, Fla., Florida territory; Augusta Overland Motor Car Company, Augusta, Ga., Lincoln, Columbia, Richmond, Warren, Jefferson, Glasscock, Washington and Jenkins counties, Georgia, and Edgefield, Aiken and Barnwell counties in South Carolina; the Euclid Oil Company, 1906 Euclid avenue, Cleveland, O., territory included in northwestern Ohio, Cleveland, Akron and Youngstown; the James Gray Kuhn Company, 5712 Penn avenue, Pittsburg, Penn., for the territory within a radius of 60 miles of that city. The Pittsburg and Cleveland agents exhibited at the motor car shows held recently in those cities.

Nelson S. Riley has been appointed manager of the Kansas City branch of the Studebaker Corporation, Detroit. He was for some time connected with the company's branch at Denver, Col.

Hopkins, Botto & Hocke, New York City, agent for the Abbott-Detroit, made by the Abbott-Detroit Motor Company, Detroit, has moved the Regal cars, made by the Regal Motor Car Company, Detroit, into new quarters at 1668 Broadway. An increase of business required housing these machines separately.

The Heald Machine Company, Worcester, Mass., maker of grinding machines, is issuing to the trade, a neat booklet entitled "Oversized Standards for Pistons and Rings," being a reprint of a paper presented at a meeting of the Society of Automobile Engineers. The booklet is illustrated and teems with interesting features.

The Henderson Motor Sales Company, Indianapolis, Ind., distributor of the Cole line, made by the Cole Motor Car Company of that city, has appointed the following new agents: Richardson-Neighbors Motor Company, 2039 Euclid avenue, Cleveland, O.; Dayton Automobile Company, Dayton, O.; Corning Automobile Company, Corning, N. Y.; Wolcott Motor Company, Elmira, N. Y.; F. B. Porter, Silver Creek, N. Y.; Fisk & Slocum, Morrisville, Vt.; P. C. Rumboldt, Tonawanda, N. Y.; Bellis & King, Watching avenue and Race street, Plainfield, N. J.; Cole Motor Sales Company, 90 Mathewson street, Providence, R. I.; John Hemwall Automobile Company, 4612 Washington boulevard, Chicago; Worley & Terry, Viola, Ill.; C. H. Bergstrom, Neenah, Wis.; Palmer Sales Company, Grand Rapids, Mich.; Cole Motor Agency, Shreveport, La.; Waynesboro Automobile Company, Waynesboro, Va.

E. P. Chalfont, who has been at the head of the E. R. Thomas Motor Car Company of Buffalo, N. Y., since its reorganization, resigned recently to become associated with Harrison Williams of New York City, financier and director of public utility corporations. Mr. Chalfont will remain a stockholder in the Thomas company.

The Nyberg Automobile Company, Chattanooga, Tenn., will begin the extensive manufacture of the Nyberg car in the near future. A building has been leased for a factory and is being equipped with machinery. Several models will be constructed including a commercial vehicle.

The Ford Motor Company, Detroit, will establish a branch factory in Los Angeles, Cal., so soon as a suitable location can be found. The factory will cost about $300,000 and will employ about 800 men. The new plant is intended to supply all Ford cars used in Arizona, Nevada, Utah, California and Japan. The dimensions will be 150 by 500 feet and four stories in height. Electricity will be employed for power.

The Krupps Motor Company, Pittsburg, Penn., will erect a new plant either at Ambridge or Beaver Falls, Penn., and the buildings will be of reinforced concrete. The plans call for five structures, these ranging from two to five stories.

The Croxton Motor Company, Cleveland, O., held its annual meeting recently at which the following officers were elected: President, H. A. Croxton; vice president, Charles Stevens; secretary, O. A. Peters; treasurer, I. Zimmer; directors, J. P. Stoltz, John Stoltz, O. A. Peters, Charles S. Patterson.

The Frontier Tire & Rubber Company, Buffalo, N. Y., which was organized to take over the business of the Frontier Rubber Company of that city, plans the extension of the business. The concern proposes to manufacture about 2000 tires a day and in addition will make mechanical rubber goods. A large number of workmen will be employed.

The Simplex Motor Car Company, Mishawaka, Ind., maker of the Amplex car, announces the opening of a salesroom and repair shop at 853 Carondelet street, New Orleans, La. W. Durand will have charge.

F. R. Humpage, Detroit, who has been with the E. R. Thomas Motor Company, Buffalo, N. Y., for about a year, has been elected president to succeed E. P. Chalfont, who resigned recently. W. L. Gleason becomes vice president, and J. R. Ramsey continues as secretary and treasurer.

The Briggs-Detroiter Company, Detroit, maker of the Detroiter, is now occupying its new factory of reinforced concrete at 475 Holbrook avenue, in that city. The structure is 250 feet long and 100 feet wide, and is equipped to produce 1000 cars before July 1. The foundation is being laid for another building to adjoin the present factory.

The Bellamore Armored Car & Equipment Company, Bridgeport, Conn., has purchased the business and plant of the Bridgeport Vehicle Company of that city and will continue to manufacture bodies and accessories. The general office will be located at 286 Fifth avenue, New York City.

The H. W. Johns-Manville Company, New York City, manufacturer of asbestos products, etc., states that the increasing demand for its product in Pittsburg, Penn., and vicinity, has necessitated a move to larger quarters. The branch is now occupying the entire eight-story stone, reinforced concrete and steel building at the northeast corner of Wood street and First avenue, which has been leased for a term of years. The structure provides a floor space of 23,808 square feet.

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TROY DRAWS VISITORS FROM MANY TOWNS.

The decision of the Albany dealers not to hold an automobile show this year, placed the second annual display of the Automobile Club of Troy, N. Y., in an enviable position. The event was held in the local armory, Feb. 12-17, and drew visitors from all the cities and towns in that section of New York State, including Albany, Schenectady, Watervliet and Cohoes. The management was placed in the hands of Frank M. Packus and Frank N. Barhydt, and their success was most marked.

Among the exhibitors were: Rensselaer Auto Exchange, Moon, Atterbury truck; Troy Auto Exchange, Pierce-Arrow; Bolton-Myers Auto & Truck Company, Parry, Haynes; Albany Rubber Tire Company, Selden; Alanson A. Aird, Pratt-Elkhart; Congress Auto Company, Nyberg; Scott D. Nichols, Ford; Cohoes Auto Company, Corbin; Abbott-Detroit Motor Car Agency, Abbott-Detroit; Albany Motor Car Company, Cadillac; Betz Auto Company, Oldsmobile; Franklin Automobile Company, Franklin; Mack Bros., Mack truck; W. M. Whitney Company, Fiat; C. S. Ranson, Hudson, Stevens-Duryea, Lozier; Kissel Motor Car Company, KisselKar; Close Bros., Knox; Albany Garage Company, Chalmers, Peerless, Simplex; Buick Motor Company, Buick; A. W. Knapp, Overland, Fred B. Clute, Pope-Hartford; George H. Snyder, Stearns-Knight, Velie; Trojan Garage Company, Locomobile, Stoddard-Dayton-Knight; Payne Auto Company, E-M-F, Flanders; Troy Motor Carriage Company, Mitchell, Speedwell, Kelly truck; C. H. Abbott, Stanley steam; Troy Everitt Thirty Company, Everitt; Wilbur Auto Sales Company, Cole, Regal; Eastern Motor Sales Company, Packard; Burdick & Hartwell, Alco, Hupmobile.

WANT NATIONAL TOUR.

Mayor Samuel L. Shank of Indianapolis, Ind., has filed the first application for the honor of starting the national tour for the new A. A. A. cup. Several cities have been mentioned as the possible starting point, but no definite action has been taken by the American Automobile Association. It is possible that a decision will be reached at the March meeting of the executive committee.

K-R-I-T BRANCH IN PHILADELPHIA.

Harry Lonsdale, formerly with the Fiat car, has been appointed general manager of the new factory branch opened in Philadelphia by the K-R-I-T Motor Car Company, Detroit, maker of the K-R-I-T line. This make of machine has proven very popular in Pennsylvania, and the volume of business has been increasing rapidly of late. The Philadelphia branch will have charge of the entire business transacted throughout the state.

PREMIER BERLIN FOR WINTER.

For many years the family of J. C. Schaff of Indianapolis, Ind., has spent the winter months in Florida or California. Being enthusiastic motorists, Mrs. Schaff and other members of the family have felt it necessary to visit winter resorts in order to enjoy the pleasures of their car. The purchase of a six-cylinder 60 horsepower Premier Berlin limousine, made by the Premier Motor Manufacturing Company, Indianapolis, was the means of changing their minds. Despite the very cold weather of the present winter, Mrs. Schaff and the others have spent nearly every day out of doors, and they are so well pleased with the new car that it is probable they will spend all their winters in the North in the future.

WHITE COMPANY'S PRIVATE EXHIBIT.

During the progress of the annual Newark automobile show in Newark, N. J., the White Company, Cleveland, O., maker of White pleasure and commercial cars, held a private display in its new branch salesrooms and service station at Broad street and Central avenue. The building offers floor space of 12,000 square feet, in which it was possible to display about 25 cars, including touring, roadster, limousine, landaulet and berlin types of pleasure vehicles, and 1500-pound, 1.5, three, and five-ton trucks.

BIG RAMBLER SALES AT CHICAGO.

Announcement is made that the Thomas B. Jeffery Company, Kenosha, Wis., sold 187 Rambler cars in the six days of the pleasure car show at Chicago. This is claimed as a world's record in the matter of sales to individuals. Forty salesmen, represented numerous dealers throughout the United States and Canada, participated in the campaign.

BECOMES FACTORY REPRESENTATIVE.

E. F. White, who has been connected with the automobile industry in various capacities during the past nine years, and has represented the Pullman Motor Car Company, York, Penn., maker of Pullman cars, at Reading, Penn., for two years, has become a member of the factory sales force. He will cover the middle western and southern territory.

FLANDERS POPULAR IN SCOTLAND.

The foreign sales department of the Studebaker Corporation, Detroit, is very much pleased over the closing of large contracts with dealers in Edinburgh, Glasgow, Aberdeen, Fife and several other cities in Scotland. The Flanders car is popular with the Scottish people, whose knowledge of machinery has always been a racial characteristic.

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NEW HOME FOR BOSTON FIRMS.

Another handsome building or rather group of buildings has been added to those in Boston in the recently completed structure located at the junction of Beacon street and Commonwealth avenue, which will be occupied shortly by the Premier Motor Car Company of New England, the Ford Company, and the Boston branch of the Firestone Tire & Rubber Company of Akron, O. In general the dimensions of the three buildings are the same with different arrangements of the interiors to meet the individual requirements of each concern.

The structure is six stories in height, of steel and concrete, the entire front and back practically being of glass, so that a maximum of light is afforded. The representative of the Premier Motor Manufacturing Company, Indianapolis, Ind., has a ground space of about 35 by 130 feet, and occupies six stories or about 30,000 square feet of floor space.

The first floor is devoted to the display of new models while the second is utilized for rebuilt cars. The general offices are situated on the third while the fourth is occupied by the garage. The stock room is on the next floor and a portion of this and the entire upper floor is occupied by the shops of the company.

The Ford Motor Company's branch, which is under the management of Charles E. Fay, occupies the building at the right of the Premier, and the lower floor will be employed as the salesroom which is 32 by 85 feet. At the rear will be the shipping room. The general offices will be on the second floor while the entire third will be utilized for a stock room. The remaining floors will be used for the storage of new cars and stock for shipment.

The Firestone branch will be located in the structure at the left of the Premier and in the basement will be a garage 60 by 33 feet. The ground floor will be devoted to the general offices and a reception room. The receiving and shipping departments will occupy the second floor, while the third will be for the storage of pneumatic tires and tubes in systematically arranged racks which provide for 11,000 shoes. The fourth floor will be utilized as a stock room and here will be stored solid tires for trucks and carriages, equipment for rims, tires, etc. A complete mechanical department, including a wood working shop, tire applying machines, etc., will occupy the fifth floor while the repair shop will be on the sixth floor.

In the basement is located a heating plant for the entire building which is lighted by electricity, and current is also employed for operating the elevators which include passenger and freight. All of the modern conveniences in the care of automobiles and their users is incorporated in the structure.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

HARRIS AUTOIL BOOKLET.

A decidedly interesting booklet entitled "How to Tell Pennsylvania Oils" has been issued by J. C. Harris, proprietor of the Harris Oil Company of Muncie, Ind., maker of Harris Autoils. The treatise takes up the subject in a thorough manner, explaining what is meant by gravity, viscosity, flash and fire tests; color, filtering, acid treatment, cold test, etc. Harris Autoils are made in two grades of body, medium and heavy, from Tiona, claimed to be the superlative grade of Pennsylvania crude, and are guaranteed by the maker to give the most efficient service without carbonization. The booklet is free upon request made the company.

CORBIN SELLS ENTIRE OUTPUT.

The Corbin Motor Vehicle Corporation, New Britain, Conn., maker of Corbin cars, has sold its entire output for 1912 to the Miner Garage Company of Hartford, Conn. It appears that the manufacturing concern has been negotiating for this sale for some time, and that a number of other firms were bidding for the opportunity to purchase the 1912 product. As a condition of the sale the Corbin company agrees to maintain its present repair shop and garage with a full line of parts for all models for repair, care and upkeep of all products sold in the past and the cars in the 1912 line for a period of five years, insuring to the owners of Corbin cars the same service which has been maintained in the past.

OPPOSE REAR LIGHT BILL.

Many representatives of the national and state automobile associations are much interested in the bill introduced in the New York Legislature by Representative Stiwell, which requires all motor vehicles to use a rear light, the color of which can be changed from red to green from the driver's seat when the car is to be slowed down. It is claimed that the proposed law is in the interests of a certain patented device, and because of this suggestion is receiving more than usual opposition.

STUTZ TO HAVE SERVICE STATION.

Realizing the value of a service station, M. F. Chase, manager of the Empire Motor Car Agency, Boston, New England distributor of Stutz cars, has leased 4000 square feet of floor space on Bickerstaff street, a short distance from the salesrooms on Massachusetts avenue. Arrangements have been made with the Ideal Motor Car Company, Indianapolis, Ind., maker of the Stutz, to send an expert factory man to Boston to take charge of the station. A full line of spare parts will be carried.

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HEARING ON LIGHT BILL.

Motorists in Rhode Island were well represented at the hearing of the proposed lighting bill granted by the Senate judiciary committee recently. The rural districts were also in favor of the bill and those who opposed the measure were mostly large trucking and express concerns in the capital of the state. The president of the Team Owners' Association stated that teamsters as a rule were in favor of the act as long as it did not apply to trucks, and that personally he thought a lamp tax was unnecessary, as owners of teams are sufficiently taxed at present. He further declared that the bill was a protection for automobilists, and he did not like the idea of being classed as a criminal or law breaker under the law.

KULICK CREATES ICE RECORD.

Although Frank Kulick announced last summer he was through with racing he was persuaded by the Ford Motor Company, Detroit, to try for the mile ice record of 0:39.8, established by Henry Ford nine years ago with the Ford 999. Kulick's trial took place over the frozen surface of Lake St. Clair near Detroit recently and although the ice had to be scraped free of the snow and was rough the Ford racing driver completed the mile in 0:33.4 with a flying start.

NEW COLE SERVICE STATION.

In keeping with its policy of rendering the best service to owners of Cole automobiles, made by the Cole Motor Car Company, Indianapolis, Ind., the G. E. & H. J. Habich Company, Boston, has completed a new repair shop and service station on Bickerstaff street, near the salesroom of the concern.

PLAN NATIONAL DEALERS' SHOW.

A national dealers' automobile show is proposed closely following the state fair at Detroit, Mich., in October. President Thomas E. Newton of the Michigan State Agricultural Society is highly pleased with the idea, and efforts are being made to ascertain the wishes of the manufacturers and makers in other parts of the country. The arrangement of the buildings is such that the different types of machines could be housed separately while there is ample room for demonstrations, etc.

SUSPEND POLICE HEAD FOR SPEEDING.

Those who operate motor cars at a reckless speed on the Island of Porto Rico lose their licenses when caught. Although the law has been in effect about two years there has not been occasion to suspend a driver until recently when the first to come under the ban was the head of the insular police. A report was made to the department of the interior which has charge of matters pertaining to automobiles, that the chief of police and a member of the Porto Rican House had been racing on the road. The department suspended the licenses of both men for six months, and as the chief's name was ahead of the other's on the license list he was the first to be penalized.

BILL TO DATE TIRES.

A bill has been introduced in the assembly at Albany, N. Y., to prohibit the manufacture, sale or offering for sale, of any tire for a motor vehicle unless the date when such tire was manufactured is impressed or branded upon the material of which it is constructed, or otherwise indicated by a label attached thereto. The penalty for violation is $50 recoverable in civil action by any person who shall sue for same, but one-half goes to the state. The bill is similar to one passed in a western state some time ago.

DEMAGNETIZATION OF MAGNETS.

"While the magnets of a magneto can be demagnetized, this seldom occurs if the maker's instructions are heeded in making connections," says the Remy Electric Company, Anderson, Ind. "Demagnetization is usually caused by passing the battery current through the magneto windings, due to improper installation, and some manufacturers utilize the colored wire cable scheme which facilitates wiring inasmuch as each colored wire is attached to the terminal of the same shade."

WILL ADDRESS STUDENTS.

Two members of the Boston branch of the Velie Motor Vehicle Company, Moline, Ill., have been invited to give addresses upon motor car topics before the students of the new Boston Y. M. C. A. automobile school. Harold D. Bornstein has been invited to talk upon the pleasure vehicle and Lin McKie of the commercial department, upon mechanical transports.

MULFORD TO PILOT A KNOX SIX.

Ralph Mulford, the well known racing driver, has entered the racing branch of the industry on his own account, having just purchased a six-cylinder Knox, made by the Knox Automobile Company, Springfield, Mass. The machine is a regular stock model 6-60 with long stroke motor and will be entered in the 500-mile race at Indianapolis, as well as the Elgin, Fairmount Park, Vanderbilt and Grand Prize events. Mulford is very much pleased with the automobile and is confident of success.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

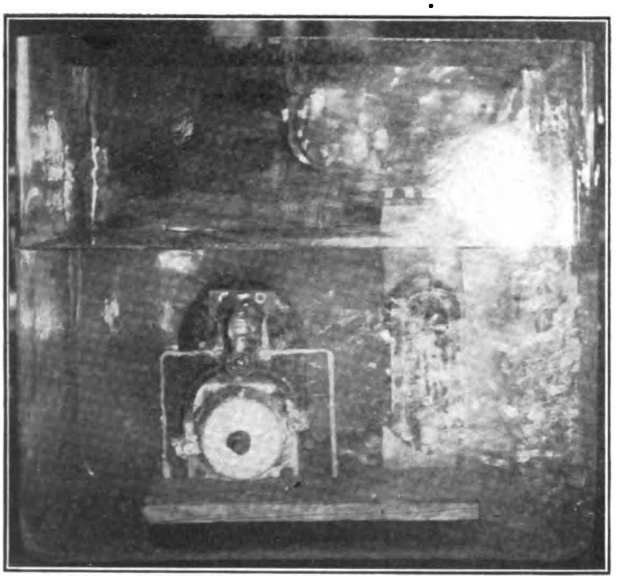
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NOVEL EXHIBIT OF ESTERLINE COMPANY.

One of the interesting features of a commercial vehicle show held at Chicago recently was the exhibit of the Esterline Company, La Fayette, Ind., manufacturer of the Berdon lighting system. A complete outfit, including the electric generator and controlling system, were placed in a large glass jar and the vessel filled with water, to which was added a small amount of sulphuric acid.

The generator and controller were operated continuously during the entire week of the show, the generator being driven as a motor by a six-volt storage battery and through the automatic controlling system. Small electric lamps were placed in front of the device to illuminate the interior of the jar.

In the accompanying illustration is shown the equipment at the end of the week and it will be noted that all metal parts of the generator and controller



Dynamo and Controller of Berdon Lighting System Which Operated Lights in Acid Solution During Week of Chicago Commercial Vehicle Show.

are badly corroded by the acid and the interior of the former is filled with copper sulphate and sediment. Quite a deposit of sediment accumulated in the bottom of the jar and on the board upon which the equipment rested.

The device operated successfully during the show and attracted considerable attention as well as favorable comment. The maker states that while its lighting system is not constructed to be employed in acid baths, it is subjected to a severe test to show that it will operate under unusual and very severe conditions.

CITY ADOPTS SHAWMUT TIRES.

At a recent meeting of the board of supervisors in San Francisco, Cal., it was decided to use Shawmut tires on all the city automobiles during the coming season. This subject has been given considerable thought by the board and its selection of the Shawmut brand is particularly gratifying to the maker, the Shawmut Tire Company, Boston, as well as being another addition to the long list of municipal recognitions of this product.

WORCESTER'S PUSHMOBILE SHOW.

Sometime since the automobile dealers in Worcester, Mass., decided that it would be impossible for them to hold a show this year. This decision does not appear to have appealed to the boys of that city, who have organized the Worcester Pushmobile Club, which held a show of its own early in the month. In practically every instance the power was "boy power" operated from the rear. It will prove of interest to peruse the names of the exhibitors and the makes they displayed:

Frank P. Kendall, 90 horsepower Fiat; Ezra Cutting, 60 Marmon; Russel Keith, 40 American; George Kendall, 33 Hudson; David Smith, 40 National; Helen Lange, 88 Amplex; Allen Russell, 40 Franklin; Alden Adams, 90 Alco; Edmund Guerin, 50 Isotta; Walter Pierce, 60 Benz; Sidney Smith, 33 Mercer; Daniel Goss, 50 Rainier; Lester Willard, 40 Atlas; Roger Heald, 60 National; Richard Heald, 40 National; Franklin Barrett, 40 Knox; George Harrington, 40 Lozier; Harold Finney, 60 National; Philip Bailey, 60 Knox; Albert Hunt, 90 Alco; Donald Vandermark, 30 Benz; Charles Eaton, 88 Amplex; Robert Kendall, 60 Alco.

Some of these various machines were copied faithfully from the cars they were supposed to represent, great pains having been taken in the matter of detail, and the show was staged every bit as grandly as a real automobile exhibit.

AMERICAN DRIVERS IN GRAND PRIX.

Ralph De Palma and David L. Bruce-Brown returned from Europe last week, announcing that they had signed contracts to drive in the French Grand Prix race in June. Bruce-Brown will drive a Fiat, in a car of which make he won the American Grand Prize race for the second time in 1911. De Palma declines to make public the name of his mount, although it is understood it will not be a Mercedes, as was annouced at one time.

STEINBOCK ENGINEERING COMPANY.

Articles of incorporation have been filed in New Jersey for the organization of the Steinbock Engineering Company, with capital of $1,000,000 and the following officers: President, E. J. Forham; vice president, H. E. Steinbock; secretary-treasurer, F. B. Knowlton. Mr. Steinbock was for many years chief designer for the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., now a constituent of the United States Motor Company, New York City, and recently severed his connection with the latter concern.

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TAMPA CLUB IS ACTIVE.

The members of the Tampa Automobile Club, Tampa, Fla., have taken a decided stand against the newly adopted ordinance regulating motor car traffic. They desire its repeal and the substitution of a provision imposing a fine on a driver who operates his machine in a reckless manner.

The following committees have been appointed by the club for the ensuing year: Law and ordinance, H. S. Hampton, E. L. Sparkman, D. F. Conoley, A. C. Clewis, D. F. Owen; entertainment, T. C. Taliaferro, Henry E. Snow, George N. Benjamin, W. G. Brorein, D. C. Gilbert; exhibitions and contests, E. E. Bryan, B. M. Reed, L. B. Giles, W. A. Bonacker, W. F. Stovall; good roads, Fred F. Freeman, C. S. Washington, T. M. Wier, F. C. Paul, W. W. Clark, C. G. Memminger, I. S. Giddens, C. M. Price, J. H. Chenney, C. A. Lock, J. L. Greer.

UNIVERSAL LIGHTING IN CALIFORNIA.

The street committee of the board of supervisors in San Francisco, Cal., has a proposition before it to adopt an ordinance providing for lights on all vehicles using the highways of the city during the hours of darkness. As has been the case in other localities, the plan is meeting with strenuous opposition on the part of owners of horse drawn vehicles. Frank Carroll of the Goodyear Tire & Rubber Company's local branch, and J. W. Leavitt, head of J. W. Leavitt & Co., distributor for the Overland and KisselKar lines, are representing the motorists in the matter, and are receiving much valuable support from the press of the city.

RECIPROCITY IN NEW JERSEY.

The new reciprocity bill in the New Jersey Legislature has passed the lower house by a vote of 43 to 15, and those interested in it appear to be certain it will receive favorable endorsement by the senate as well. The proposed law was introduced by Representative Stickel, and permits non-residents the use of Jersey highways without the payment of a fee, the same as all other states. Another feature is the elimination of the "power of attorney" clause, which is alleged to have killed the bill presented last year.

STUTZ AT CHICAGO SHOW.

One of the cars displayed at the recent Chicago show, which caused not a little favorable comment was the Stutz, produced by the Ideal Motor Car Company, Indianapolis, Ind. The concern was unfortunate in that it was unable to secure space except in the Coliseum basement, but the fame of the machine which performed so satisfactorily in the 500-mile race on the Indianapolis speedway last Memorial Day, was sufficient to attract a crowd throughout the entire week. The exhibit comprised a torpedo roadster and stripped chassis, and the sales closed were decidedly in excess of what had been anticipated.

NEW STEVENS-DURYEA FACTORY.

As an indication of the expansion and stability of the motor car industry in New England, it is interesting to note that the Stevens-Duryea Company, Chicopee Falls, Mass., maker of Stevens-Duryea cars, recently awarded a contract for structual steel to the American Bridge Company, totalling approximately 4000 tons. This will be used in the erection of additional buildings at East Springfield, Mass.

Connecticut Shock Absorber Banner—The Connecticut Shock Absorber Company, Meriden, Conn., is distributing a handsome wall banner, which portrays a charming young woman and an excellent illustration of the Connecticut shock absorber. The banner measures 22 by 28 inches, and will be mailed to any dealer or garage owner upon request.

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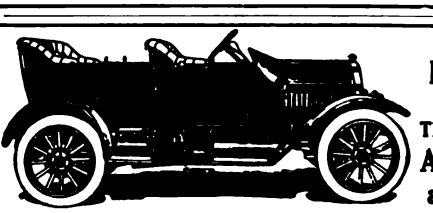
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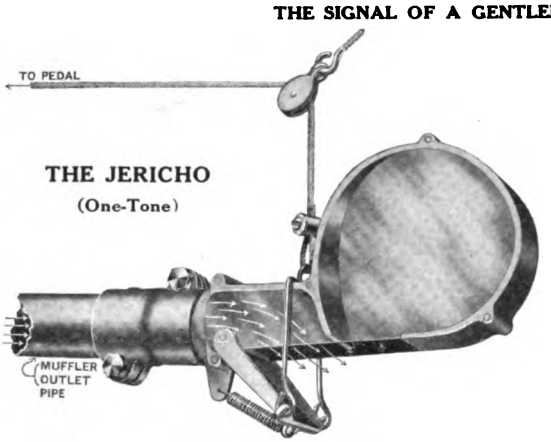
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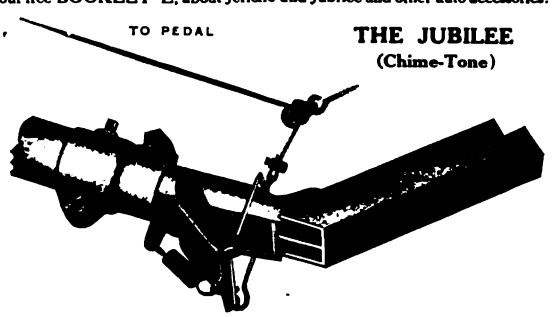
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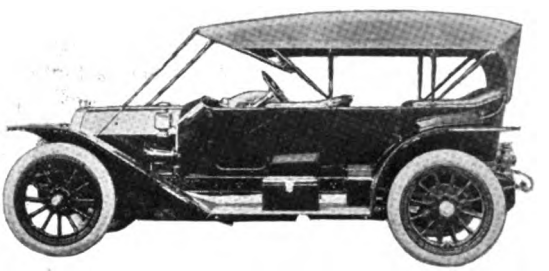
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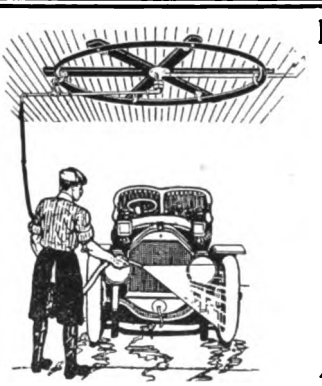
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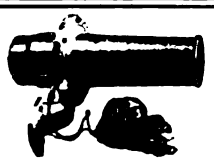
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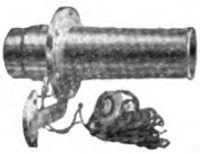
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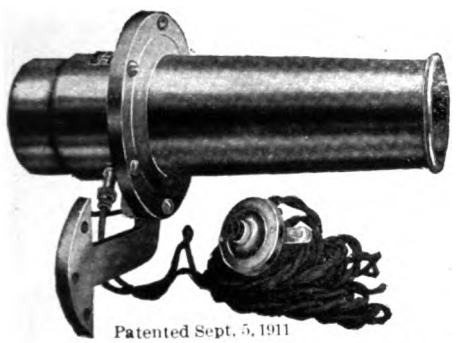
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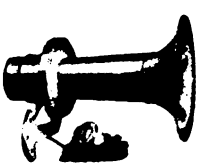

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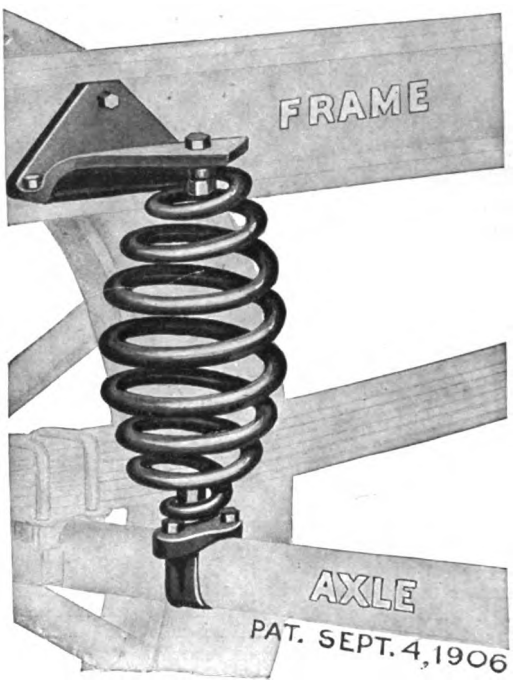
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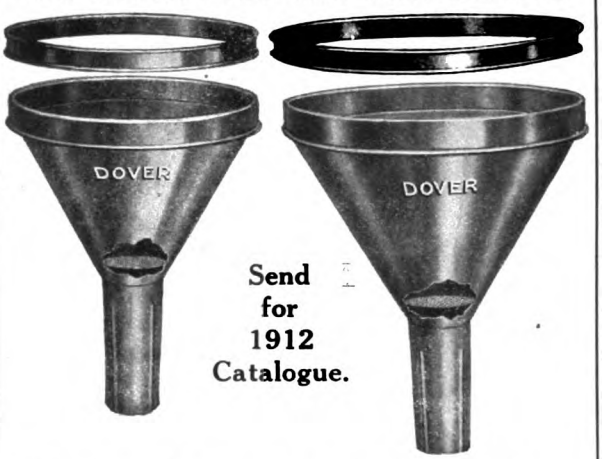
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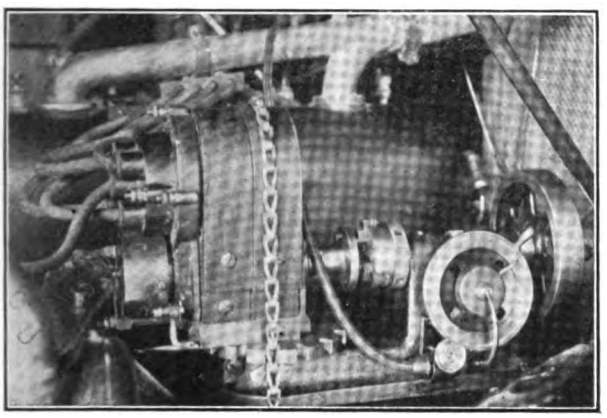
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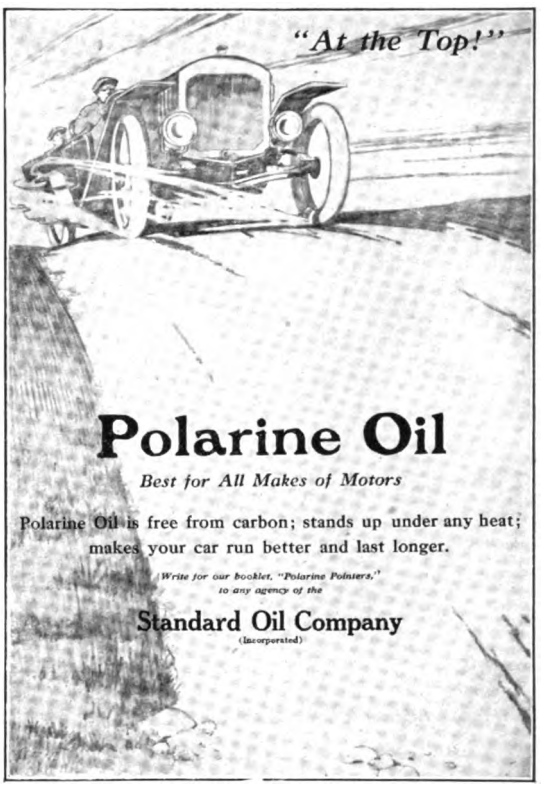
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Lexington Motor Car Co., Connersville, Ind. (Lexington.)

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Oakland Motor Car Co., 1300 Oakland Ave., Pontiac, Mich. (Oakland.)

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Fiske Bros. Refining Co., New York City. (Lubroleine.)

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Harris Oil Co., A. W., 326 South Water St., Providence, R. I. (Harris.)

Branch: 143 No. Wabash Ave., Chicago.

Havoline Oil Co., 133 William St., New York City (Havoline.)

Hawa, Geo. A., 77 Pine St., New York City (Panhard.)

Branch: 899 Boylston St., Boston, Mass.

Kellom & Co., Chas. F., 113 Arch St., Philadelphia, Penn. (Invader.)

Branch: 284 Columbus Ave., Boston, Mass.

Kincaid Oil Co., 219-221 West Exchange St., Providence, R. I. (Kincaid.)

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New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)

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Texas Company, The, 7 West St., New York City.

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Valveline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

Wolverine Lubricants Co., 80 Broad St., New York City (Wolverine.)
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International Metal Polish Co., Indianapolis, Ind. (Blue Ribbon.)

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Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

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Firestone Tire & Rubber Co., Akron, O.
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Aristos Company, The, 1008 Boylston St., Boston, Mass. (Disco.)

Webb-Veitch Co., 1777 Broadway, New York City. (Invex.)

Willard Storage Battery Co., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Aristos Company, The, 1008 Boylston St., Boston, Mass. (Mondex.)

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Hess & Co., 295 Lafayette St., New York City (Bougie Mercedes.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPARK PLUG TERMINALS.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae Universal.)

SPEEDOMETERS AND RECORDING DEVICES.

Casgrain Speedometer Co., 172 Columbus Ave., Boston, Mass.
Branches: 1919 Broadway, New York City; 2031 Euclid Ave., Cleveland, O.

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 802 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Janney, Steinmetz & Co., Philadelphia, Penn.

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Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Gilbert Manufacturing Co., The, New Haven, Conn. (Gilbert.)

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York City.

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park square, Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco,

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Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17½ Dorrance St., Providence, R. I.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRE CHAIN GRIPS.

Atlas Chain Co., 24 35th St., Brooklyn, N. Y. (Atlas.)

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator). See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

New Tyr Manufacturing Co., 771 Lexington Ave., New York City. (New Tyr.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder)

TIRE SLEEVES.

Selbach Rubber Co., 404 Atlantic Ave., Boston, Mass. (Selbach Safety.)

TIRE TOOLS AND REMOVING EQUIPMENT.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

TIRES—CUSHION.

Mots Tire & Rubber Co., The, Akron, O. (Electric Special, Mots Cushion.)
Branches: New York, Chicago, Detroit, Kansas City.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.
Branches: See Rims—Removable and Detachable.

Firestone Tire & Rubber Co., Akron, O.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Mots Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Butler Mfg. Co., The, Carthage, Ind.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing, Mich.
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Pitless Auto Turntable Co., Kansas City, Mo.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, Hartford, Conn. (Kant-Break.)

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Crone, F. G., 331 Genesee St., Buffalo, N. Y.

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Auto Parts Co., Motor Ave., Providence, R. I. (Apco.)

VARNISHES FOR AUTOMOBILE BODIES.

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U-Auto-Varnish Co., Cleveland, O.
Branch: 218 Columbus Ave., Boston, Mass.

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Perfect Mfg. Co., Albany, N. Y.

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Conover & Robinson, 244-252 W. 54th St., Motor Hall, New York City (Boreas.)

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Coes Wrench Co., Worcester, Mass.

Cutter, Geo. A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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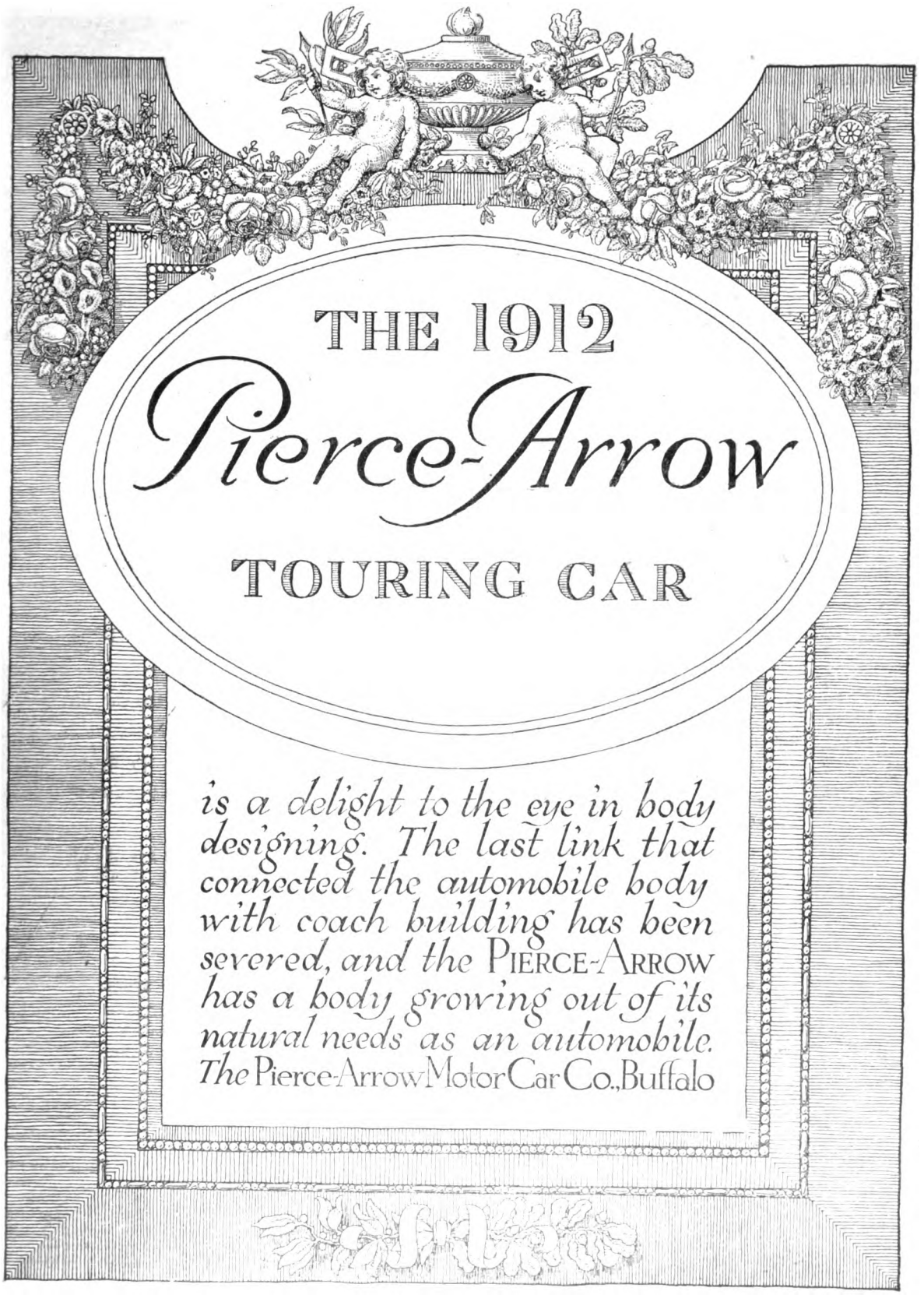
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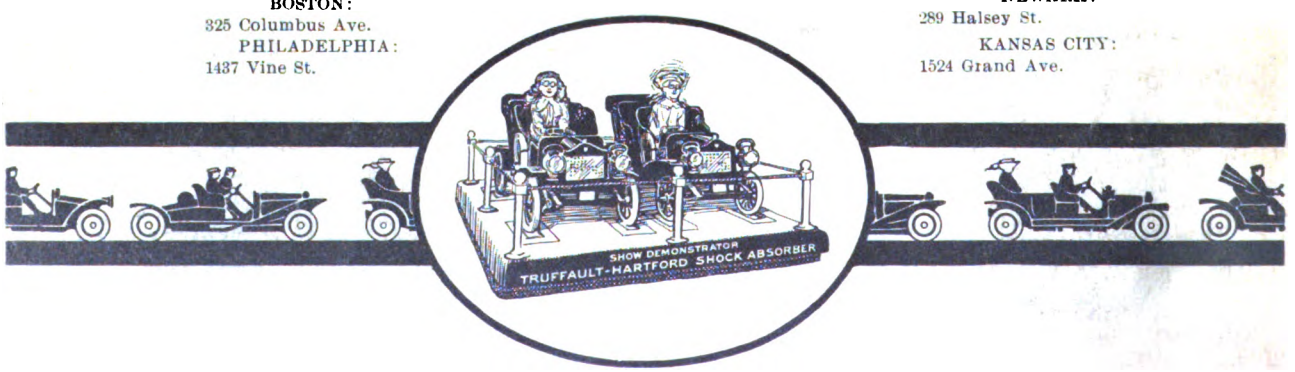
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VOL. XXXIII No. 3

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PAWTUCKET. R. I.

March 10, 1912

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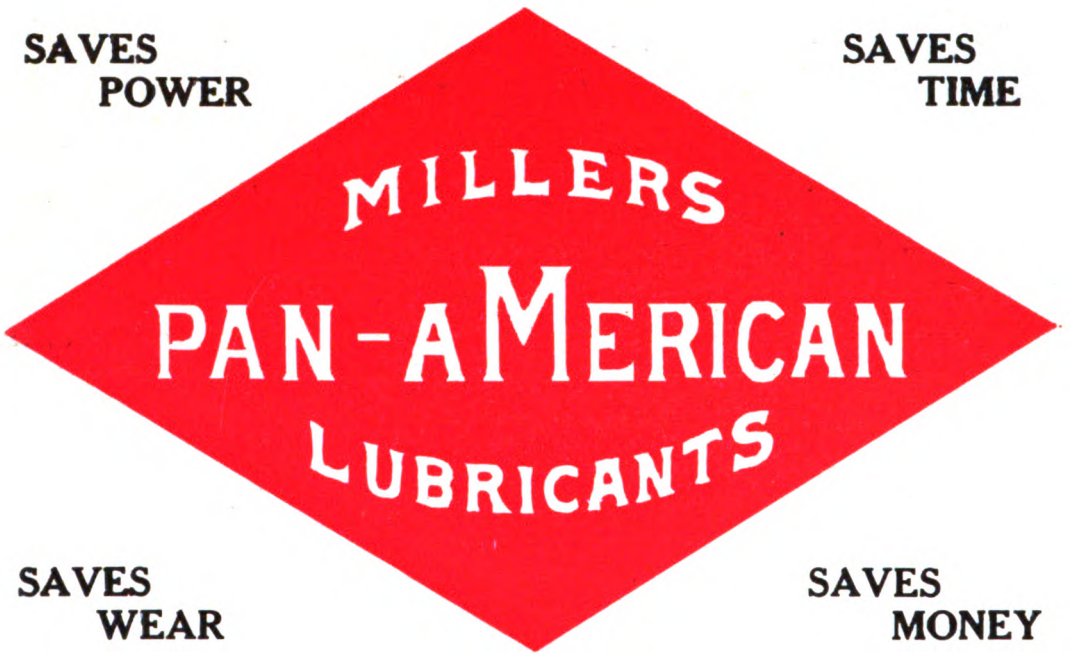
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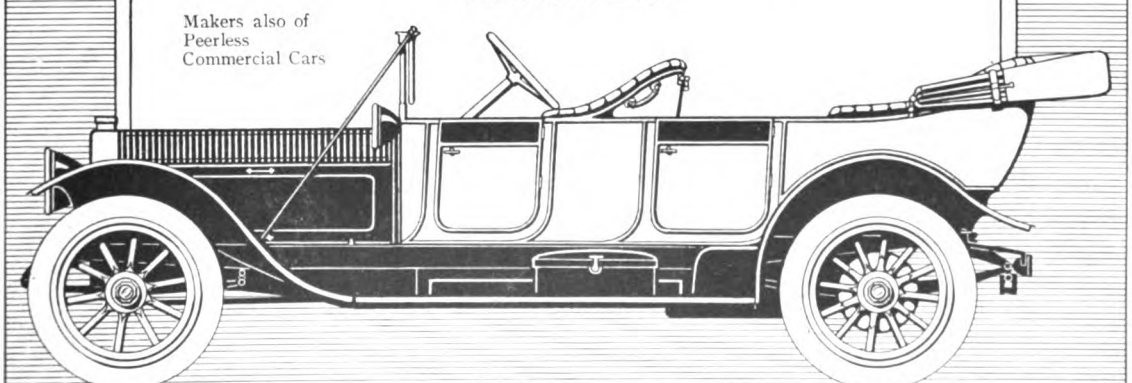
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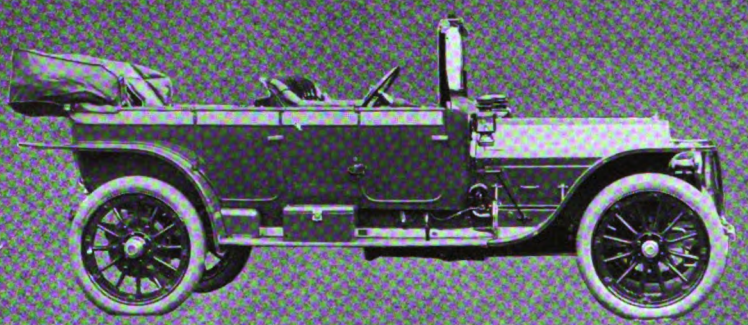
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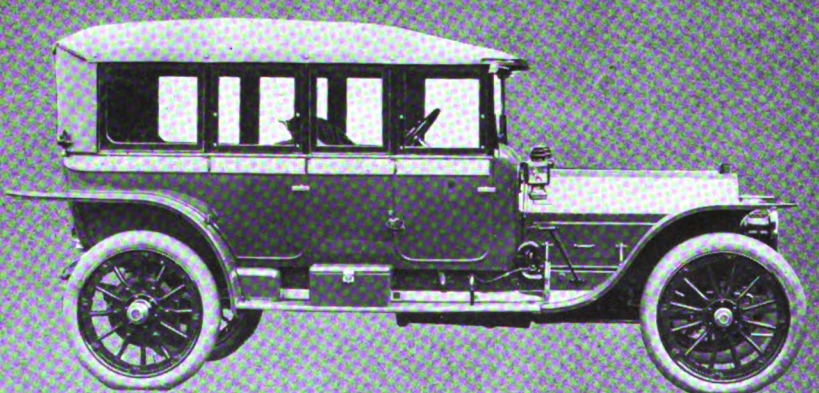
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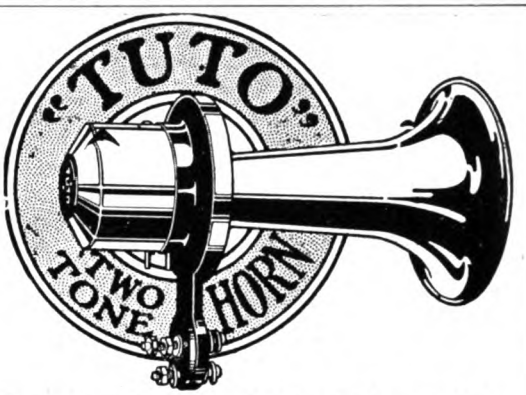
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27 E. 22nd St.
New York City, N. Y. Oct. 27-1911
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Yours very truly,
Joseph Mayer

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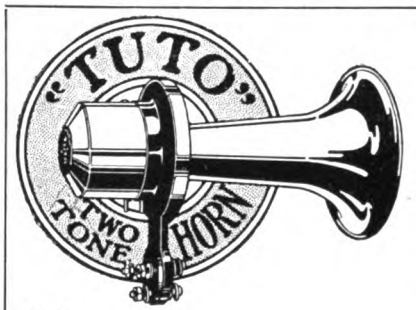


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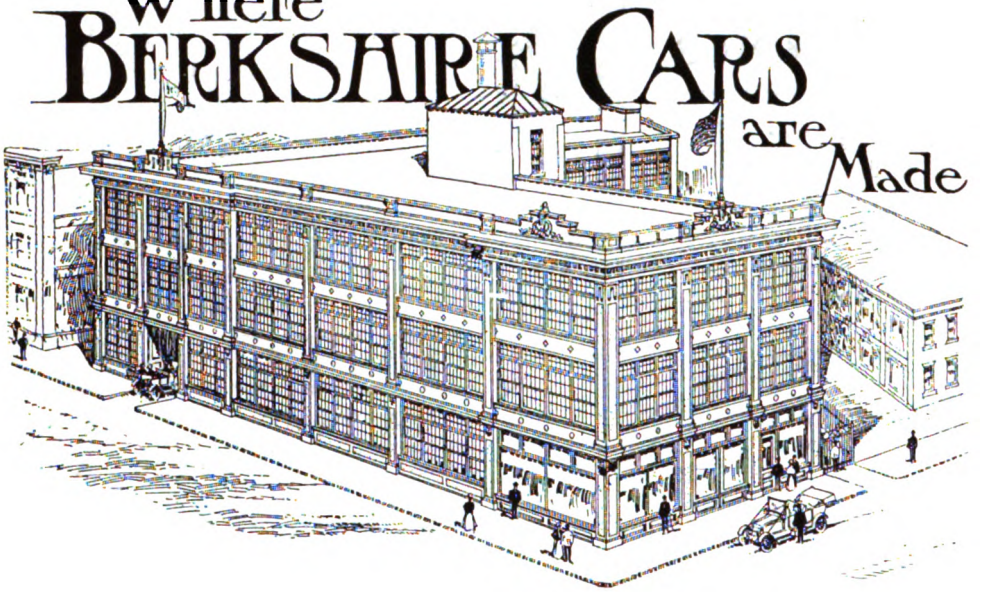
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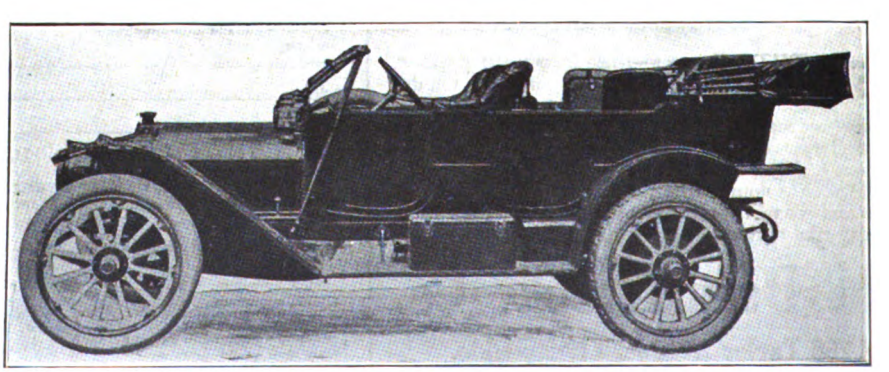
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Gearset—Sliding selective, 4 speeds and reverse.
Rear Axle—Full floating type.
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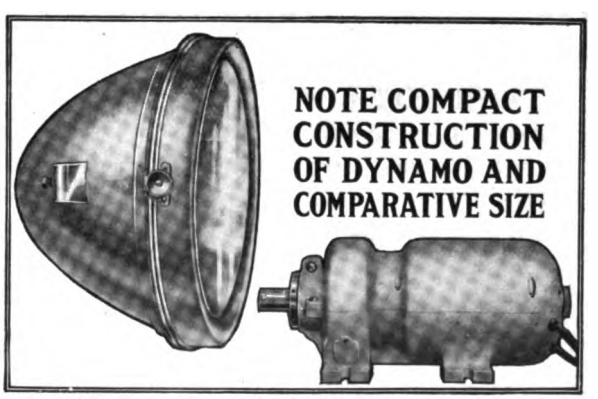
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Is compact. Weighs but 19 1-2 lbs. Requires no attention and works all the time regardless of running conditions.

There's nothing to it but GRAY & DAVIS. At the Shows, in the automobile factories, on the salesrooms floors—whenever they talk of electric lights it's GRAY & DAVIS.

Tell the dealer to deliver your new car equipped with this system—it will outlast the life of your car and ALWAYS give satisfaction.

WHEN IN BOSTON

Call at our salesrooms—let us demonstrate how highly efficient this Dynamo is. Write for catalog.

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Speedwell Worth

The actual worth of a motor car cannot be measured by mechanical details or lineal specifications---so much for so much money.

The character and length of the service, the riding comfort, the distinguished appearance---that is, the actual quality and satisfaction embodied in a motor car---these are the factors that count.

Measured on this real scale of worth Speedwell Motor Cars have no superior.

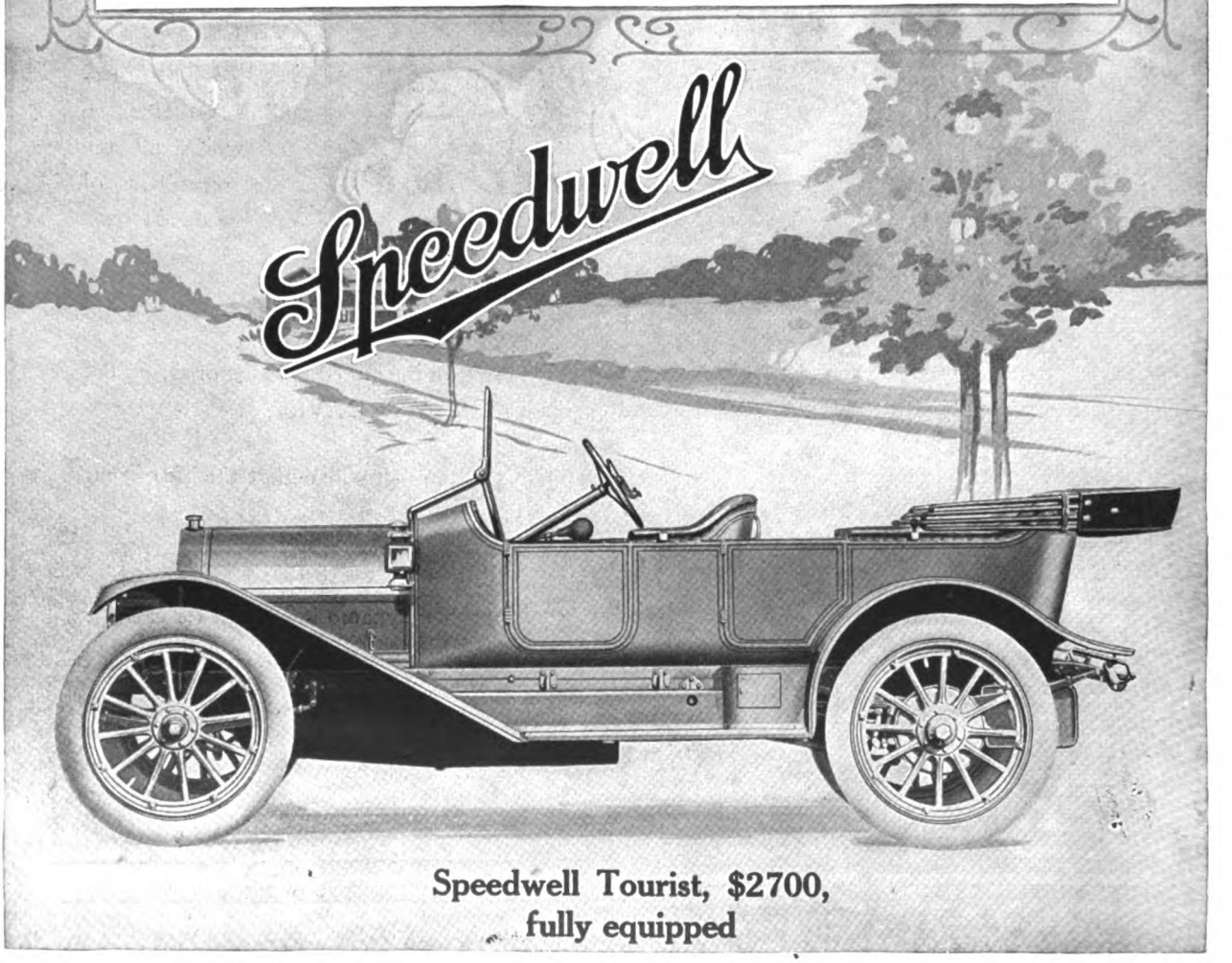
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The Speedwell Motor Car Co.
80 Essex Ave., Dayton, Ohio.

*** Standard Equipment**

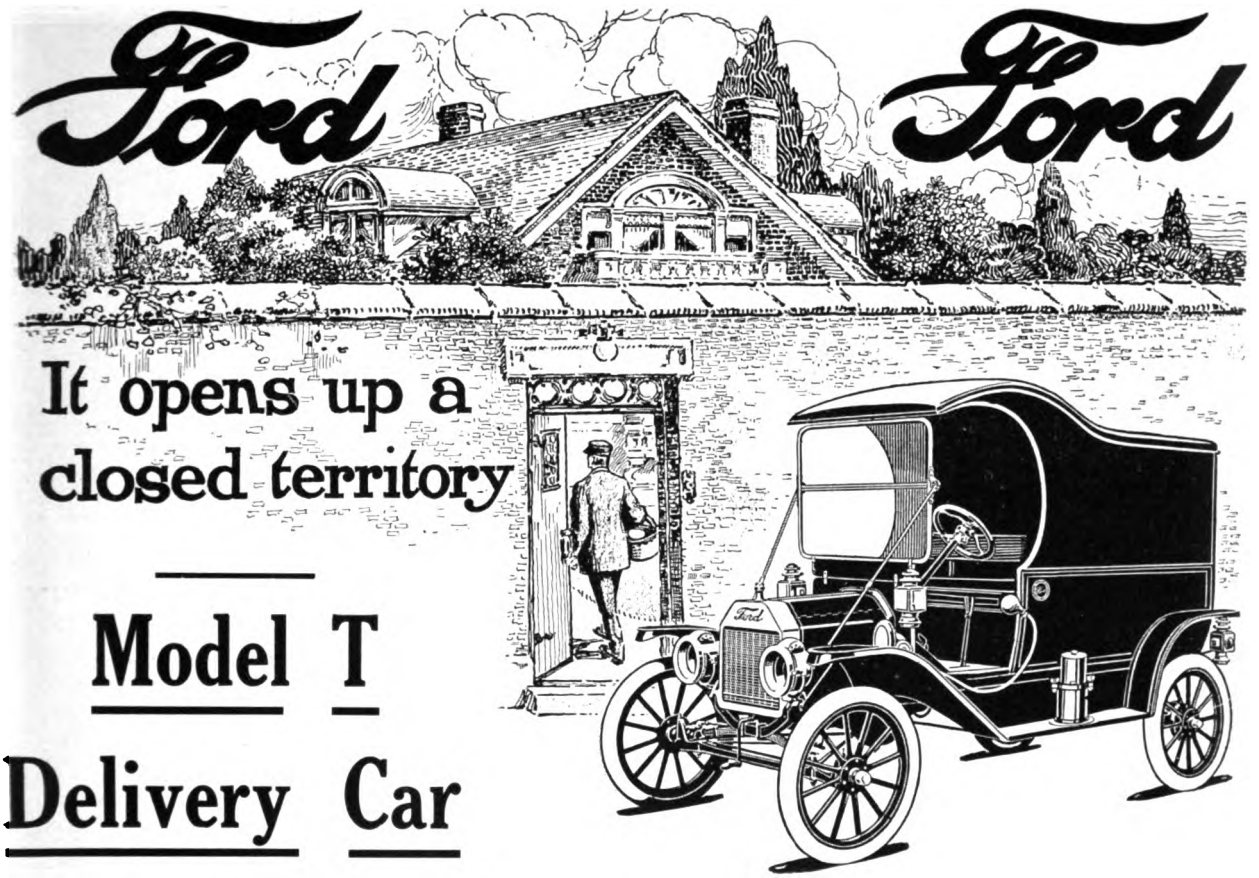
Self-starter,
Full cape top and boot,
Glass front,
Demountable rims,
Gas tank and full lamp equipment,
Tool kit,
Tire kit,
Etc., etc.
One standard chasis—
4 cylinder, 50 H. P.;
123 inch wheelbase;
36 inch wheels.

* Equipment as given above applies to all models except roadsters and limousines, which vary slightly in their standard equipment.



Speedwell Tourist, $2700, fully equipped

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The Barriers Are Down for all the many lines of business that have been looking for a light, flexible, tough, low-priced, high-quality delivery car. Not a truck nor a van, but a CAR—that can cover the ground, open up new territory, bring in new customers, advertise its owner, extend the business, outwork a team of horses and cut the maintenance bill. **That car is this FORD Model T Delivery.**

$700

This price includes full equipment---Automatic Brass Windshield, Speedometer, Ford Magneto built into the motor, two six-inch Gas Lamps and Generator, three Oil Lamps, Horn and Tools. No Ford cars sold unequipped.

Capacity, 750 pounds of Merchandise.

THERE IS NO CLOSED TERRITORY to the wholesaler, the retailer, the power or light company that uses the Ford Model T Delivery Car. It eats up space and annihilates time. It makes relics of more than a million old style delivery vehicles in the United States. It is the feature of 1912 in commercial automobiles. It advertises its dealers and booms its buyers.

TWO YEARS OF HARD PRACTICAL TEST lie behind this statement of fact. The Wanamaker stores of New York and Philadelphia, and the Bell Telephone Company all over the Country, have taken these Ford Model T Delivery Cars and driven them now for over two years, winter and summer, uphill and down. No factory test here, but the actual grind of work. Result—not a change. The **guarantee of Accomplishment** stands on this car.

Light: weighs 1200 pounds—low tire expense—less fuel, multiplies the actual horsepower—carries 750 pounds of merchandise—carries it anywhere, any time.

Flexible: turns in a circle of 28 feet—accommodates itself to owner's and customers' space.

Tough: the same strong chassis of all Ford Model T cars—same simplicity of operation, same Ford magneto built into the motor, same Vanadium steel throughout (40 locomotives of vanadium at twice the cost of carbon steel are now being considered by the Secretary of War for use at Panama).

Low-priced: completely equipped—$700—no more than a team and wagon.

High-quality: stands side by side with the other productions of Ford genius—with more than 100,000 drivers vouching for them.

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Good dealers in unoccupied territory are requested to write us.

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Detroit, Michigan, U. S. A.

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The ability, comfort, appearance and construction of the KisselKar are surpassed by no car at any price. You may not be able to investigate every automobile, but the special features and exceptional values of the KisselKar line deserve your special investigation.

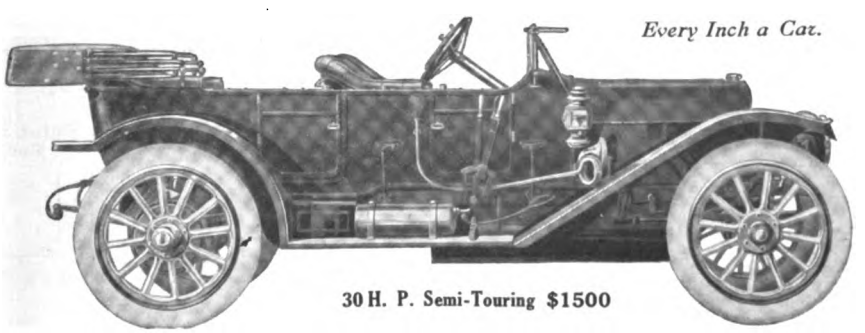
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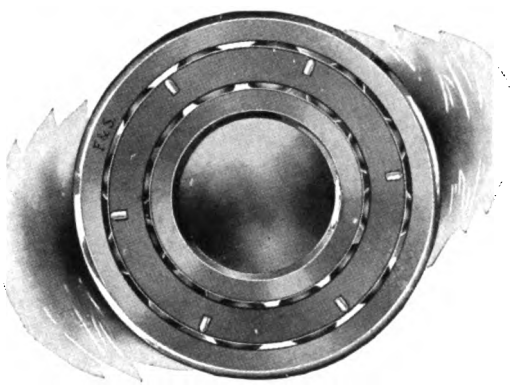
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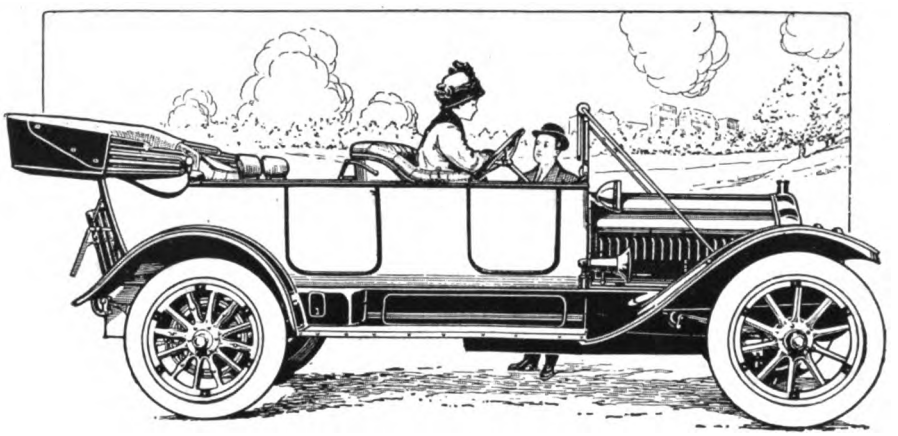
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This car has been produced to meet the heretofore unfilled demand for a powerful six-cylinder car that is both economical in operation and simple in construction and control.

The White Six embodies all of the principles of motor car design which The White Company has so thoroughly developed, and which have made White Cars world-famous for economy, durability, and simplicity of operation and construction.

Absolutely the latest in every detail of body design, with lines unbroken by hinges and handles, the White Six is the only car to incorporate the entirely new but extremely convenient combination of the left-hand drive with a thoroughly practical and efficient electric starting and lighting system, making it possible, for the first time in motor car construction, to reach the driving seat, start and light the car without the necessity of stepping into the street.

The striking simplicity in the design and construction of the White Six, with its long-stroke, cast-in-block motor, commands the admiration of all who see it; and the owner of a White Car rests secure in the knowledge that it is absolutely the best and most advanced car produced anywhere.

The White Company

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THE AUTOMOBILE JOURNAL

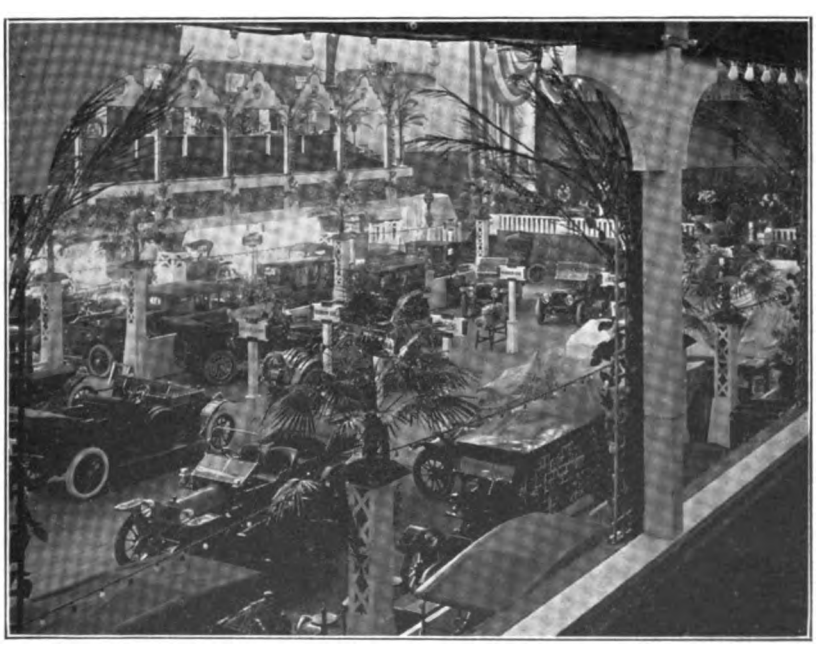
VOL. XXXIII, No. 3 MARCH 10, 1912 Price $1.00 the Year

BOSTON SHOW CREATES NEW RECORDS.

Sales the Largest Industry Has Known—Attendance Exceeds Previous Events by Nearly One-Third—Beautiful Setting and a Remarkable Display.

TWO MILLION dollars worth of automobiles were sold during the seven days and nights of the 10th annual Boston show. As the doors closed, the evening of March 9, the total number of sales reported to the management was 1492. Cars sold ranged in price from $600 to $6000, and a fair average is fixed at $1500. Less than 1000 cars were sold a year ago, and that was considered the best show made by any motor car exhibition ever held.

Very nearly 200,000 people had visited the show Friday evening, and this was increased by approximately 25,000 the last day. A conservative estimate by the management puts the total attendance at 223,841. Of course, it will be expected that these figures will be changed slightly when a more accurate counting has been made. Last year there were 188,000 visitors.

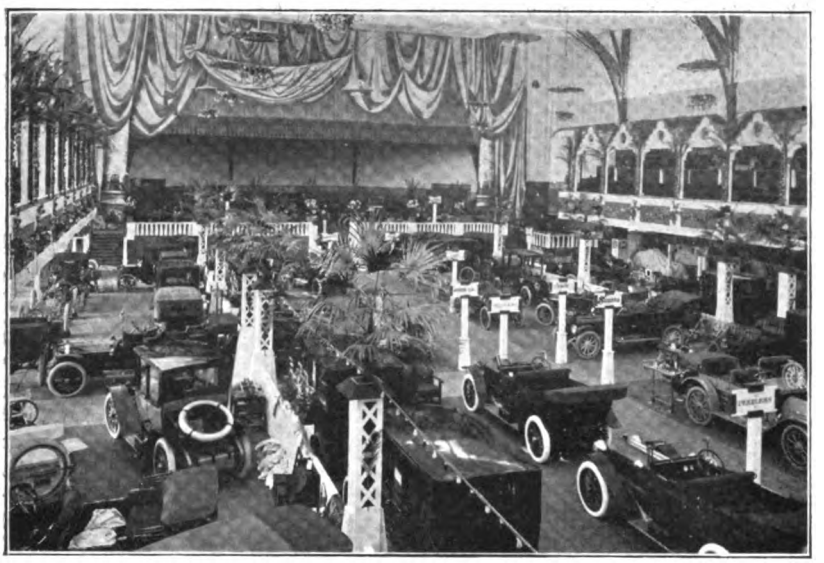


Looking Down from the Balcony in Grand Hall During the Progress of Boston's Tenth Annual Pleasure Car Show.

These figures offer substantial evidence that New England has lost none of its prestige as being the greatest motor vehicle market in the world, and that the Boston automobile show is still able to attract the motoring public. No attempt is made to consider the accessory end of the show, since it practically is impossible to secure reliable statistics as to the business accomplished along this line. It hardly seems probable, however, that the exhibitors of parts, fittings and supplies experienced any other result than that which greeted the motor car dealers.

But it was a great show in other respects. Chicago's best record of 98 makes of pleasure vehicles on display last month was exceeded by nine. New York can boast of but 91, when the 60 makes on view at the Madison Square Garden are added to the 31 at the Grand Central Palace. In total number of cars

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General View of the Main Floor, Grand Hall, with its Spanish Mission Setting.

and chassis on exhibition, the Grand Central Palace had but 163; Madison Square Garden 248, Chicago 344, and Boston 375.

These figures take into account only those cars which were inside Mechanics' Building. Hundreds of demonstrating cars were lined up against the curb on three sides of the building's exterior. This is a feature which is particular to the Boston show. As is well known the so-called national events are staged by the manufacturers in an endeavor to interest the dealers and agents first of all. Demonstrations are by no means as necessary with these. But the Boston show appeals to the would be purchaser. It is the one big sales exposition of the year, and the cars outside the hall are quite as important as those disposed among the decorations inside.

With reference to the decorations: The dainty appeal of the so-called apple blossom show of 1907 will long remain in the minds of those who saw the decorative treatment at that time, but there were many who expressed the opinion that the old English rose garden setting in Exhibition Hall this year exceeded it in point of beauty. There was something about the rich dark green of the boxwood hedges and the brighter hues of the roses that caused the visitor to return again and again to admire the display from another angle. And best of all, there was nothing about the decorative scheme which detracted from the cars themselves. Indeed, they seemed to fit in so naturally that their absence would have been cause for comment.

In Grand Hall, the general treatment was that of old Spanish Mission architecture. It was stately in design and gave an idea of permanence which well befits the automobile industry. The view from the balcony, as indicated by an accompanying illustration, was one of remarkable beauty, in which the classic lines and graceful curves of the cars on the main floor

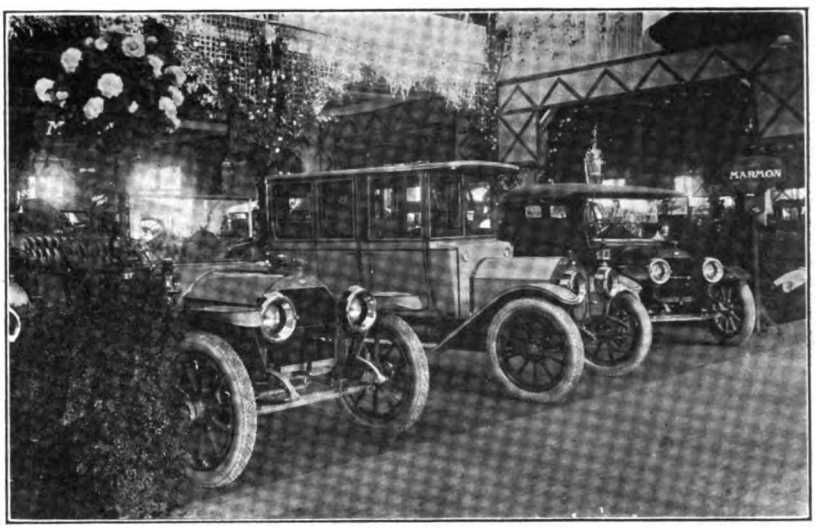


General View of Main Aisle in Exhibition Hall, Showing the Remarkable Beauty of the Old English Rose Garden Setting Employed.

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added their full quota. The basement does not admit of much in the way of decorative art. Still, bunting and lights were utilized throughout to obtain the best effect. The same thing may be held to apply in the balconies and other smaller halls, in which the accessories were displayed.

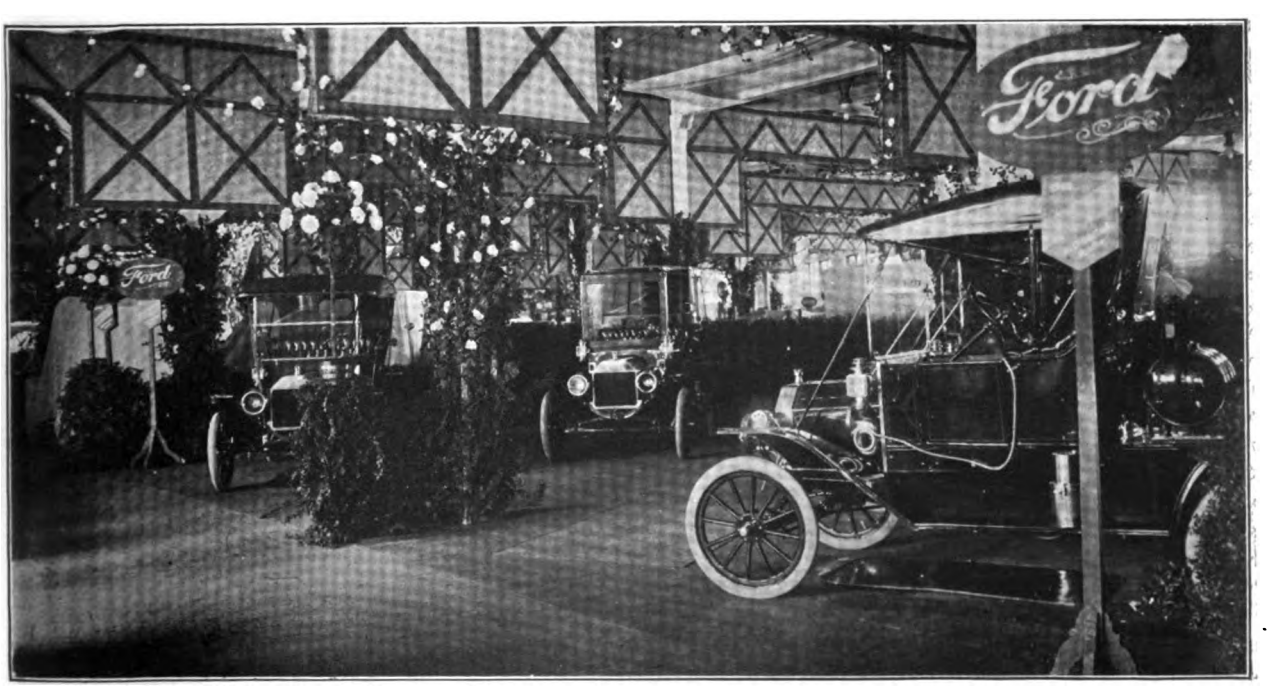
Of the 107 makes of machines on view, 14 were new to Boston, never having been exhibited at a show in that city before. These were: Havers, King, Lion, Metallurgique, McFarlan, Nyberg, Norwalk, Ohio gasoline, Ohio electric, Otto, R-C-H, Staver and Stutz. Some of these were not seen at either the New York or Chicago shows, and there were still others, not new to Boston, which were not seen at the other shows mentioned, this year. This list includes: Apperson, Bailey electric, Berkshire, Chadwick, Ford, Lenox, Moyer, Norwalk, Nyberg and Stanley steamer. To these should be added the Atlas Knight, since it was not seen at the other displays, although announced during the exhibit at Madison Square Garden.



A Splendidly Appointed Enclosed Town Car Occupied the Centre of the Marmon Exhibit.

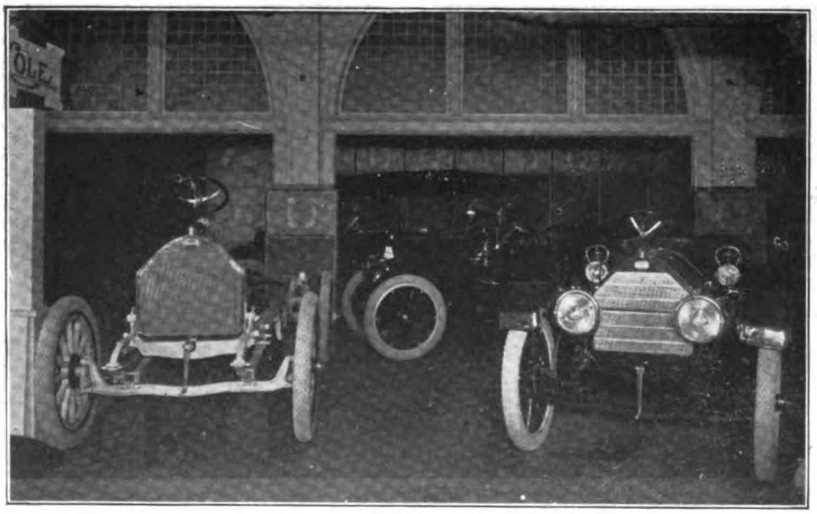
Inasmuch as this was the first opportunity to study the construction of the Atlas-Knight, made by the Atlas Motor Car Company, Springfield, Mass., it will prove of interest to make some mention of its chief characteristics. The motor is changed but slightly from the regulation Knight construction, the movement of the sleeves being slightly less. The four cylinders are cast in pairs with bore of 4.5 inches and stroke of 5.5, the rating being 50 horsepower at 1200 revolutions a minute. Another special feature of the construction is the use of an underslung worm drive. This is believed to be the first instance in which an American made pleasure car has employed the worm for final drive. The Atlas-Knight will be fitted with a self-starter.

Apperson cars are made by the Apperson Bros. Automobile Company, Kokomo, Ind., and it is somewhat surprising to find this concern waiting until the



Ford Cars Had a Commanding Position in Exhibition Hall, Being Surrounded by Boxwood Hedges and Rose Trees.

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Where Cole Cars Were Displayed Under the Balcony in Grand Hall.

Boston show before introducing its new models to the public. The line does not differ materially from from that of last year. The equipment is most complete, including a special windshield ventilating attachment and demountable rims.

The Bailey electric is made in Boston by S. R. Bailey & Co. Its prominent feature is the use of the Edison battery. The line has been increased by the addition of a roadster, in which the battery is divided, one-half being located under the rear compartment and the other in front under a low hood. It is claimed that this machine will average 20 miles an hour with a run of 80 to 100 miles on a single charge.

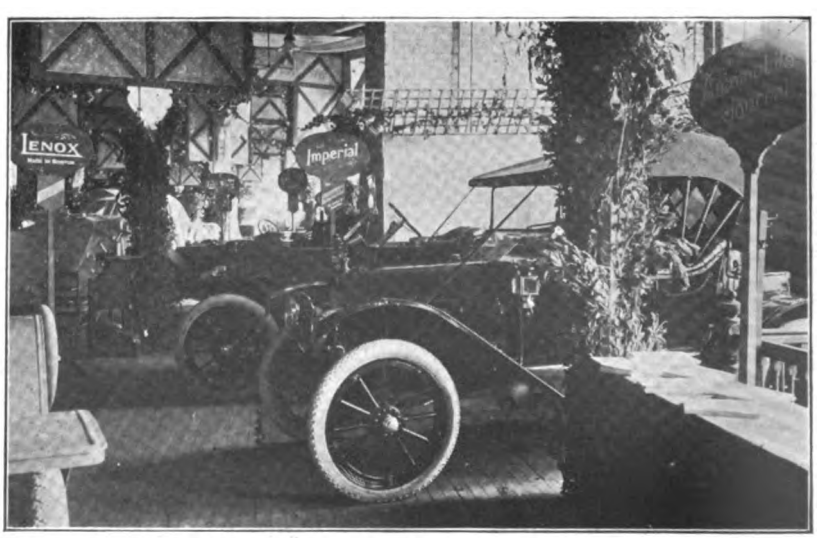
Berkshire cars are produced by the Berkshire Motors Company, now located at Cambridge, Mass. Two chassis are presented, a four-cylinder and a six. To the former of these five bodies are fitted, and four to the latter. The changes in mechanical construction are not many, and in the main the Berkshire 1912 models are similar to those which have won for this make an enviable reputation throughout New England. Equipment includes a self-starter and demountable rims.

The Chadwick is made by the Chadwick Engineering Works, Pottstown, Penn., in six-cylinder models only. Several mechanical features, which may be regarded as distinctive of the Chadwick design, are still retained without material change. Special attention has been paid to the system of brakes and spring suspension, and the side chain drive, with which this car is equipped, is enclosed in a dust and dirt proof chain case.

While conditions have changed materially in the automobile industry during the past year, it would appear that the Ford Motor Company, Detroit, maker of Ford cars, is not yet ready to display at the shows under the management of either national organization of automobile manufacturers. Ford cars always have been seen first at the Boston show, and this was true again this season. The standard chassis has been changed but slightly during the past year, and is almost too well known to need extended description.

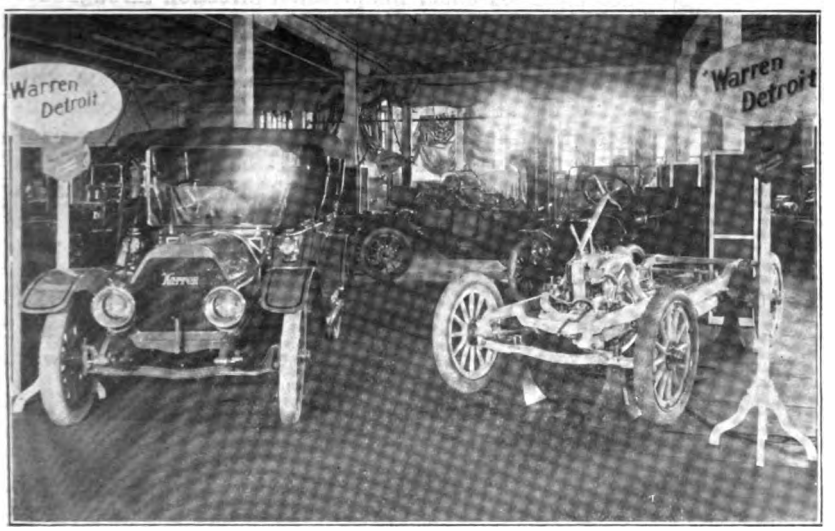
The Lenox Motor Car Company, Boston, Mass., which brought out its first Lenox car just previous to the Boston display of last year, has added two new body designs, one a speedster and the other a limousine. The changes in design and construction are such as are intended to make for economy and comfort. Heavier wheels are used throughout, and the rear axle is of Krupp steel. Standard equipment includes demountable rims and one extra rim. While a self-starter and electric lighting will be fitted at an extra charge at present, it is understood that the company is experimenting in connection with Gray & Davis, Amesbury, Mass., for the production of a combined electric starter and lighting system which will be adopted as regular equipment.

Moyer cars have been manufactured for two years by W. A. Moyer, Syracuse, N. Y., but this was the first time they have been displayed at any show, outside of their home city. The maker has had long experience in the production of wagons and is well and favorably known in that field. There are two chassis, a four-cylinder and a six, the former rated at 30 horsepower and the latter at 45. The motors have the



Imperial and Lenox Models Were Shown Side by Side in Exhibition Hall.

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Warren Display, Indicating Decorative Treatment in the Basement.

same bore and stroke, 4.25 by five inches. A particular feature of construction is the spring suspension. Two semi-elliptic members are utilized in front and two three-quarter elliptic members in the rear, the latter being connected by an equalizer at each end. It is claimed that by this method, no matter how the car is loaded, both sides of the frame will be depressed equally. Equipment includes electric lighting, Blitzen self-starter, tire carrier, quick detachable rims and provision for the acetylene tank in the tool box.

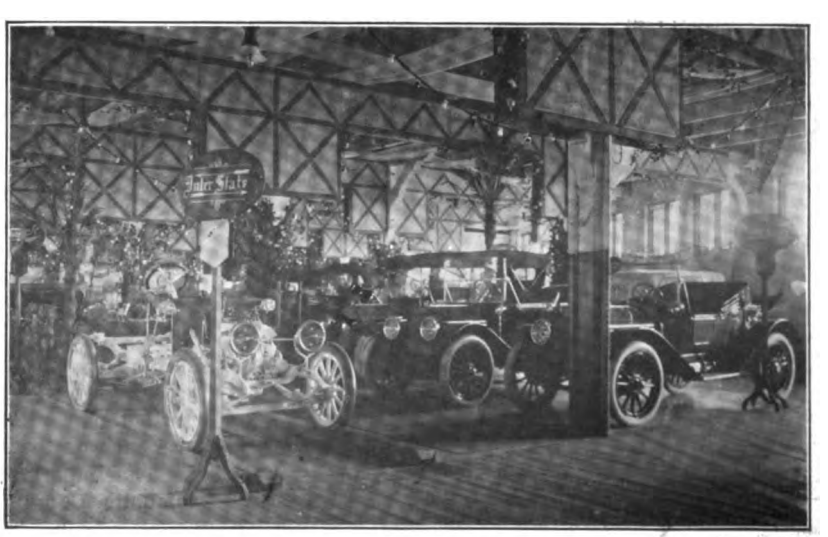
What is claimed to be the first underslung six-cylinder car is found in the Norwalk, made by the Norwalk Motor Car Company, Martinsburg, W. Va. It would appear from an examination of the chassis, that about all that was removed from Norwalk, O., to Martinsburg, in the recent reorganization of the company, was the name. The old Norwalk car had a four-cylinder motor rated at 45 horsepower. The new six-cylinder engine is expected to develop from 54 to 62. Cylinders are cast in pairs with valves in removable cages in the head. The bore is four inches and the stroke five. Equipment is most complete and includes electric lighting and Prest-O-Starter.

The Nyberg is made by the Nyberg Automobile Works, Anderson, Ind. The construction follows standard lines throughout the two chassis, one of which is fitted with a four-cylinder motor rated at 40 horsepower, and the other a six, rated at 60. The engine is a Rutenber of the latest long stroke type, the bore being 4.25 inches and the stroke 5.25. Several types of bodies are fitted, including delivery wagons and fire apparatus.

As is fitting in connection with the Boston show, held in the city in which the first automobile show was conducted in the days when steam was regarded as the only ideal propulsive agent, the Stanley steam car, made by the Stanley Motor Carriage Company, Newton, Mass., was shown again this year. While several changes have been made in the mechanical construction, they cannot be regarded as radical. The chief difference lies in the appearance, a fore door torpedo body having been added both for the touring car and roadster models. The line is sold fully equipped this year.

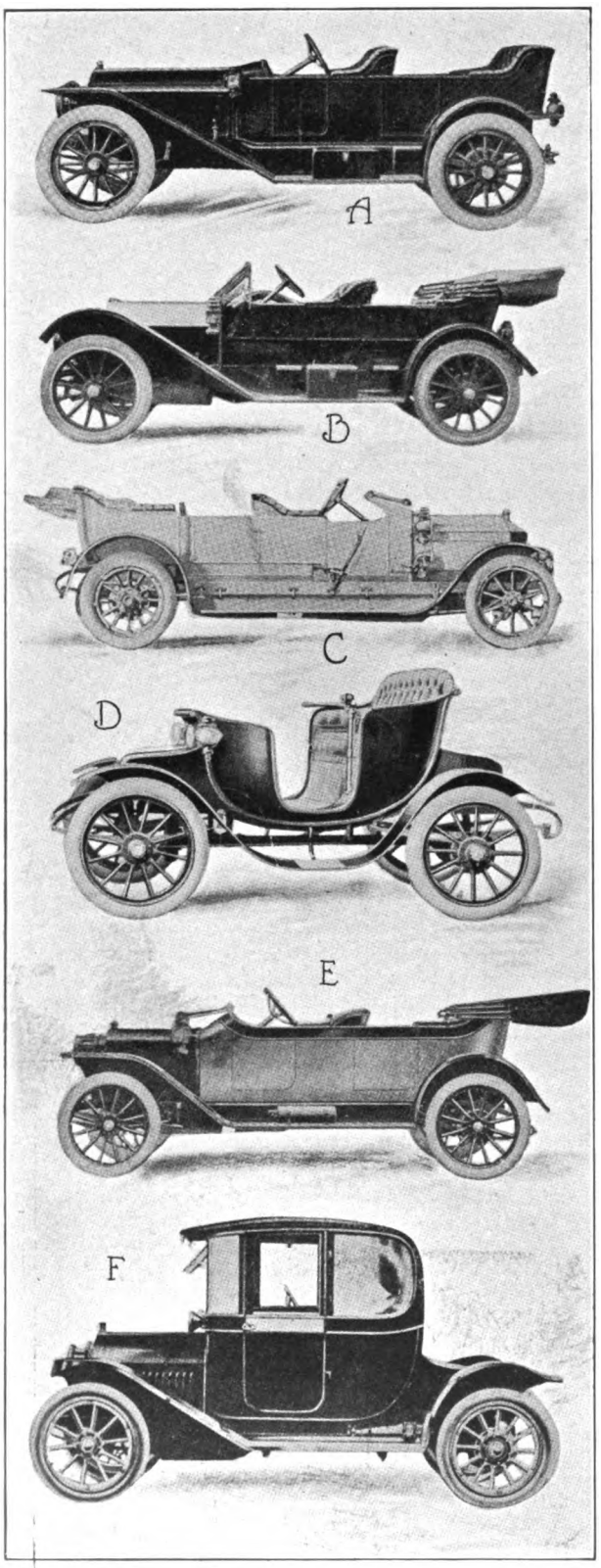
Concerning the other lines shown, all of which were seen either at New York or Chicago, brief descriptions have appeared in The Automobile Journal in connection with the review of those displays. A few of these exhibited new features, however, and it will be proper to make mention of these here.

The Peerless line, for instance, included an advance model in which were incorporated a few features which will be seen in the 1913 design. The changes are not what may be regarded as radical, but with a view to offering even more comfort and economy than has been exemplified in previous Peerless models. Of particular interest was the berlin limousine in rich royal purple, with beautifully executed landscape panels vignetted centrally upon the body. The interior treatment was in handsomely grained, soft-toned Circassian walnut, embellished with hand painted Louis XVI decorations. This design was by John L. Snow of the Boston branch and the work was



Inter-State Cars Drew a Splendid Location in Centre of Exhibition Hall.

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Seen for the First Time in Boston: A, Havers; B, McFarlan; C, Metallurgique; D, Ohio Electric; E, R-C-H; F, King.

accomplished under his personal direction throughout.

Another enclosed car of Boston construction was that designed by F. E. Wing of the F. E. Wing Motor Car Company, agent for Marmon cars. In this, the driver's seat was completely shut off from the remainder of the interior, an extra seat in front being provided for the third member of the party. This also was handsomely appointed and finished both inside and out, and attracted unusual comment.

A berlin limousine finished in mahogany was shown at the booth of the Underhill Company, agent for Knox cars. The rich coloring, resembling the grain of the wood, as have all of the Knox show cars this year, was particularly effective. One feature was the locking of the doors by means of Yale locks, so that it would be possible to leave wraps inside the machine, while attending the theatre, making calls, etc.

The White Company displayed one of its four-cylinder cars equipped with the new White self-starter. It will be remembered that only the new six-cylinder White machine was thus equipped at New York and Chicago. In the future, all White cars will be fitted with the self-starter, including the limousine.

White, Ware & Leatherby displayed the new 40 horsepower Bergdoll, both in the chassis and as a torpedo model. This was shown for the first time in New York City, but not in such complete form. It does not differ materially from the older 30 horsepower car, except in the motor, which is of the long stroke design, being with bore of four inches and stroke of six.

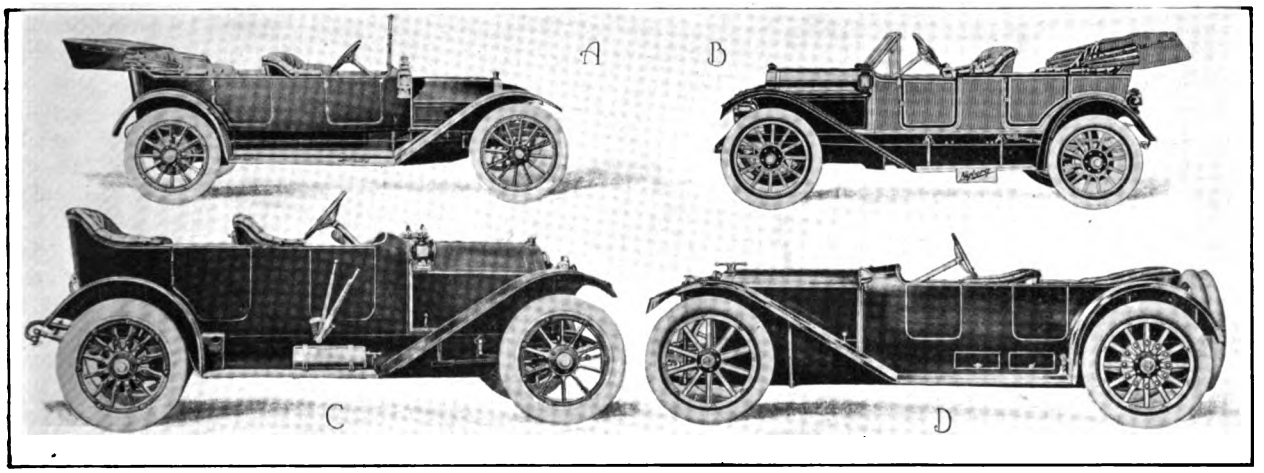
The KisselKar New England branch presented the new seven-passenger six-cylinder 60 horsepower KisselKar, which was seen for the first time in the East. The particular features of this model, besides the usual KisselKar quality, are the long wheelbase, 132 inches; large tires, 37 by five inches, and the very complete equipment. Electric lighting and self-starter may be had at a slight additional expense.

The Stutz line attracted considerable favorable comment, largely because of the announcement just before the opening of the show of its victory in the recent road race at Bakersfield, Cal. Inasmuch as this is the first time the Stutz has been seen in Boston, the Empire Motor Car Agency, local representative of the maker, the Ideal Motor Car Company, Indianapolis, Ind., was kept exceedingly busy demonstrating its merits.

F. N. Smith displayed the new Mercer raceabout, this particular machine being the one with which Hugh Hughes of the Mercer Automobile Company's racing team created a New York-Boston road record, March 5. The mechanical construction is the same as that shown at New York City in January but the particularly pleasing appearance of the new body was such as to occasion much favorable comment.

The Imperial line was shown by the Imperial Automobile Company, Jackson, Mich., several factory representatives being in attendance. The week was one of decided success for this make, a number of

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Other Makes of Machines That Made Initial Showing in Boston: A, Otto; B, Nyberg; C, Stutz; D, Norwalk.

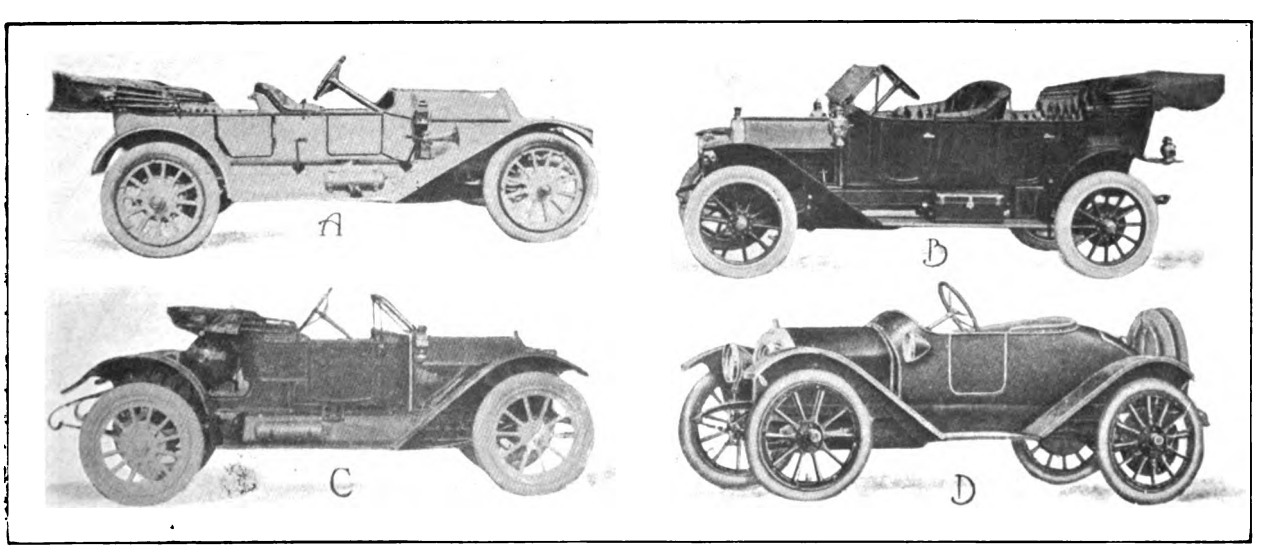
agencies being closed in this territory and in central New York State. It was announced that during the coming season the 44 horsepower chassis would be fitted with a limousine body and the 33 with a coupe.

The latest type of detachable demi-tonneau body on the Flanders was shown by the E-M-F Boston Company. This is mounted on the regulation Flanders chassis, and permits the use of the car as a utility vehicle. Three possible conditions are brought about by this arrangement. The demi-tonneau is removable, allowing for the use of an open flare board or enclosed delivery body. This is expected to have a decided appeal for merchants, florists, plumbers, etc.

Particular attention was paid to attracting and retaining the interest of women during this show. Several car representatives presented souvenirs, among which may be mentioned the Whitney-Barney Company, agent for the Selden; Chauncey Thomas & Co., Cunningham; and many others.

In fact, this was the first automobile show, that may be regarded as of national importance, in which women were exhibitors. Miss Virginia E. Aiken of Brookline, Mass., but 16 years of age and holding the distinction of being the youngest automobile agent in New England, becomes the first to display motor vehicles. She represents the Babcock electric, made by the H. H. Babcock Company, Watertown, N. Y.

Another woman, Miss Margaret E. Knight of South Framingham, Mass., is the first to display in the accessory division, her exhibit being the product of her inventive genius—the Knight-Davidson motor. This is a sliding sleeve engine, in which the sleeves are crescent or semi-circular in shape, and are arranged concentrically about the piston between the cylinder walls and water jacket. The details of the scheme have been worked out with commendable success. The bore is four inches and the stroke six, giving an S. A. E. rating of 25.6 horsepower, although the engine is said to have developed in excess of 50 on an actual



Four Cars Never Before Displayed at the Boston Show: A, Staver; B, Moyer; C, Lion; D, Ohio Gasoline.

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brake test. Its development will be awaited with interest.

Two other motors were displayed, these being designed more particularly for aviation use, although they may be applied to automobile or motor boat construction as well. One of these was the R. V., made by the Raymond Engineering Company, Boston, this being a six-cylinder V motor rated at 75 horsepower, and operating on the two-cycle principle. The other was an eight-cylinder Frontier motor, also of the V type, made by the Frontier Iron Works, Buffalo, N. Y.

EDWARDS IS MARQUETTE MANAGER.

Clifton C. Edwards, well known to motorists throughout New England, has been appointed manager of the Boston branch of the Marquette Company, maker of Marquette cars, at 733 Boylston street. He assumed his new duties immediately preceding the Boston show, and was busy throughout that exhibition receiving the congratulations of his many friends who visited the Marquette display.



Clifton C. Edwards, Manager Marquette Boston Branch.

Mr. Edwards has been connected with the automobile industry for a number of years. For the past two years he has been connected with the E. R. Thomas Motor Car Company, Buffalo, N. Y., representing the Thomas car in the South and in Mexico. Previously, he was associated with the sale of Panhard cars in New York City.

He is best known in New England through his interest in the old Crown garage, closely allied with the Crown Hotel, in Providence, R. I., where he handled the Oldsmobile, Premier and other lines. Inasmuch as many tourists make their headquarters at the Crown when in Providence, Mr. Edwards had abundant opportunity to secure a wide circle of acquaintances and friends, all of whom are glad to learn of his latest appointment.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

SEAMLESS BOOSTERS "SMOKED."

During the exhibition of the pleasure cars at Boston an exceedingly pleasant incident for the representatives of the Seamless Rubber Company, New Haven, Conn., was a "smoker" tendered to them at the Hotel Oxford by Vice President and Sales Manager Henry G. Pagani. The principal part of the entertainment was an admirable dinner, to which all did justice, and at which decidedly pleasing souvenirs. useful to every smoker, were distributed. Following the menu was a period of informal speeches, which naturally assumed the character of trade "talk." The company was presided over by R. L. Kingston, manager of the Seamless Boston branch. Those participating were: Henry G. Pagani, R. L. Kingston, C. H. Teahan, Ware, Mass.; C. E. Walsh and C. H. Stoddard, Worcester, Mass.; David McConnell, Fall River, Mass.; H. L. Waite, Providence, R. I.; C. B. Thomas, Watch Hill, R. I.; George A. Clark, Westerly, R. I.; W. I. Willard, New Haven, Conn.; James A. Murray, New Haven, Conn.; R. E. Steer, Boston, Mass.; E. S. Steer, New Haven, Conn.; E. M. Schwarzenberg, Boston, Mass.; Percy I. Reynolds, Lynn, Mass.; W. I. Bissell, Northampton, Mass.; J. H. Atwood, Boston, Mass.; William Perdue, New York, N. Y.; John E. Reed, Brockton, Mass.; Thomas H. Steerworth, New York, N. Y.; George P. Brophy, Boston, Mass.; A. Mansfield, Boston, Mass.; W. R. Blodgett, New York, N. Y., and William W. Scott, Providence, R. I.

MUCH INTEREST IN MULTIBESTOS.

A feature of the Boston show which was particularly gratifying to the Standard Woven Fabric Company, Worcester, Mass., was the amount of interest taken in its product, Multibestos brake lining. It would not seem at first thought that the owner or prospective purchaser of a motor car would be greatly concerned with brake lining, inasmuch as cars come completely equipped with this material and it is not a component which wears out easily. However, this company found that the crowd about its booth was much interested, both in the product and the method of manufacture. Early in the week it was deemed necessary to telegraph the factory for additional demonstrators in order to explain adequately the virtues of Multibestos.

ISSUES ATTRACTIVE POSTER.

The American Lava Company, Chattanooga, Tenn.. maker of Alco acetylene burners recently issued a copyrighted eight colored poster entitled "The Brightest Light on the Highway." Placed in a special frame, and being particularly appropriate, it is unusually attractive.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

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A Convincing Record of Display Automobile Advertising In Boston Newspapers

TOTALS FOR JANUARY, 1912:

BOSTON	**POST**	**15,464**	Agate Lines
"	Globe	13,448	"
"	Transcript	10,436	"
"	American	8,030	"
"	Herald	6,587	"

TOTALS FOR JANUARY and FEBRUARY Combined:

BOSTON	**POST**	**31,282**	Agate Lines
"	Globe	29,350	"
"	Transcript	27,092	"
"	American	14,919	"
"	Herald	12,719	"

GRAND TOTALS FOR JANUARY, FEBRUARY and FIRST 8 DAYS OF MARCH:

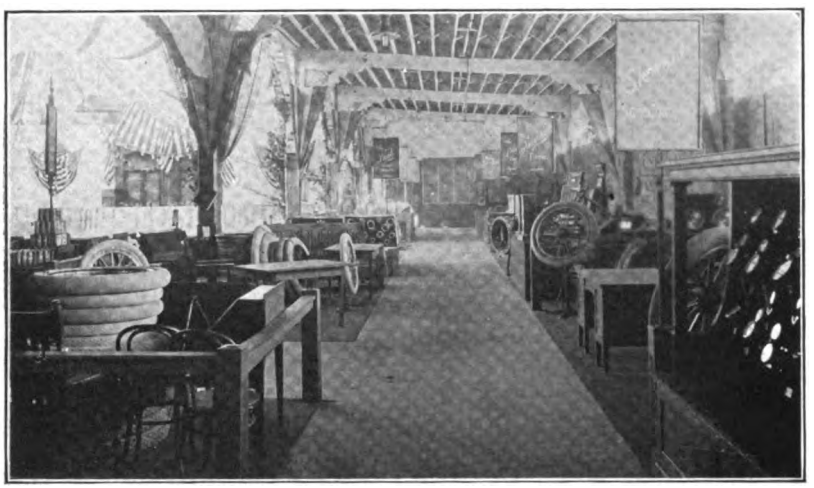
BOSTON	**POST**	**88,177**	Agate Lines
"	Globe	80,955	"
"	Transcript	67,656	"
"	American	60,020	"
"	Herald	47,205	"

THESE FIGURES PROVE THE BOSTON POST THE AUTOMOBILE LEADER IN 1912

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ACCESSORIES AT THE BOSTON SHOW.

THE DISPLAY of accessories at the 10th annual Boston automobile show was very large and comprehensive, it being the best ever made in connection with a Boston exposition. It was particularly notable for the considerable number of comparatively small devices. Several machine and shop power tools were exhibited, these being operated and practically demonstrated by skilled mechanics. Many of the exhibits shown were those prepared for the New York and Chicago shows and these were in charge of capable demonstrators. The following briefly describes some of the principal displays:



An Aisle in the Accessory Department Above Machinery Hall, Looking Toward Paul Revere Hall.

TIRES.

Ajax-Grieb Rubber Company, Trenton, N. J.—Displayed a full line of Ajax pneumatic shoes and tubes for pleasure cars with both round and anti-skid treads.

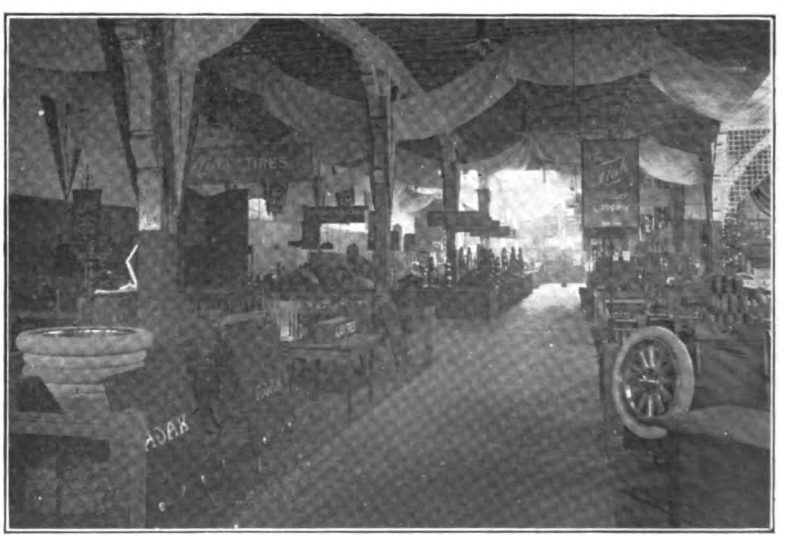
Boston Tire & Rubber Company, Boston, Mass.—Showed the Boston shoes and tubes for pleasure vehicles with round tread made in both the clincher and quick detachable types by the single cure wrapped tread processes.

Cataract Rubber Company, New York, N. Y.—Boston Motor Company, Agent—Cataract quick detachable and clincher shoes in plain and break-skid treads, and the Cataract gray and Selector red tubes.

Century Tire Company, New York, N. Y.—Showed the Century "custom made" shoes in both round and "guard" treads, the "guard" tread being surfaced in large blocks by hand-cut grooves. These shoes are of wrapped tread construction.

Empire Tire Company, Trenton, N. J.—Displayed a full line of the Empire shoes in clincher types, the gray and red tubes, and the Empire demountable rim for clincher tires.

Firestone Tire & Rubber Company, Akron, O.—The Firestone display included the Firestone pneumatic shoes and tubes for pleasure vehicles in clincher and quick detachable treads, the Firestone solid tires for pleasure vehicles, the Firestone solid tires for power wagons, the Firestone quick detachable rims for pneumatic shoes, and the Firestone demountable rims for solid tires for wagons and trucks.



South Aisle of the Accessory Division Above Machinery Hall from Among the Tire Exhibitors.

Goodyear Tire & Rubber Company, Akron, O.—Showed the full line of the well known Goodyear "oversize" shoes and tubes, both round and anti-skid, for pleasure cars, and the Goodyear quick detachable rims. One feature was the double-thick non-skid tread, especially adapted for winter driving.

Fisk Rubber Company, Chicopee Falls, Mass.—Displayed the Fisk shoes of the bolted-on and clincher types, the Fisk demountable rim, the Fisk tubes for pleasure cars, and the latest Fisk production, the dual equipment for power wagons. This consists of a special rim adapted for the installation of dual pneumatic tires on machines up to 5000 pounds capacity, practically of the same design as the well known Fisk removable rim for pleasure cars.

Motz Tire & Rubber Company, Akron, O.—Exhibited the Motz solid tires, adapted for pleasure cars and for use with service wagons of varying capacities, these shoes being designed for constant service and not for track or racing work

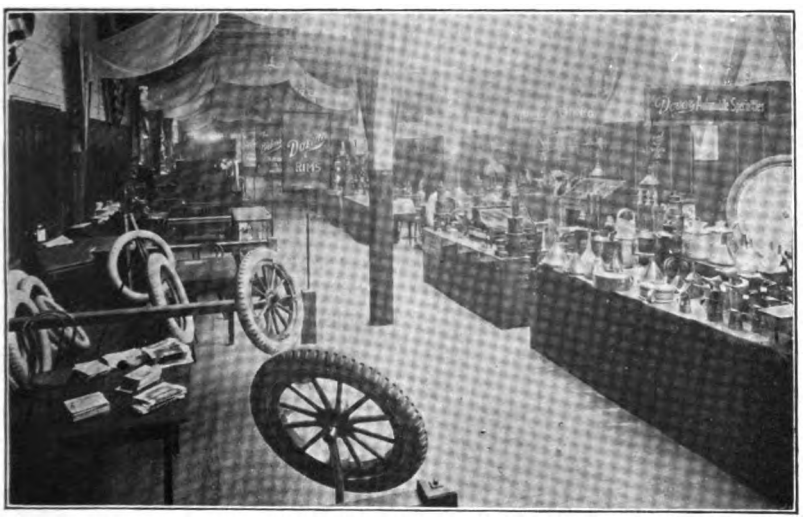
Michelin Tire Company, Milltown, N. J.—The Michelin shoes and tubes for pleasure cars, the casings being either clincher or quick detachable, and round or the steel-studded anti-skid, were shown with the Michelin quick detachable rims for both automobiles and service wagons, the latter being of the dual type, and a full line of the Michelin tire tools and the Michelin materials for making temporary or permanent repair.

John Lewis Morse, Boston, Mass.—Made demonstration of the Brown perfection tire tube, which is constructed with a thick tread so designed that the internal pressure when inflated will close a wound effectually without leak or loss of resiliency.

Seamless Rubber Company of New York, New York, N. Y.—Showed the Seamless shoes, both round and anti-

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skid types, and the gray and red tubes. The maker claims for these tires not only superior quality because of the materials used and the workmanship, but maintains that they will endure the use of tire chains in any legitimate manner without undue wear.



Looking Through the South Section of the Accessory Department in Machinery Hall Balcony, Showing the Displays of Dorian Rims, Dover Automobile Specialties, and Havoline Oils.

Shawmut Tire Company, Boston, Mass.—Shawmut shoes of standard types were shown by this concern, together with regulation tubes. For these tires the highest construction methods and best of materials are claimed by the maker to justify a guarantee of service that is very broad.

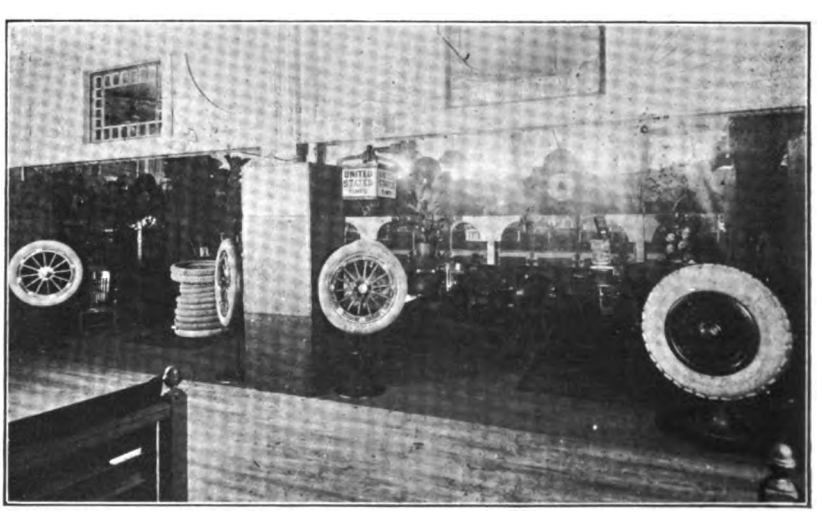
Standard Tire & Rubber Company, Boston, Mass.—Displayed Standard tires in clincher, quick detachable clincher and Dunlop types, with either round or 10-strike grip casings, the last mentioned tread being scored with a straight line and an X alternating the circumference of the shoe.

Star Rubber Company, New York, N. Y.—Shown by C. J. Downing—Displayed Star tires and tubes, with round tread and constructed by the wrapped tread and single cure processes, and Excelsior tires and tubes. The former is made in clincher and quick detachable and the latter in these and the Dunlop types.

Steel Cushion Tire Company, New York, N. Y.—Demonstrated the Ellis steel cushion tire, the device being a series of helical springs arranged in pairs in a channel formed by steel flanges extending beyond the face of the felloe and attached to the rim, carrying a solid rubber shoe. As the wheel is revolved the weight forces the rim carrying the solid rubber shoe between the side flanges and this produces a tension on all the series of springs, which is claimed to equal the effect of resiliency in a pneumatic tire. The tire is made for both pleasure and service vehicles.

Tyer Rubber Company, Andover, Mass.—Showed Tyrian shoes and tubes for pleasure vehicles, these being of clincher type and with either round or hold-tite treads, the latter having two circumferential channels and a series of tranverse channels at either side, which are claimed to be so efficient as to preclude the need of chains.

United States Tire Company, New York, N. Y.—Showed at its stands the differing products of the Hartford Rubber Works Company, the Continental Caoutchouc Company, Morgan & Wright and the G & J Tire Company, including the standard and the special lines. These were specialized principally for the pleasure vehicles and included the clincher, quick detachable and the Dunlop types, both in round and anti-skid treads. One feature was the Nobby tread shoes of Morgan & Wright and G & J make. In addition there was the Hartford solid tire demountable equipment for service wagons, this being a special rim designed to minimize time in replacement should a shoe be damaged or shed.



The Exhibit of the United States Tire Company in the Balcony Overlooking Grand Hall.

Voorhees Rubber Manufacturing Company, Jersey City, N. J.—Besides the regular lines of tire and tube repair material a feature of this display was the reinforcing stock for relining shoes, made in 50 and 100-foot lengths and in differing widths and packed on reels, for use in repairing.

Walpole Rubber Company, Walpole, Mass.—Displayed Walpole shoes of the quick detachable types with either plain or Bailey treads in all standard sizes, Walpole tubes, Walpole motorcycle tires and tubes, and Walpole tire accessories.

LUBRICANTS, GREASES, ETC.

Borne, Scrymser & Co., New York, N. Y.—Exhibited the complete line of Colonial motor oils, Colo transmission grease, Colonial timing oil and Silex grease for heavy duty gears and continuous service, in display and sales containers.

Joseph Dixon Crucible Company, Jersey City, N. J.—Made a showing of the Dixon graphited greases suited for gear and transmission lubrication and the stick grease recently produced for bearings and similar work where a fluid could not be used.

Eagle Oil & Supply Company, Boston, Mass.—Display was made of Eagleine No-Karbon oils of varying grades for internal combustion motors both in the regular packages and in tubes to illustrate the clarity and viscosity of the different qualities.

A. W. Harris Oil Company, Providence, R. I.—Every quality of the Harris oils, suited for gas engine use, was displayed, this being supplemented by a demonstration of the Harris trans-compound, a grease made purposely for transmission

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and differential gears, by gears driven by an electric motor.

Havoline Oil Company, New York, N. Y.—Made demonstration of the varying grades of Havoline oils for internal combustion engines and of the greases made for use with gears and bearings in the customary sales packages and by exhibition in glass tubes to evidence the purity.

Charles F. Kellom & Co., Philadelphia, Penn.—Invader lubricants, especially refined for gas engine service, and in grades to meet every requirement, were demonstrated in display tubes and in usual containers, while a feature was made of Invader gear oil, a product made purposely for transmission, differential and other heavy gear work.

New York Lubricating Oil Company, New York, N. Y.—The exhibit of the Monogram oils was in all the grades produced suited for automobile service, as well as the transmission gear and differential greases manufactured under the same name as the oils. A feature of the display was the new sealed can.

New York & New Jersey Lubricant Company, New York, N. Y.—Motorol oils of differing qualities and consistencies were demonstrated together with the Non-Fluid oils, which are especially suited for service with gears and bearings enduring heavy duty.

George A. Hawa, New York, N. Y.—The showing of Panhard oils in containers conspicuous for the checkered color border effect, and in glass that illustrated the viscosity and color, effectually demonstrated these well known lubricants.

Standard Oil Company, New York, N. Y.—The exhibit of this concern was largely given over to a demonstration of the different grades of Polarine, a lubricant especially produced for gas engine service and marketed in all forms of containers convenient for use in the garage or on the road.

Texas Company, New York, N. Y.—Texaco motor oil in grades especially adapted for automobile engine lubrication was demonstrated in the sales packages, these being cans containing one and five gallons and sealed so that they may be sold with the original contents. This feature is claimed to be exclusive with the Texaco products.

Vacuum Oil Company, Rochester, N. Y.—The exhibit of Gargoyle Mobiloils, which lubricants are made in numerous grades and suited to practically every type of motor, was very complete, there being, aside from packages of differing sizes, a comprehensive demonstration of purity and viscosity in tubes graduated by colors.



Stand of the Weed Chain Tire Grip Company, Showing the Increase of Production of Weed Chains on a 72 by Six-Inch Tube.

Valvoline Oil Company, New York, N. Y.—This concern displayed the Valvoline products which have been known in the market for years, and which included standard lubricants of all kinds.

Wolverine Lubricants Company, New York, N. Y.—Packard oils and greases and Wolf's Head oils of different consistencies, were demonstrated at this stand, these being produced to meet every requirement for motor vehicle and motor yacht use. The Packard lubricants are prepared especially for use with cars of the same name.

SPEEDOMETERS.

Jones Speedometer Company, New York, N. Y.—All models of the 1912 Jones speedometers and clock-speedometer combinations, the Jones recorder, and the Jones hub odometer for service wagons were shown, both on a tablet and in cases, together with sectional instruments for the illustration of the mechanical construction and the operation of the different parts. One feature is the reset of the trip odometer to tenths of a mile.

Stewart & Clark Manufacturing Company, Chicago, Ill.—One of the features of the new Stewart speedometers is the micrometer adjustment by which the instruments may be made to establish an exact result. The Stewart speedometers are made in numerous models and are suited for all vehicles and all purposes.

Warner Instrument Company, Beloit, Wis.—Display was made of the latest Warner auto-meters, which have been improved in several details, among which is the device by which the trip odometer may be reset for the convenience of making a digression from a mapped route and for taking up the journey without recourse to notes and figures to learn a position with reference to any given point.

SPARK PLUGS.

Blake Spark Plug Company, Cambridge, Mass.—The Blake quick detachable spark plug consists of a brass shell of conventional pattern, a long porcelain core with an electrode extending through the centre that terminates in a cap at the base, through which the centre of the electrode projects. Attached to the porcelain is a heavy loop of wire that is set with the bottom of the loop at the proper distance from the electrode point. The usual bushing is replaced with a brass fitting that carries a small vulcanite handle. The upper terminal of the core is finished with a metal cap and an adjustable nut for securing the terminal. The fitting drops into the bushing through slots, and lugs on the fitting engage in grooves so that by turning the fitting a quarter-turn with the handle the core is firmly engaged and there is no possibility of leakage. The core may be removed in a second without removing the terminal, the bushing serving the purpose of a priming cup, or the plug may be tested while holding it.

Autoparts Manufacturing Company, Jersey City, N. J.—The E-Z quick detachable spark plug shell is machined to have a pair of lugs at the upper edge 180 degrees apart. The core is mounted in a fitting that has a recess to take the upper part of the shell and the sides are cut to permit the fitting to slide outside of the shell and then to be

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turned, the lugs engaging in the slots and bringing the fitting and its packing down on the shell, making a gas tight assembly. The fitting carries the loop electrode and the core electrode is centred above this. The core is retained in the fitting by a nut which also retains a winged member by which the fitting is turned. The upper terminal of the plug is capped and there are two nuts by which the cable terminal is retained.

K-W Ignition Company, Cleveland, O.—The Vim spark plug shell is formed with the bottom bullet-shaped and in the centre is a small hole into which the core electrode is set. The chamber of the shell enlarges below the base of the core and the conical-shaped core, either of mica or porcelain, but partly fills the chamber. The bottom of the shell is bisected at right angles by two thin slots. As the plug is used the bullet-like bottom of the plug becomes heated. As the gas is compressed in the cylinder chamber the spark plug shell chamber is filled, the heat causing more complete vaporization. As the spark is made the gas within the chamber is ignited and the explosion within the plug chamber forces a jet of flame through the slots of the shell into the centre of the cylinder, making for thorough combustion and efficient ignition. It is claimed that the shell protects the plug against soot or oil accumulations and that it does not require cleaning. It is made with mica and porcelain cores.

Ideal Switch Company, Inc., Plainville, Conn.—The Ideal spark plug shell is Tobin bronze with flat bottom, there being a hole in the centre into which the electrode of the core is set. The porcelain core is carried in a bushing in the usual manner of construction. There is a chamber within the bushing that protects the electrode against carbonization and fouling with oil. The core electrode and terminal are mechanically fastened so as to form one piece and cannot become separated under any conditions of use.

Mac-Kae Manufacturing Company, Boston, Mass.—The Mac-Kae spark plug is made with either porcelain or mica core and the porcelains are made with the central electrode of platinum alloy baked into the core, which, having the same coefficient of the electrode, is not affected by the extremes of heat. By unscrewing the bushing the core may be removed as one piece. The central electrode of the mica core is wound laterally with sheet mica, about which the mica washers are forced, making a perfect, gas tight construction. Both porcelain and mica cores are interchangeable.

C. F. Splitdorf, New York, N. Y.—The Splitdorf spark plug has been perfected by the form of the central electrode of the mica core, which is formed tapering, so that when wound with sheet mica and the mica washers forced on by heavy pressure the core will endure under any gas pressure. The plug has been improved in appearance by the addition of brass washers to the external insulation.

Progressive Manufacturing Company, Torrington, Conn.—The features of the Black Eagle plug are the shell electrodes, which parallel each other with the core electrode between them. It is claimed that the rounded surfaces of the electrodes resist the pitting and destructive influences of the sparks. The terminal of the central electrode is solid and capped and between this and the binding nut is a sliding collar that is forced downward toward the binding nut by a spring, and a cable terminal placed between the collar and the binding nut is held fast and cannot be shaken loose. This device is known as the Universal Spring Cap.

SHOCK ABSORBERS.

Gabriel Horn Manufacturing Company, Cleveland, O.—The Gabriel rebound snubber was displayed with other products, this being a device in which a frictional belting is wound on a spring expanding reel as the vehicle spring is compressed and resists the recoil through the medium of the spring and the friction of the belting.



The Exhibit and Some of the Demonstrators of Eagleine No-Karbon Auto Oil, Representing the Eagle Oil & Supply Company.

Hartford Suspension Company, Jersey City, N. J.—The Truffault-Hartford shock absorber was demonstrated by this company by two miniature motor cars, one fitted with shock absorbers and the other with the ordinary suspension, installed over revolving cams which imitated the road obstructions and contacted with the wheel tires. The other illustration was of a spring which was compressed and released with and without a shock absorber attached to it.

Knojah Shock Absorber Company, Lexington, Mass.—The Knojah shock absorber is of the hydraulic type and is produced in two patterns. The piston device consists of a metal cylinder in which is fixed a second cylinder with perforated walls. There is a space between the walls of the two cylinders and when a piston is moved up and down within the inner cylinder the oil with which the cylinders are filled is forced through the perforations below the piston into the outer chamber and thence through the perforations above the piston into the inner cylinder. The perforations are graduated in size and the resistance is greater at either end of the stroke of the piston as the holes are smaller. The box type consists of a triangular shaped case with the shortest angle curved instead of straight. Following the line of this curve is a metal wall that is perforated similarly to the inner cylinder of the other type. Centred in the apex of the triangle is a shaft that carries a piston arm that contacts with the perforated wall at the widest end. The space within the casing is filled with oil. The case is attached to the frame of the car and to the axle is fixed the lever arm installed on the shaft. As the vehicle springs are recoiled the lever moves the shaft and the piston arm and the oil within the case is forced from below or above the piston through the perforations and the shock is cushioned effectually. The pistons are packed to prevent leakage and being operated in lubricant there is practically no wear of the moving parts.

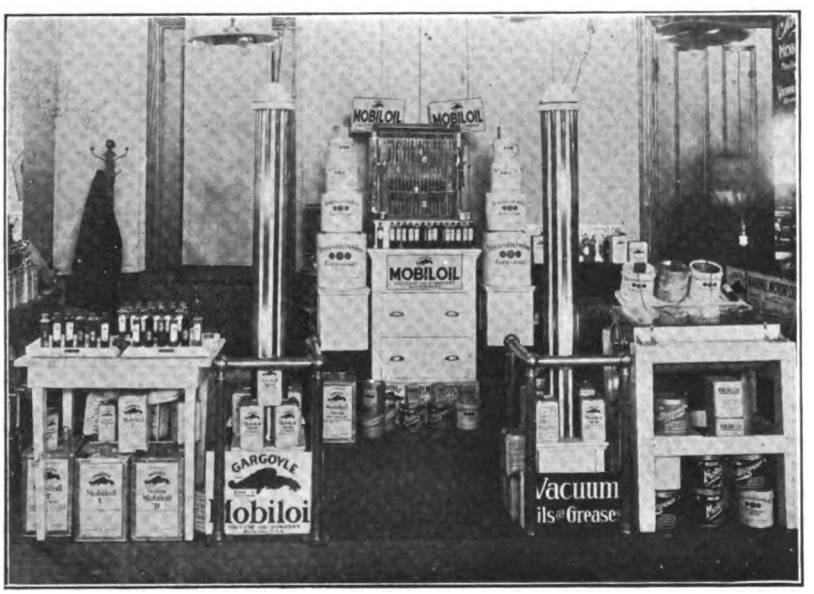
Ariston Company, New York, N. Y.—The Mondex shock absorber is of the friction type with two lever arms carrying discs with surfaces shaped to form a series of inclines.

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which are placed with elastic packing between them. As the arms are moved by the compression or recoil of the vehicle springs, the movement causes a wedging effect that is resisted by the packing and the form of the discs.

LIGHTING SYSTEMS.

Apple Electric Company, Dayton, O.—Shown by Charles A. Jackson Company—The Aplco system consists of a dynamo built for three different speeds, a current regulator that controls the generating capacity of the dynamo, an automatic cut-out that governs the volume of current supplied, a volt-ammeter and storage battery that is charged and from which the current is supplied as needed for the illuminating of the lamps. The elements of the system are constructed to endure under all conditions of service and are protected against every influence that might cause deterioration and failure.



How the Quality and Purity of Mobiloil Was Demonstrated and the Types of Containers Shown by the Vacuum Oil Company.

Detroit Electric Appliance Company, Detroit, Mich.—The Deaco system is designed for automobile and motor yacht lighting and it includes a lighting dynamo, a regulator that may be adjusted for amperage production, a dynamo switch and a storage battery that is charged according to the rate of discharge and its efficiency maintained.

Esterline Company, Lafayette, Ind.—The Berdon system is constructed to afford lighting, or lighting and ignition in combination. The installation consists of a magnet generator that has but one moving part, the armature, an automatic controller that makes and opens the connection between the battery and the generator, a fuse panel for protection against short circuiting, the lighting switch and the storage battery. Construction that makes for long endurance, simplicity that insures continuity of service, and protection against all probable causes of failure and deterioration are qualities claimed for this system.

Holtzer-Cabot Electric Company, Boston, Mass.—The Holtzer-Cabot electric lighting system for automobiles includes a dynamo of the direct current type, an automatic switch that controls the current supplied to the storage battery, a storage battery, a dash switch and connections for lighting and for ignition, if this is in combination. This system is claimed to give service with the dynamo driven in either direction.

Gray & Davis, Amesbury, Mass.—The Gray & Davis system of automobile lighting is one of the best known in motor vehicle service and it has been specially developed with reference to the needs of the motorist. The elements of the installation have been designed to insure efficiency under all conditions and to endure any service, uniformity of lighting at all speeds being the chief aim. It has been brought to a perfection that is known to all automobilists.

K-W Ignition Company, Cleveland, O.—The several K-W lighting systems are designed for differing service and for use with vehicles of differing types, one of these being adapted especially for Ford cars, while others are for machines requiring separate generators, for which the K-W systems have been designed. These systems are standard with motorists and are widely and favorably known.

U. S. Light and Heating Company, New York, N. Y.—The U-S-L system includes a dynamo that is totally enclosed, with but one moving part, an automatic switch and regulator combined, and storage battery. The regulation is accomplished with complete independence of the storage battery, an insurance against burning out the lamps in the event of a break in the circuit.

Vesta Accumulator Company, Chicago, Ill.—Showed the Vesta systems of lighting, the first being by the use of a magneto-generator, automatic control of the current charged in and sent from a storage battery, and the usual lighting equipment, and the second by utilizing the current generated by the magneto and being adapted to Ford cars only.

Remy Electric Company, Anderson, Ind.—The Remy magneto lighting installation consists of a magneto, dash coil box, storage battery and distribution block, and a fuse block for connecting the horn, speedometer lamps, etc. This is made in two forms for four and six-cylinder cars. The system affords both lighting and ignition. The control is automatic and positive and the efficiency has been practically insured.

C. F. Splitdorf, New York, N. Y.—The Splitdorflite system consists of two forms really, one of which will furnish lighting only and the other both lighting and ignition. With the first mentioned the installation includes a magneto-generator, a fuse box and an ammeter; with the second there is a switch in combination with the ammeter and a coil. The construction is such that very high efficiency is obtained. The generation of the current is controlled so that when required for charging it is supplied and when not required it is automatically cut out. The variable character of the current does not affect the quality of the lighting or the ignition.

SELF-STARTING DEVICES.

E. A. Whitehouse Manufacturing Company & LeCompte Manufacturing Company, Newark, N. J.—Bi-Motor Equipment Company—The Safety self-starter is an installation by which a supply of acetylene gas is furnished from the regular lighting tank and sent to the intake manifold of the engine, whence it is distributed in the usual manner to the cylinders as needed. The engine is cranked to fill the cylinders with the gas without the spark being advanced. When the spark is advanced the engine will start and will run with the acetylene gas until it is shut off, although gas will be taken in through the carburetor after the engine has been started.

Cox Brass Manufacturing Company, Albany, N. Y.—The Crankless self-starter system is a means for supplying acetylene gas from the tank to the intake manifold of the engine and thence to the cylinders, where the gas is exploded by a spark made in the cylinder in which the charge is compressed. The control is by a foot button in the floor.

J. W. Tudor, Boston, Mass.—The Tudor starter is of the mechanical type, the power being furnished by a spring that is at first wound by hand. Thereafter it is wound by the engine movement, being disconnected when at full tension. The starter is bolted to the front of the car and connected with the forward end

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of the crankshaft. It is operated by means of a pedal.

Hartford Suspension Company, Jersey City, N. J.—The Hartford electric system for starting automobile engines as shown was the same as was displayed at the New York and Chicago expositions, but no details of its construction are made public. The device is small and is installed at the side of the engine, where it is operated by conventional means.

LAMP LIGHTING SYSTEMS.

G. C. A. Manufacturing Company, Pittsfield, Mass.—With this system one operation, turning a hand wheel, supplies the gas from the tank to the head lamps and lights the lamps. The coil and control mechanism are included in one assembly, grounded on the car frame, and but two wires are necessary.

Motor Specialties Company, Boston, Mass.—The Flash auto-lighter installation consists of a controller, an induction coil and a pair of special burners. The controller combines a gas valve and an electric contact switch. As the gas valve is opened a spark is produced at the burners of the lamps. A single movement completes the operation.

Aristos Company, New York, N. Y.—The Mondex-Frary lighting system provides for turning a cut-off valve in the supply from the gas tank and making a spark at the lamp burners, the simplicity and efficiency of the device being strong recommendations for it.

SIGNALLING DEVICES.

Minerva Hardware Manufacturing Company, Minerva, O.—The Minerva is a horn with three tubes affording three tones musically attuned, that is attached to the exhaust pipe of the engine and is actuated by a pedal.

Electric City Manufacturing Company, Buffalo, N. Y.—The Mellotone gives a single tone when operated by a pedal, being blown by the exhaust pressure from the engine. It is made in two sizes, and is adapted for use with any car.

Randall-Faichney Company, Boston, Mass.—The Jericho and the Jubilee exhaust horns are attached to the exhaust pipe of the car and are operated by pedals, giving blasts of any length or volume as desired. Both of these are well known in the market.

Gabriel Horn Manufacturing Company, Cleveland, O.—The Gabriel exhaust horn is one of the best known devices of this type, it being made in differing sizes, ranging from the single tone to the 10-tube horn that is actuated by a keyboard and on which a limited musical selection may be played.

CARBURETORS.

Excelsior Needle Company, Torrington, Conn.—Bi-Motor Equipment Company—The Excelsior carburetor is constructed with a U shaped tube in which is placed a steel ball that governs the supply of gas fed to the engine, this being accomplished by the position of the ball which is moved upward as the velocity of the current of gas is increased, affording a larger volume to pass through at increased engine speed, and automatically dropping as the velocity becomes less. There are two adjusting valves that are fitted with numbered dials and may be set to a printed table with greatest exactness. Once adjusted the ball governor in the tube supplies the precise volume of gas to insure great efficiency and economy.

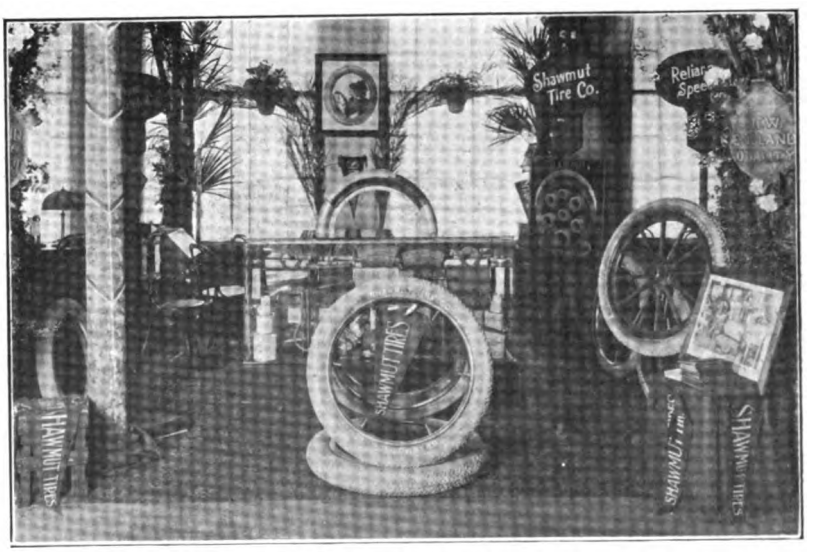
Planhard Manufacturing Company, Kokomo, Ind.—The Planhard carburetor is of the float feed type with a central draft and two venturi tubes in which the supply of air is graduated by the velocity of the draft actuating auxiliary air valve. It has one adjustment and an interchanging nozzle to meet exact operating conditions. It is claimed to be the only carburetor on which the auxiliary air valve may be adjusted while the motor is in operation.

Harry Elsner & Co., Boston, Mass.—Among other specialties this exhibit included the Geiszler storage batteries, which are of the non-sulphating type and are so constructed as to be guaranteed by the maker for long and continuous service. These batteries are made in all sizes and to meet any requirements.

MAGNETOS.

Marburg Bros., Inc., New York, N. Y.—The Mea magneto in all sizes and types was displayed by this firm, this being practically the same interesting exhibit that has been shown at the different important shows throughout the country.

C. F. Splitdorf, New York, N. Y.—Splitdorf magnetos in all types and the other Splitdorf electrical products were displayed at this stand, there being the giant magneto that attracted much attention elsewhere as a central attraction.



Where the Shawmut Tires Were Shown in the Aisle at the Rear of Grand Hall.

BATTERIES.

Narragansett Chemical Company, Providence, R. I.—Meteor storage batteries are supplied in different sizes for ignition or lamp lighting, or for both in combination, and are claimed to have unusual qualities for durability and efficiency. This concern also specializes in lighting outfits adapted for different types of cars.

U. S. Light and Heating Company, New York, N. Y.—National storage batteries are made in varying sizes and adapted for ignition, lighting, combinations of lighting and ignition, and for use in combination with dynamos for these purposes.

Burn-Boston Battery & Manufacturing Company, Boston, Mass.—These are a combination of a wet and dry cell suited for any purpose, any form of battery being used, and are especially adapted for ignition in motor vehicles and motor yachts.

JACKS, JACK-TRUCK.

Ames Auto Jack-Truck, Franklin, Penn.—The Ames jack-truck consists of a set of two frames having two long and two short arms mounted on rollers. One frame carries at the ends of the long arms two heavy screws with U shaped heads. One of the short arms is jointed at the main member. The screws are upright and are adjustable for height. The other frame is similar save that the upright screws have at the upper ends members shaped to fit the bottom, side and top of an I section axle, above these being crescent shaped rests for round axles. The jointed arm is at the back of the jack. The other arm is socketed for a lever. The jack is pushed beneath the axle at an angle and then the lever is considerably elevated. When this is depressed the jack rests on all four arms and the supporting members

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are upright. So secure is the support that a car may be raised and moved from one part of a garage to another without possibility of damage. The operation of raising and lowering may be accomplished in seconds and without effort.

Motor Specialties Company, Boston, Mass.—The A B C jack has an extension of 5.5 inches and among other features has a cut steel rack and a self-locking iron handle that cannot slip from the socket.

Hartford Suspension Company, Jersey City, N. J.—The Hartford auto-jack was shown by this concern, this being a specially constructed tool that has unusual efficiency and endurance under hard service.

WINDSHIELDS.

Eagle Company, Newark, N. J.—Bi-Motor Equipment Company—The Eagle windshields are made in both the clear vision and rain vision types and in different forms to be adapted to any form of vehicle dash. These are fitted with multiple disc hinges and are manipulated with one hand by the driver. The Standard windshields are fitted with a combination of friction and ratchet and pawl hinge.

Columbia Tire & Top Company, Boston, Mass. — Columbia windshields are constructed of leather or fabric leather and celluloid panels that are formed to protect the driver or the occupants of the tonneau seats, having a folding upper panel when fitted to the dash. They are adjustable to many positions and are ventilated for warm weather. The tonneau shield may be folded and rolled across the back of the driver's seat.

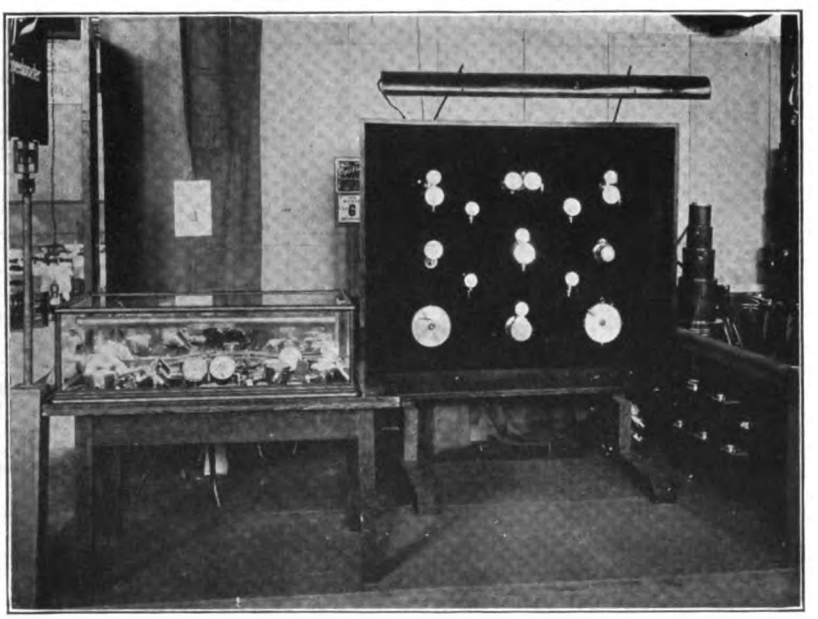
Smalley Daniels, Boston, Mass.—Boreas ventilating and rain vision windshields are made in single and double section and in any form with the upper section automatic one-hand control. The hinge is of the friction disc type and may be adjusted in many positions.

Standard Auto Supply Company, Boston.—The Deflector windshield has a metal frame and a large panel of celluloid at the front with leather or fabric sides that practically enclose the car forward of the seat. The form is such that the current of air is directed above the heads of the occupants of the seat.

TIRE ACCESSORIES.

Auto Time-Saver Repair Kit Company, Boston, Mass.—Displayed combination rubber and metal tire tube repair plugs with tools for making emergency repairs that are maintained to be permanent so far as endurance is concerned.

A. J. Bennett, Providence, R. I.—Showed Bennett tire spreader, a metal device for spreading a tire shoe either off or on the wheel for work or examination.



The Showing of Jones Speedometers, Odometers, and Recorders Made at the Stand of the Jones Speedometer Company.

Boston Tire & Rubber Company, Boston, Mass.—Presented Challenge blow-out patches, for all sizes of tires; lapped-end reliners for tire shoes, and endless tire preservers.

C & T Auto Specialty Company, New York, N. Y.—Exhibited Universal blow-out patches in five sizes, designed to prevent creeping when in use, for use with all types of tires.

J. N. Macdonald & Co., Wethersfield, Conn.—The Necessity tire chain repair tool, adapted for opening and closing the links of a tire chain when under tension were seen at this booth.

James L. Gibney & Bro., Philadelphia, Penn.—Diplayed the Gibney multiple tube vulcanizer and the Gibney line of electric and steam vulcanizers for use in the private garage or on the road.

W. L. Johnson & Co., Endicott, N. Y.—The Utility blow-out boot is a sleeve of specially treated leather studded with steel heads on the tread, fitted with metal lugs that clamp under the wheel rim and are secured by the inflation of the tire. The boots are water proof and are made to fit clincher or quick detachable tire shoes, mounted on any type of rim.

O-Tak-A Tire Remover, Le Roy, N. Y.—The O-Tak-A tool is clamped on the wheel rim and a plunger operated by a lever may be forced against the shoe to relieve the strain on the locking rim, and the rim and shoe removed. It is maintained with this tool a woman may remove or replace practically any tire.

C. A. Shaler Company, Wanpun, Wis.—This exhibit was of the steam, alcohol-heated and electric vulcanizers for private garage or road tire repairing, as well as materials and tools for preparing for such repairs.

C. O. Tingley & Co., Rahway, N. J.—The full line of C. O. T. tire repair kits and repairing materials were shown, these including those adapted for the service station and for the private motorist who desires equipment for roadside emergencies.

T. F. Russell & Co., Boston, Mass.—The Q-D tire iron is for the removal of tires from any wheel rim without loss of time or damage to the tire or tube.

MISCELLANEOUS.

Auto Towing Device Company, Cleveland, O.—The Jarless towing device is a length of steel chain with an end fast to the plunger in a metal casing, the plunger being normally held at the end of the casing by a heavy spring. At the plunger end of the casing a second length of chain is attached to a swivel. Both free ends of the chain are fitted with hooks. The chain is used for towing, the spring compensating the jars.

F. Shirley Boyd, Boston, Mass.—Exhibited the Dorian demountable rims, a device well known in the motoring world, and the R. I. V. ball bearings, these being of all the types and adapted for all purposes, not only for motor vehicles, but machine and factory use.

B. B. B. Combination Terminal Company, Boston, Mass.—Showed a spark plug cable terminal that is adapted for use with any form of spark plug, and which has a special fitting for use with the Rajah type of plug, there being a vulcanite handle through which the cable is passed and fastened permanently by a finger nut. The terminal may be removed at any time and used to test the ignition without fear of shock.

Cox Brass Manufacturing Company, Albany, N Y.—The X-Ray indicator is a device for testing the ignition, locating spark plug defects, defective coils, short circuits, weak

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Tarvia

Preserves Roads
Prevents Dust~



U. S. Naval Training Station, Great Lakes, North Chicago, Ill., Roads treated with Tarvia X.

Tarvia at a Government Station

THE new Great Lakes Naval Training Station near Chicago rivals Annapolis and West Point in its fine equipment and the thorough and finished development and beautification of the property.

It has many macadam roadways, some of which carry an especially heavy traffic, built with Tarvia X, for the purpose of keeping down maintenance costs.

In appearance, these roads are clean, firm under foot and free from dust.

In durability, they will, of course, far exceed ordinary macadam, for they are bonded with the dense viscid Tarvia for several inches in depth.

The Tarvia fills the voids, keeps the stone from creeping or shifting under the weight of traffic, eliminates abrasion due to internal movement of the stone, excludes water and frost, and best of all permits the use of the more durable large stone close to the surface.

It has long been recognized by engineers that large stone pulverized and wore away much more slowly than the carpet of fine screenings with which ordinary macadam roads must be covered, but the tendency of the large stone to shift and ravel has previously prevented the use of the large stone in this way.

Tarvia X makes it possible to use materials to vastly better advantages and preserves the road so long that the cost of the Tarvia itself is more than paid for.

The government engineers chose Tarvia for economy. Incidentally, they secured dustlessness, a reduction of noise, freedom from mud and an improved appearance.

Illustrated Booklet on request to nearest office.

BARRETT MANUFACTURING CO.

New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle.

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current and faulty magneto generation by producing a spark between electrodes visible through a hole in the shell of the indicator.

Coes Wrench Company, Inc., Worcester, Mass.—The display of Coes wrenches was of all the types and sizes turned out by this concern, as well as of wrenches that had been in service for long periods in shops and works. The exhibit was of decided interest because it indicated the resources of the maker, the quality and character of the material and the workmanship, and the endurance of the wrenches in every day usage.

Connecticut Telephone & Electric Company, Meriden, Conn.—The Connecticut plug coil is a combination intended for marine service, though it may be used with any type of jump spark ignition. The base for the coil is brass and attached to the base is the plug. Mounted on the coil top is the standard vibrator. The



View of the Accessories Display in the Balcony of Grand Hall, Showing the Stand of A. R. Mosler & Co.

secondary winding of the coil has more than double the resistance of the ordinary coil for marine work. The coil top and vibrator are housed in a metal cap that locks securely and gives complete protection. The plug is of the petticoat type and is connected automatically with the secondary winding of the coil. There are two primary wires, one from the battery to the coil and the other from the coil to the timer. When desired the coil is supplied with a removable switch lever, combining the coil and switch, so that with the lever removed it is impossible to start the engine.

Ideal Oil Pump & Tank Company, Boston, Mass.—The exhibit of Ideal long distance self-measuring outfits, non-measuring outfits, Ideal portable wheel tanks for gasoline and lubricants, storage tanks and pumps, recording meters, cabinets, oil wagons and self-measuring tanks was very complete and a full demonstration of the equipments designed for use by railroads, mills, and works of all kinds, as well as for use with public service stations and public garages.

Hartford Pump & Manufacturing Company, Boston, Mass.—The Hartford friction tire pump is driven from the flywheel of the motor by friction and may be hung in any position. The pump is well constructed and should endure any service, it being a permanent installation and capable of operation to produce any effect. The Hartford gear tire pump is designed to be driven by a gear attached to the magneto or pump shaft.

Standard Woven Fabric Company, Worcester, Mass.—The exhibit of Multibestos, a special frictional material designed for use as brake lining for motor vehicles, showed the degree of endurance under varying conditions of wear. It is claimed for this material that under careful and scientific tests the endurance shown was especially satisfactory. The fabric is not combustible and its efficiency is not affected by water, dust, mud, or lubricant. Multibestos is produced for numerous purposes and in all standard sizes, widths and thicknesses.

Standard Oil Company, New York, N. Y.—A full line of the Gilbert & Barker underground storage tanks, with measuring and non-measuring pumps, for gasoline, naphtha and lubricants, was exhibited, together with hose connections, filling cocks, extension pumps, gasoline filters, portable tanks, adjustable measuring outfits, transfer pumps, funnels, gasoline gauges, and other equipment.

Standard Wrench & Tool Company, Providence, R. I.—Fitzall wrenches are made for pipe and nut work and are adjustable by a sliding tooth block that cannot slip and affords a grip that is positive.

Weed Chain Tire Grip Company, New York, N. Y.—One of the most conspicuous features of the display of the well known Weed chains was a tire tube 72 by six inches, fully inflated, about which was a tire chain 18 feet 10.25 inches in length. Within the tube was a tabulation showing in prominent figures the enormous increase in the quantity of chain necessary to supply the demand for Weed chains, there being nearly 100 per cent. more required in the last year than in the corresponding period that preceded. The growth of the industry was demonstrated in a very striking manner by this statement, which included each year of the company's existence.

Aristos Company, New York, N. Y.—The Disco self-starter is a system for supplying acetylene gas from a tank through a distributor and suitable piping to each cylinder of the engine and firing the charge. The operation consists of turning a small handle attached to a disc on the dash and then throwing over the switch. A complete charge is supplied to each cylinder, sufficient to cause from 10 to 12 full revolutions of the engine. The device may be attached to practically every make of engine. An ordinary gas tank contains sufficient gas to start an engine approximately 3000 times.

Dean Electric Company, Elyria, O.—Showed the Titanic cranking and lighting system, this including a positive cranking device that is operated by an electric motor by current supplied from a storage battery of large proportions. This motor is designed to operate as a generator when the car is moving and furnish current for the battery, which is also drawn upon for the energy for a lighting system. In this, simplicity has been sought, and high voltage and complicated wiring has been dispensed with, so that the owner and the garage repair man can master the care and maintenance without special training. The Dynalux, a system of car lighting by electricity was exhibited, this consisting of a highly perfected generator, designed for special service, which is geared or belted to an engine crankshaft, that charges a storage battery, the charging being regulated automatically and constantly maintained. Low or high speed of the engine is controlled so the battery is never overcharged nor excessively drawn upon. But two wires are attached to the generator, these leading to the storage battery, the construction being such that either lead may be attached to a battery terminal without derangement of the system. The control of the lights is at a push-button switch located on the dash. This lighting system may be utilized for ignition and for sounding a horn. Besides these the Tuto electric horn, which has a widely varied tone adapted for both city and country driving, operated by a push button on the steering wheel, the Tuto-ette electric horns, and the Tally-ho bulb horns, were shown.

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My Ideal of a Car

By R. E. Olds, Designer

Reo the Fifth—My Farewell Car—in every detail marks the best I know. If any man can build a car better, he's a better manthan I.

Most makers say that the best in a car can't be given for $1,055.

And I am inclined to agree with them.

The initial price on this car I consider too low. I doubt if we can maintain it.

It is subject to advance. And conditions, I fear, will compel that advance.

But this I know:

While I direct the making, Reo the Fifth will mark the best I can do, regardless of price or profit.

After 25 Years

I have spent 25 years in building automobiles. And Reo the Fifth—my 24th model—marks the cap-sheaf of my career.

All I have learned in a lifetime's experience is embodied in this car. All I have gained is staked on its performance.

Never was a car watched in the making as I watch Reo the Fifth.

And there will never be built, in my estimation, a materially better car.

Center Control

This car introduces my cane-handle control. All gear shifting is done by moving this lever less than three inches in each of four directions.

There are no side levers in the way of the driver. Both brakes are operated by foot pedals. Thus the driver may sit, as he should sit, on the left-hand side.

Ask for Book

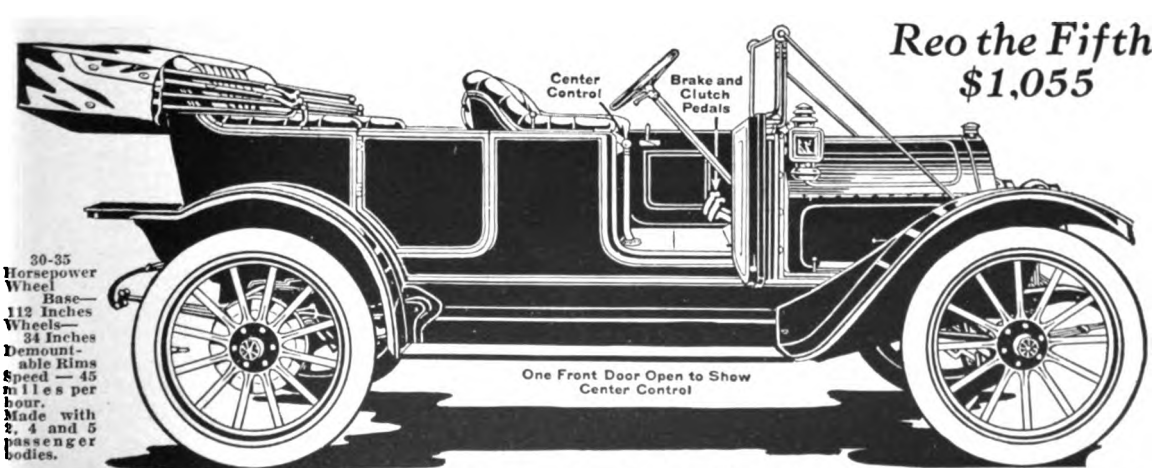
This car is the season's sensation. Every motor car lover should know all about it. Send for our book, giving all the details and picturing the various bodies.

At the present price, no car on the market begins to give so much for the money. Address

R. M. OWEN & CO. General Sales Agents for

REO MOTOR CAR CO., Lansing, Mich.

Canadian Factory, St. Catharines, Ontario.



Top and windshield not included in price. We equip this car with mohair top, side curtains and slip-cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $20.00 extra

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COMING EVENTS.

March.

March 11-16—Show, Norfolk, Va.
March 11-16—Show, Cedar Rapids, Ia.
March 12-16—Show, Denver, Col.
March 13-16—Show, Muncie, Ind.
March 13-20—Commercial car show, Boston, Mass.
March 16-23—Show, Syracuse, N. Y.
March 17—Track races, San Jose, Cal.
March 25-29—Show, Manchester, N. H.
March 25-30—Show, Indianapolis, Ind.

April.

April 8-13—Show, Oswego, N. Y.
April 27—Speedway meet, Los Angeles, Cal.
April 27—Roadability run, Philadelphia, Penn.
April 29-May 4—Show, Burlington, Vt.

May.

May 4—Road race, Santa Monica, Cal.
May 14-17—Commercial car trials, Chicago, Ill.
May 17-18—Track races, Denver, Col.
May 30—Track events, Salem, N. H.
May 30—500-mile race, Indianapolis, Ind.

June.

June 6—Reliability run, Washington, D. C.
June 20—Algonquin hill climb, Chicago, Ill.

July.

July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach meet, Old Orchard, Me.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Road races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.

TRUFFAULT-HARTFORD PATENT DECISION.

Judge Gray of the United States Circuit Court of Appeals has handed down a decision in the case of the Hartford Suspension Company, Jersey City, N. J., maker of the Truffault-Hartford shock absorber, against the Westen Manufacturing Company, in which the decision of the lower court is upheld. The suit was brought for alleged infringement of United States reissue letters patent No. 12,437, granted Jan. 16, 1906, to Edward V. Hartford and George H. Hartford, upon the invention of J. M. M. Truffault for frictional retarding means for spring vehicles. The former decree held the letters patent valid and infringed by the defendant and ordered the usual accounting for damages and profits.

CELEBRATES TENTH BIRTHDAY.

The American Automobile Association celebrated its 10th birthday, March 4, having been organized as a national body of American motorists March 4, 1902. It is now composed of 42 state organizations and some 320 local clubs, besides thousands of individual members, and its work during the 10 years of its existence has been of inestimable benefit to the cause of motoring. In his congratulatory letter to the presidents of the state associations on the anniversary date, President Robert W. Hooper gave the following as his sentiments:

"Never before in its history has the American Automobile Association been better prepared to serve the purposes laid down for it by its founders, who recognized that in the growth of a great pastime and industry, wherein healthful recreation and the benefits of commerce were blended, there was need of a national organization which would assist in the general progress of the motor driven vehicle by safeguarding the interests of the user and at the same time aiding the maker in perfecting a better car. We are doing a most important work in furthering good roads, and our national board of this character is accelerating the movement throughout the entire country. Legislation affecting the use of the motor vehicle itself has not yet reached a finality, and there is an imperative demand to keep thoroughly in touch with the legislative mills that grind out laws both good and bad, and sometimes pass ill considered statutes.

"In preparing and disseminating information required by the growing volume of intrastate and interstate travel, our touring information department has amplified its facilities. In the conduct of contests the governing rules were never more impartially enforced than at present. I look forward to multiplying of membership during the present year, and believe that before it is concluded we will have well organized bodies in every commonwealth in the Union."

RAYFIELD CABRURETORS SELL WELL.

Sales Manager Charles K. Stein of George Sumner, Inc., 1841-43 Broadway, New York City, Eastern distributor for the Rayfield carburetor, made by the Findeisen & Kropf Manufacturing Company, Chicago, reports that this concern not only will continue to handle this product but will engage in the manufacture of certain other automobile specialties. Mr. Stein spent the entire week in Boston, visiting the show, and finds that the Harry F. Grant Company, 1008 Boylston street, which handles the Rayfield in this territory, is particularly pleased with the sales to date. The Sumner concern states that more carburetors of this make were sold during February than during any previous month since the business was organized.

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No-Rim-Cut Tires

10% Oversize

Three Times Last Year's Demand

This is what happened when men proved that tire bills could be cut in two:

In 1907 we sold 28,685 tires.
In 1908 we sold 51,542 tires.
In 1909 we sold 105,127 tires.
In 1910 we sold 210,762 tires.
In 1911 we sold 409,521 tires.

That's pneumatic automobile tires alone.
So far this year the demand has run three times that of 1911.

This is what happened when motor car makers made their final comparisons:

44 makers in 1910 contracted for Goodyear Tires.
64 makers in 1911—
127 makers for 1912.
And these makers know tires.

No-Rim-Cut tires now far outsell all others. And the demand is six times larger than two years ago. *It's the coming tire.*

Are They Mistaken?

Are these men mistaken—these tens of thousands of users who have come to this patented tire?

Can they be mistaken, after 900,000 of the tires have been tested out?

Or are you mistaken—you who still cling to the old-type clincher tire?

Loss—$20 Per Tire

We figure the loss at $20 per tire for men who don't use No-Rim-Cuts.

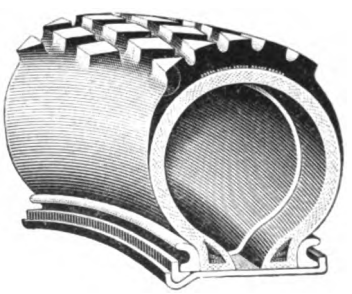
This varies, of course, with the sizes. And care or abuse affects it.

But we figure like this: Statistics show that 23 per cent of all ruined clincher tires are rim-cut. No-Rim-Cut tires wipe out this loss entirely.

Ten per cent oversize, under average conditions, adds 25 per cent to the tire mileage. And No-Rim-Cut tires, measured by air capacity, average 16.7 per cent larger than five leading makes of clinchers.

And No-Rim-Cut tires now cost no more than other standard tires. They used to cost one-fifth extra. The saving is entirely clear.

You are bound to find, as all these others have found, that it pays to get Goodyear No-Rim-Cut tires.



GOODYEAR

No-Rim-Cut Tires

With or Without Double-Thick Non-Skid Treads With a Bulldog Grip.

Our 1912 Tire Book ---based on 13 years of tire making---is filled with facts you should know. Ask us to mail it to you.

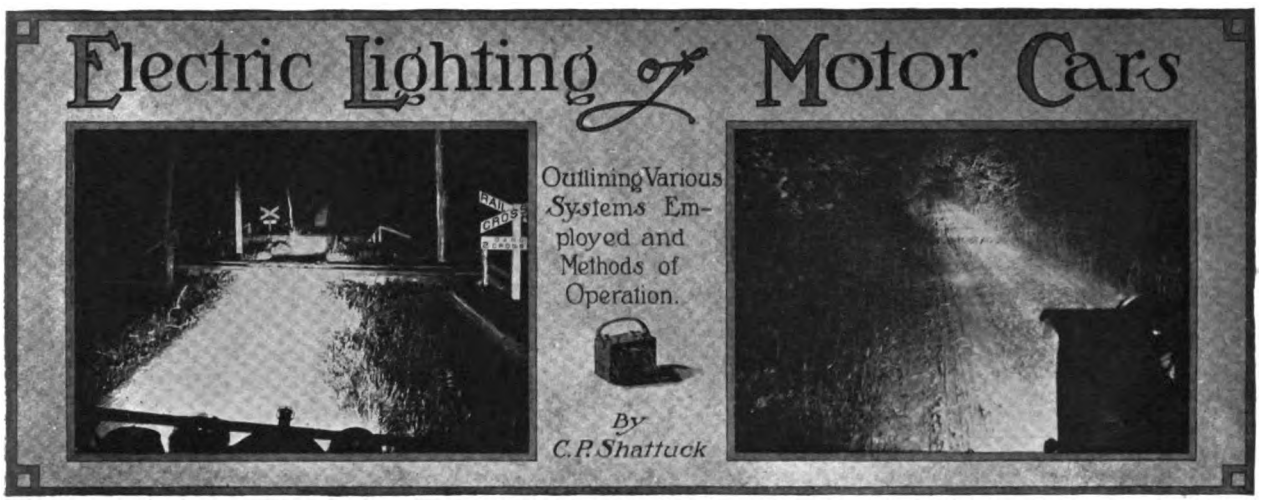
THE GOODYEAR TIRE & RUBBER CO., Akron, Ohio.

Branches and Agencies in 103 Principal Cities

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
Main Canadian Office, Toronto, Ont. Canadian Factory, Bowmanville, Ont.

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Part. III—Wiring With Junction Boxes.

THOROUGH and perfect insulation is essential to the success of the lighting system and ordinary wiring methods are not applicable because of vibration and other unusual service conditions. While splices or other connections may be taped successfully, a better and more complete system has junction, terminal and fuse boxes. These devices not only protect wiring joints from accidental injury or strain, but make for accessibility and reliability; in fact, their primary function is protection.

A type of main junction box is outlined at Fig. 19 and it will be noted that it contains the necessary leads going to the head, side and tail members, and that provision is made for a speedometer light, horn or coil. The box in this system should be located, if possible, under the engine hood on the front of the dash and it should be so placed that crossing of wires is avoided.

Outlet Boxes.

Outlet boxes are utiized when a particularly reliable connection is desired between the lamp socket and branch circuit. These are made in two forms, one having a fuse, which is an advantage in a circuit when a mechanical generator is fitted as it protects that member. They are not absolutely essential, however, but are recommended when a complete system is installed. When a fused outlet box is incorporated in the battery circuit the fuse will prevent premature discharge and injury to the battery in the event of a short circuit. Fuse boxes should be so arranged as to use the standard, new code, 15-ampere fuses, which can be obtained at any electrical supply house.

All boxes should be made as compact as possible and the use of aluminum is recommended as it is excellent material, light in weight and presents a neat appearance. When they are exposed they may be with enamel corresponding in color to that of the car. The members supplying the head lights should be placed in wooden blocks and fastened into the recess on the inside of the spring forks next to the radiator. Those for the side lamps should be placed on the front of the dash at either side, or if the latter

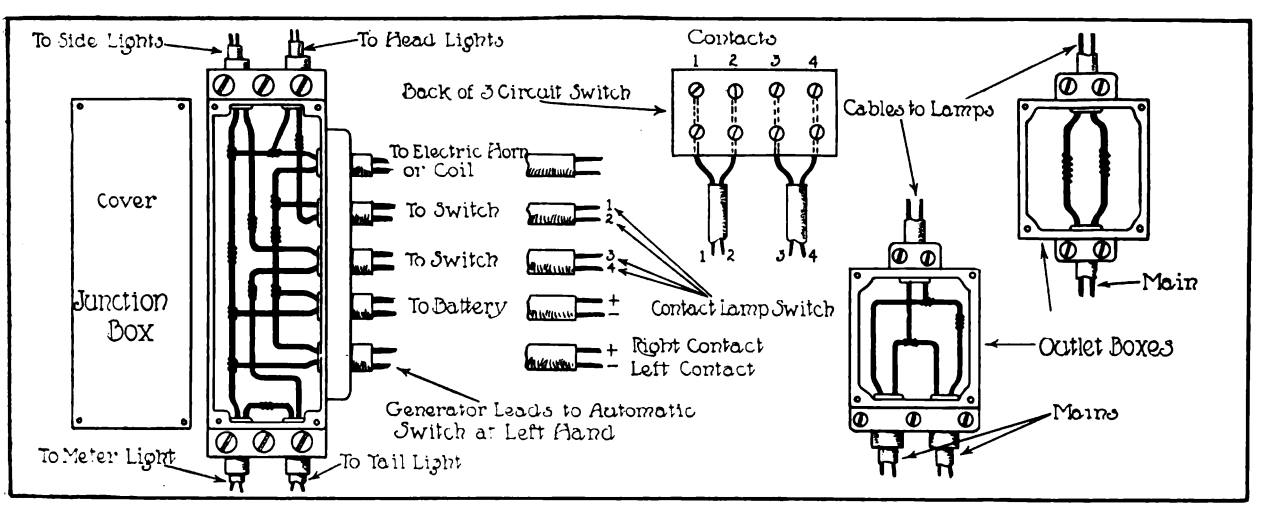


Fig. 19—Depicting the Construction and Components of Main Junction and Outlet Boxes, and Method of Installing Wires.

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is covered with a round hood the boxes should be placed on the side of the hood as near the lamps as possible. That for the tail light should be attached to the rear portion of the frame. The outlet box for the battery or generator should be bolted to the frame near these members.

The three-circuit switch utilized with the wiring diagram depicted at Fig. 20 should be placed either on the dash near the centre or on the front board under the seat at the centre, between the two passengers. The dash location is preferable as it permits the removal of the body of the car without disturbing the wiring installation. The diagram referred to is for a complete system including automatic switch, battery and generator. The brass armored cable, previously described, is recommended and where it passes through a metallic part of the car it should be covered with a short piece of circular loom. Ordinarily the armor of the cable would be sufficient to protect the wire, but constant vibration might destroy the covering.

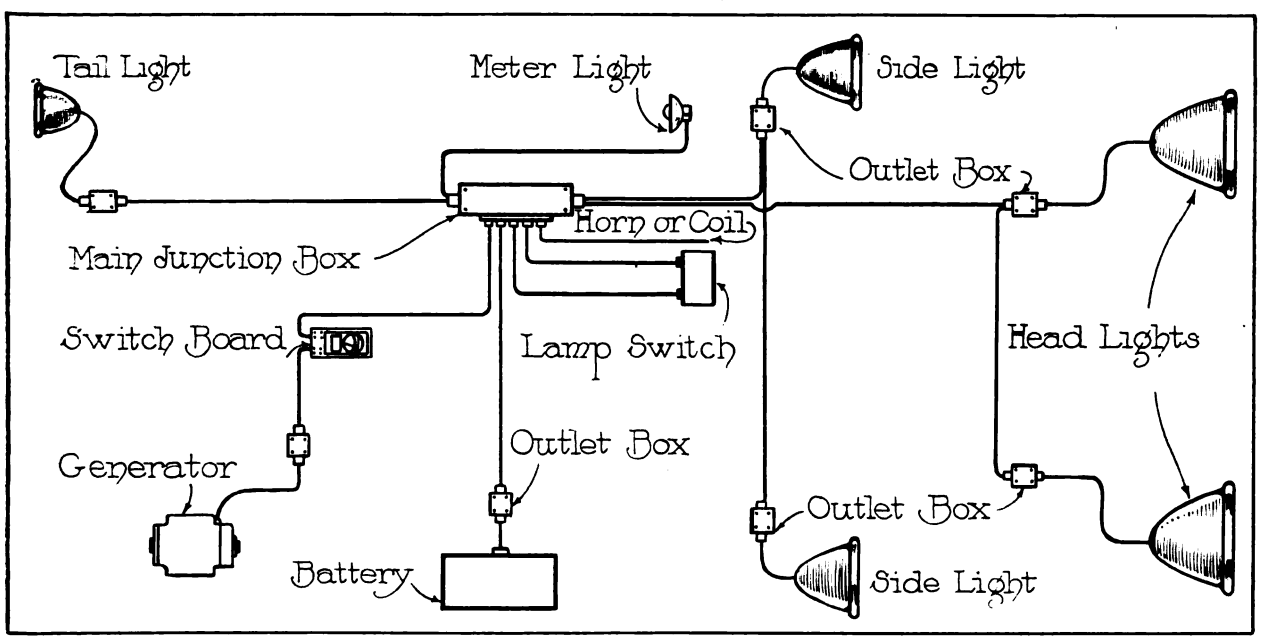


Fig. 20—Outlining Wiring Plan for Group of Five Lamps, Current for Which Is Supplied by a Mechanical Generator and Storage Battery.

Wiring Junction Box.

When wiring the junction box, the following suggestions will be of service: First, cut off the cable and armor squarely, then pull the armored covering back about an inch. This operation will be similar to that of pulling the finger of a glove off the hand as the armored insulator will telescope. The frayed ends of the metal should be well taped, making three or four turns of the material. Next remove the insulation from the wire and place the exposed ends in the junction box and clamp the wire into position, the clamp being over the portion taped. This will make a secure fastening as the tape will adhere to the parts on the box which clamp it. If the speedometer light be not desired the meter light wires should be short circuited. It will be noted that in the wiring diagram outlined at Fig. 20 is incorporated a generator and that between the latter and the junction box is placed a switchboard which comprises an automatic switch and ampere meter the functions of which will be explained in proper sequence.

Generator and Battery System.

Having considered the straight storage battery system, the original method of lighting the motor car, the equipment which includes means of charging the battery without removing it from the machine is next in order. This makes for the ideal system, as the battery is automatically charged and its capacity maintained by a generator. This system may be subdivided into two groups, one in which the generator is employed solely for supplying current to the battery and the latter utilized for lighting, and the other where the battery is employed to assist the generator when this is operating at a low speed or when the car is standing still.

With the second plan, the battery is said to be floated upon the line. The mechanical device supplies current direct to the lamps and when this is employed it is necessary that some method of regulating the dynamo be incorporated; that is, to take care of the wide variation in the driving speed peculiar to the automobile. It would be a simple matter to construct a small generator to charge a storage battery providing it was operated at a given speed, but as that of the automobile engine varies greatly, different devices are incorporated and these may be classified under three heads; namely, mechanical, electrical and electro-mechanical.

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Controlling the Current.

The mechanical takes advantage of slipping belts or clutches and in this manner the speed of the armature is kept constant which assures a practically constant voltage. Electrically operated devices tend to distort and weaken the field while the electro-mechanical method combines the principles of the two described. Centrifugal devices in combination with field resistances serve as the voltage governor. Some machines also employ a load regulator, which increases the field current as more lamps are turned on.

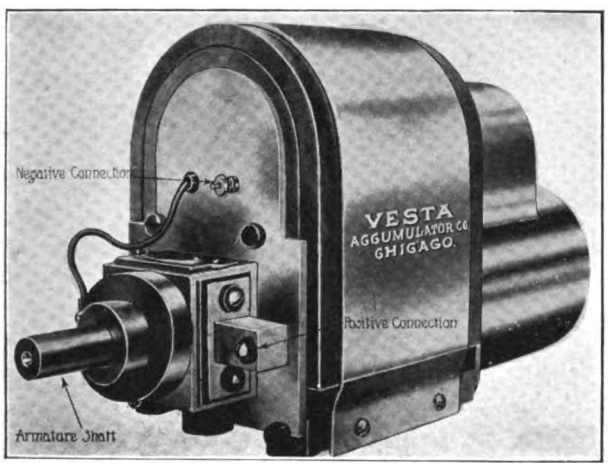


Fig. 21—Vesta Magneto Generator Employing Permanent Magnets and Making for Simplicity.

In designing devices to take care of the variation in speeds, etc., another factor has to be considered and that is a method of disconnecting the generator from the battery when the speed of the car falls to such a value that the voltage of the battery exceeds that of the generator. Should this occur the battery would discharge through the generator and would tend to run it as a motor, thus short circuiting the battery. The fact that some operators drive considerably at night while others use the lamps but little, also enters into the matter of controlling the current generated.

These devices will be explained in connection with each system outlined and may be termed automatic switches, these opening and closing according to conditions and the equipment. An ampere meter or voltmeter is usually employed in connection with the switch and mounted with it, to show the condition of the current and how much is passing from the generator to the battery. The ampere meter should have a dead beat action with a divided scale, reading from 0 to 10 to the left and 0 to 25 to the right.

Magneto Lighting Systems.

In connection with the generator it may be stated that its current may be utilized for ignition purposes, thus taking the place of the usual magneto. Several equipments of this type are manufactured and will be described in logical sequence, as will those furnishing current for lighting, ignition and starting. As previously stated, it is not the intention of the writer to confuse the reader with a technical description of the components of generators and their operation, but to make clear their practical features and installation so that in selecting the equipment the principles of the system will be understood.

The size, shape and weight of the device are important to the motorist desiring to install a lighting system when the car is not provided with a standard position for the generator. It is interesting to note that there is a growing tendency on the part of the manufacturer to provide for the installation of electric lighting and this is to be commended as it eliminates special equipments. Regarding the drive, it should be positive. The gear and silent chain are recommended as friction and belt methods sometimes cause trouble by slipping, although they are utilized abroad.

VESTA MAGNETO GENERATOR.

The lighting equipment manufactured by the Vesta Accumulator Company, 1336 Michigan avenue, Chicago, comprises the straight storage system and the Vesta magneto generator which is driven direct from the engine, maintains a storage battery in a fully charged condition, and is automatically controlled. A feature of the generator is the device employed for regulating the flow of the current generated by the magneto to the battery and the method employed in keeping it constant after the armature has reached a certain speed. This is obtained by mechanical means and is simple in construction, consisting of two weighted arms which operate inwardly and outwardly, depending upon centrifugal force. It will be noted

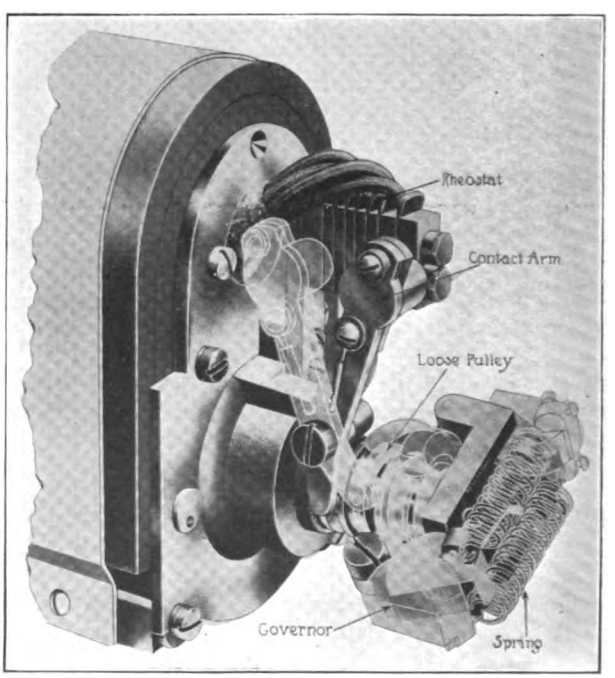


Fig. 22—Depicting Mechanism Controlling Flow of Current to Storage Battery and How Circuit Is Broken by Rheostat Arm.

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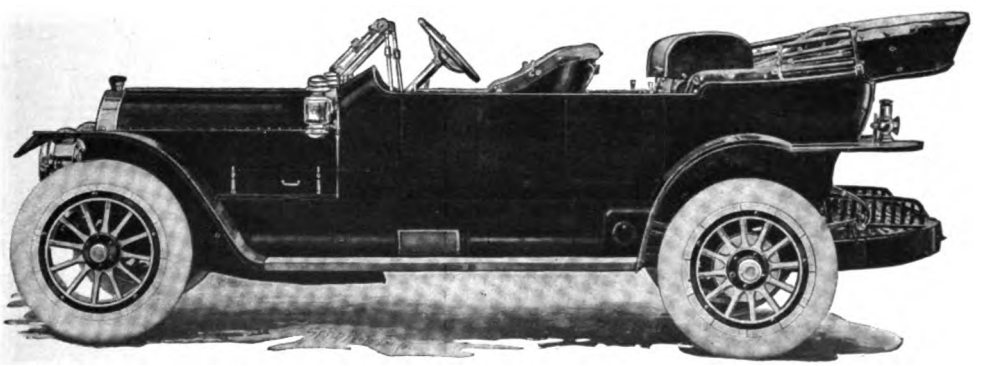
Cars May Come and Cars May Go!

But There's The Knox BEST BY TEST For Over

12 Years in the hearts of its countrymen

Built in New England. **In limited quantity.**

But of a quality which makes every owner conscious of the keenest motor satisfaction and pride.



Knox Model "S" 6-cylinder, 60 H. P. Touring Car, Series B, 7 passenger.
Price completely equipped. $5000

4-Cylinder
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that the armature shaft is fitted with a loose pulley and pivotally connected to the latter is a lever termed the contact arm.

This arm is fitted with two iridium points, the extra member being employed as an auxiliary, thereby insuring perfect operation under all conditions. These points are in contact with a form of rheostat to which is led a number of wires connected with the generator. The arm is securely but lightly held against the rheostat member and is free to move backward or forward when actuated by the loose pulley on the armature shaft.

This rheostat arm works in conjunction with two weighted arms which are much the same in construction as the old and well known ball governor employed on steam engines of the stationary type. Two springs are fitted on the governor of the Vesta generator and to charge a battery at the normal rate given by the maker and this may vary according to the design and capacity of the member. In the Vesta device the current is prevented from flowing to the battery by the rheostat arm until the generator attains a certain speed which is adjusted to approximately 400 revolutions a minute when the speed of the automobile is about six miles an hour. The charging rate when the current first cuts in is from .5 to one ampere, and as the speed of the generator increases so does the ampere flow until it reaches a fixed point, that of six amperes in the type 6 generator. The current is held constant at this point by means of the governor, which automatically inserts such resistance in the circuit as is necessary to maintain the constant amperage.

The rheostat arm moves backward and forward on the rheostat, travelling inwardly toward the generator

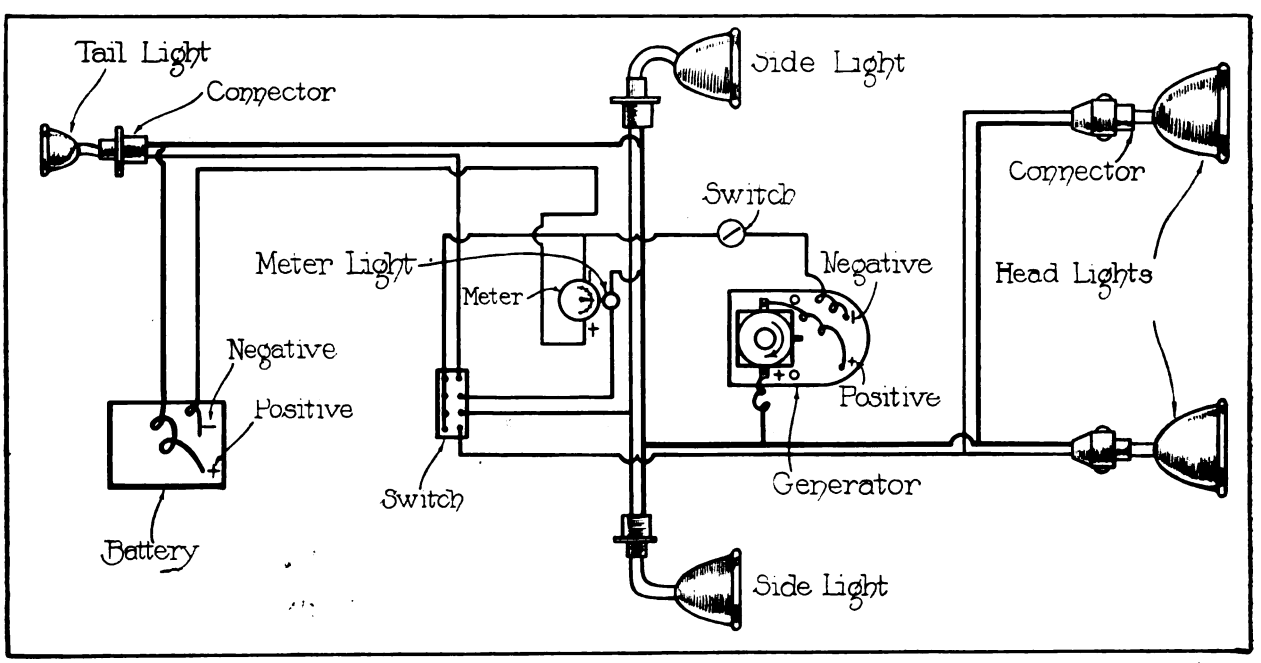


Fig. 23—Wiring Diagram of Vesta System, Showing Position of Generator, Switch and Method of Connecting Leads—These May Be Reversed According to Location of Generator.

these are utilized to counteract the centrifugal force against the weighted arms. Both springs are adjustable. One governs the time at which the circuit is made and broken, and the other the amount of resistance inserted into the circuit at the varying speeds.

Regulating Current Flow.

A feature emphasized in the Vesta system is that by its principle the battery is properly and fully charged and the current is not cut off prematurely. The breaking of the circuit by the voltage of a battery attaining its maximum before being fully charged is eliminated by the controlling mechanism. It is also pointed out that in the case of a sulphated battery with which the voltage would increase immediately upon application of the charging current, the member would not be cut out but fully charged.

As has been explained previously it is necessary proper as the speed of the armature shaft increases with that of the car, and when the energy of the engine ceases, the rheostat arm flies back to normal position, preventing the battery from discharging through the generator. These movements are outlined at Fig. 22, which depicts the controlling device with hood removed. The phantom imprint denotes the position of the arm when the armature is revolving at high speed and resistance is incorporated in the circuit. With its adjustable features as previously explained, and the fitting of an ampere meter in the circuit, the flow of current may be controlled and the life of the battery lengthened thereby.

Lubrication and Attention.

It is claimed by the maker that the generator requires no other attention than oiling about every 500 miles and as the armature shaft revolves on high grade

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THE EAGLE

Clear Vision, Rain Vision, Wind Shield

Designed and Built by Experts



Strong Rigid Silent

Easy to operate, as it is equipped with that wonderful

STANDARD FRICTION HINGE

Easily placed in any position and will stay where put.

SPECIFICATIONS:

WIDTH	HEIGHT	ALL GLASS ¼" PLATE TOP	LOWER	PRICE BRASS
41"	27½"	12"	14"	$50.00
41"	31"	14"	16"	50.00
44"	27"	12"	14"	55.00
44"	31"	14"	16"	55.00

Special Finish: White or Black Nickel and Gun Metal, $5.00 extra.

We also carry in stock a complete line of Standard Friction Wind Shields, from $22.50 each to $40.00 each. Send for descriptive circular.

Sole New England Distributors:

BI-MOTOR EQUIPMENT CO.

177-179 Portland Street,
Boston, Mass.

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ball bearings these do not require lubrication more often than 1000 miles. The fields of the generator are of the permanent magnet type, constructed of a very high grade tungsten steel. The working parts are fully protected against dust or dirt, a removable hood being fitted over the governor, etc., while the generator proper is solidly enclosed. It is compact in size, being about seven inches high, 4.5 wide and about nine inches long, the latter dimension including the extension of the armature shaft.

A positive drive is recommended, either by silent chain or gears. As the generator develops six amperes at a speed of 1300 revolutions a minute with a six-volt battery in circuit, it is obvious that the gearing should provide for that number of rotations when the car is travelling at about 18 miles an hour. It is estimated that the average motor turns up at about 600 revolutions a minute under the above conditions which would require a two-to-one gear ratio, although this may vary according to the design of the power plant of the automobile.

In the installation the generator should be mounted upon a base of non-magnetic metal such as brass or aluminum and operated in a clockwise direction when looking at the brush or commutator end. The brush on the right hand side of the machine is positive and when operating in an opposite direction is negative.

Method of Wiring.

At Fig. 23 is depicted the plan of wiring the leads from the generator to the lamps, the diagram providing for two head, two side, a tail and a meter light, although additional circuits may be incorporated for the horn and speedometer if desired. In addition the battery may be utilized for ignition. In connection with the wiring diagram outlined, should the generator be installed so that it run in an anti-clockwise direction, the leads of the generator should be reversed. This arrangement simplifies installation where a choice of direction of drive is not optional.

(To Be Continued.)

SASKATCHEWAN FRAMES MOTOR LAWS.

Owing to the concerted efforts of the motorists of Regina, Saskatchewan, Canada, the act to regulate motor vehicles was referred to a special committee for a general and detailed revision, and that body practically drafted a new bill the feature of which is that there is no speed limit, the clause reading as follows: "No person shall drive a motor vehicle on a public highway recklessly, or at a speed, or in a manner which is dangerous to the public, having regard for all circumstances of the case, including nature, condition, and use of the highway, and the amount of traffic which actually is at the time or might be reasonably expected to be on the highway."

The interests of the farmer have not been overlooked and if the horse becomes frightened the operator of the automobile must stop the machine and motor as well, and render aid to the driver of the horse drawn equipment. A clause is inserted providing a penalty for any person tampering with a machine other than his property or casting missiles. Regarding lights none commonly known as a searchlight will be permitted. So-called "joy riding" is strictly prohibited and it is interesting to note that machines going north and south have the right of way over those proceeding east and west. The initial registration fee is $10 and annual renewals $3, while motorcycle fees are $5 and $3. Non-residents will have a 30-day privilege without payment of any fee but must display the license mark from place of registration. The clause providing for the impounding of the machine in the event of a third conviction has been eliminated.

ATTACK CALLAN LAW AMENDMENT.

Charles Thaddeus Terry, chairman of the legislative committee of the American Automobile Association, has served notice on the New York Legislature that his organization is prepared to attack the constitutionality of the proposed amendment to the so-called Callan automobile law, providing it is placed upon the statute books. The bill was introduced by Senator Long, and provides that the moneys received from licensing automobiles and drivers shall be divided among the towns and cities of the state.

Mr. Terry maintains that the original Callan law was unconstitutional, but the motorists have decided to pay the tax willingly so long as the funds are used for highway construction and maintenance. He holds that under the proposed amendment the cost of administration would prove so excessive that little would remain for highway work.

SUSPENSION FOR CANCELLING RACES.

The contest board of the American Automobile Association has suspended E. A. Moross and his agent, W. H. Wellman, for 60 days as the result of cancelling the proposed race meet at New Orleans, La., Feb. 17-18, without first securing permission from the contest board. It appears that the sanction was issued in proper form, but two days before the meet was to have been held the dates were cancelled without furnishing reasons therefor to the sanctioning authority. The suspension holds until April 20.

KENTUCKY'S NEW AUTOMOBILE LAW.

The lower house in the Kentucky Legislature has passed the so-called Knight bill, in an amended form, which leaves the license fees as at present, $5 to $20, according to the horsepower of the car. Under the provisions of the new law motorists of other states are permitted to operate their cars in Kentucky without a Kentucky license. Operators must bring their cars to a stop when approaching a horse drawn vehicle and cities and towns are permitted to regulate speed.

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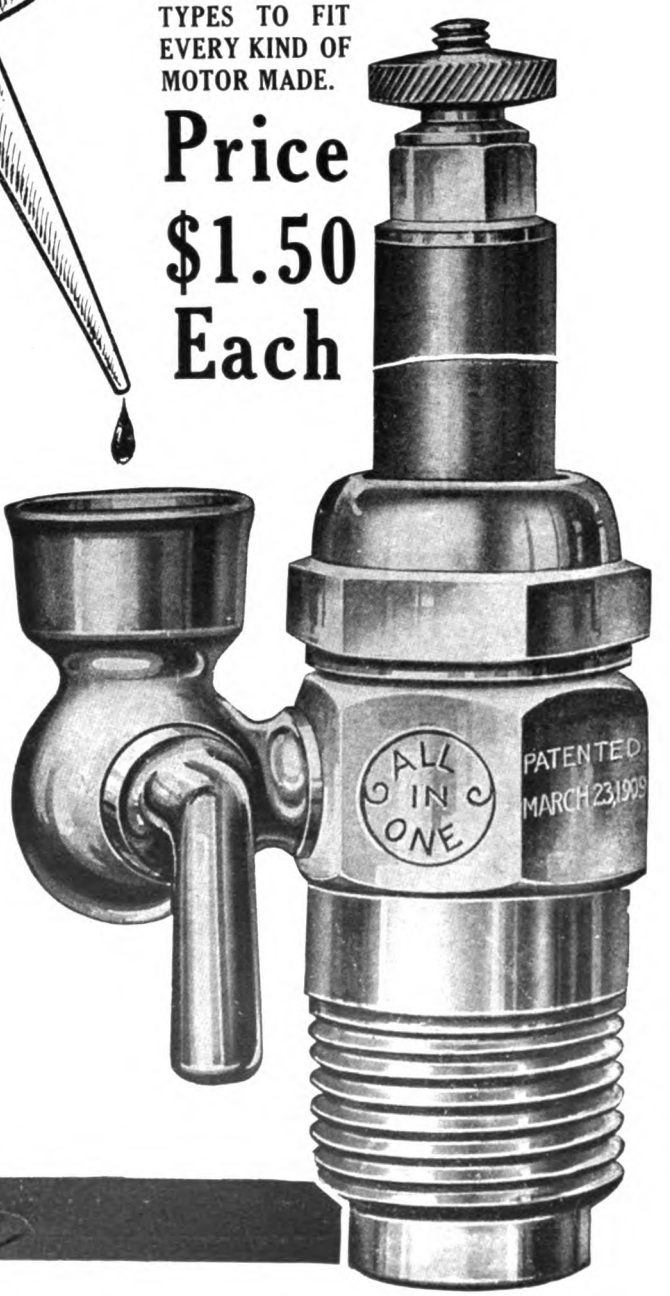
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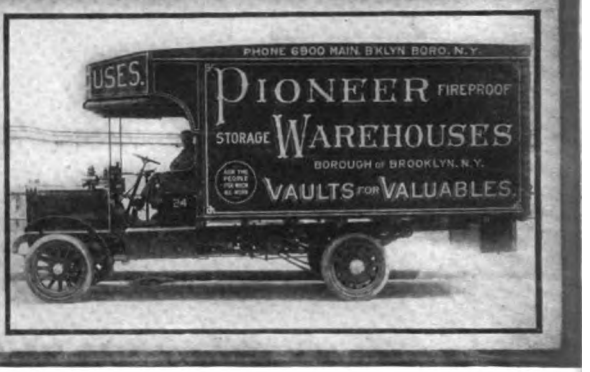
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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



BOSTON'S FIRST TRUCK SHOW.

The remarkable success which has greeted Manager Chester I. Campbell and the Boston Automobile Dealers' Association in the pleasure vehicle section of the 10th annual Boston automobile show, just closed, is sufficient indication of what the Boston Commercial Motor Vehicle Association may expect at its first separate motor truck show in Mechanics' Building, March 13-20. The event will be under the direction of Mr. Campbell, whose long experience in the management of similar exhibitions is assurance that it will be accorded the same generous support by the public.

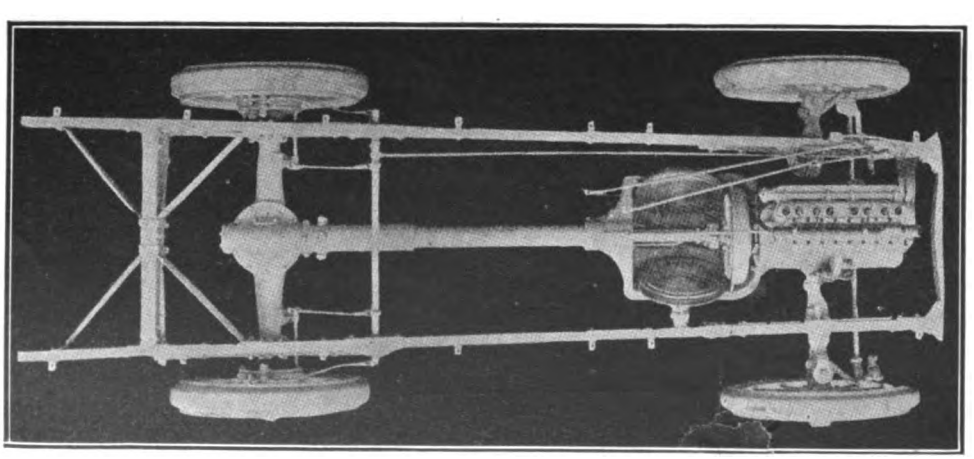
As soon as the pleasure vehicle section was closed Saturday evening, arrangements were completed for the removal of the passenger conveyances to make room for the industrial transports. Some of the larger wagons will have to be completely dismantled in order that they may pass through the entrances, but so well has the problem been thought out that everything will be in place when the doors are opened Wednesday afternoon.

Interest in the power wagon throughout the entire New England States has been awakened through the remarkable possibilities. In this section, as in no other, the practicability of motor transportation has been amply demonstrated. Towns and cities are located so close together that there has been no difficulty in bringing home the fact that decided economy may be effected through the use of motor trucks.

There remains only the necessity for an opportunity to compare the merits of the various productions, and this will be afforded by the forthcoming exhibition. Most of the makes which have been displayed at other shows this year, will be on view, and as the list of exhibitors indicates a much larger representation than was present at the recent Chicago show, looked upon as the greatest collection of industrial transports ever assembled, it follows that several makes will be seen here for the first time. Some of these are manufactured in New England or in states closely adjacent thereto, while others are of western production. In any case, there will be every chance to see and make note of the best the industry has to offer.

GREAT DAIN ONE-TON WAGON.

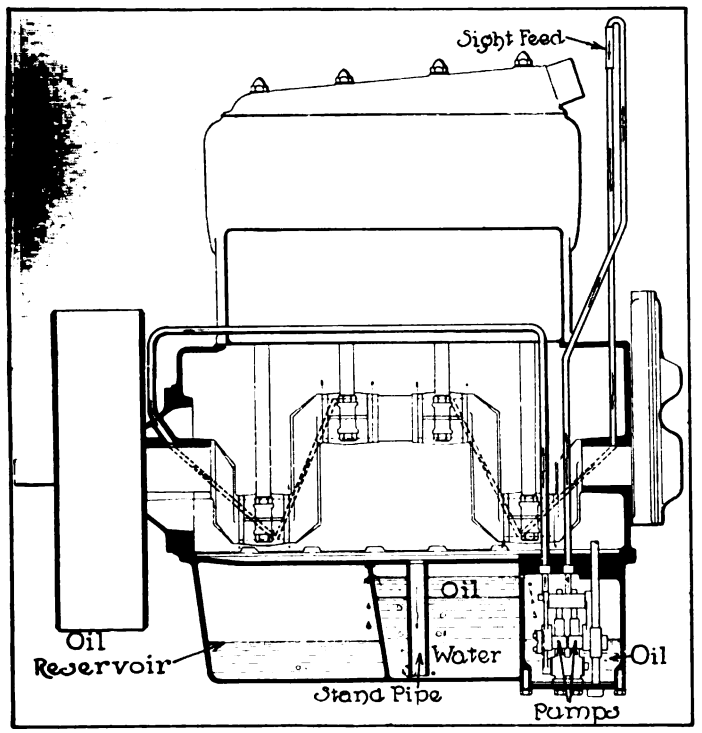
Among the new vehicles first placed in the market this year, few present more distinctive features than the Great Dain, made by Joseph Dain, Ottumwa, Ia. This is a one-ton vehicle, with driver located at the left and centre control. The motor is a four-cylinder water-cooled unit, with cylinders cast en bloc, the bore being 3.75 inches and the stroke five. Ignition is by K-W high-tension magneto. Lubrication is by forced feed.



Novel Friction Transmission and Three Point Suspension Utilized in Great Dain Chassis.

The transmission scheme is of decided interest, inasmuch as friction discs are employed, but only for low speed and reverse, the direct drive being through a cone clutch. This whole assembly is made a part of the mo-

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Interesting Lubrication System Employed on Natco Vehicles.

tor, providing a unit power and transmission plant. In addition, it is claimed for this construction that it provides a perfect three point suspension, power being transmitted at all times directly from the engine to the rear axle in a straight line, no universal joints being used.

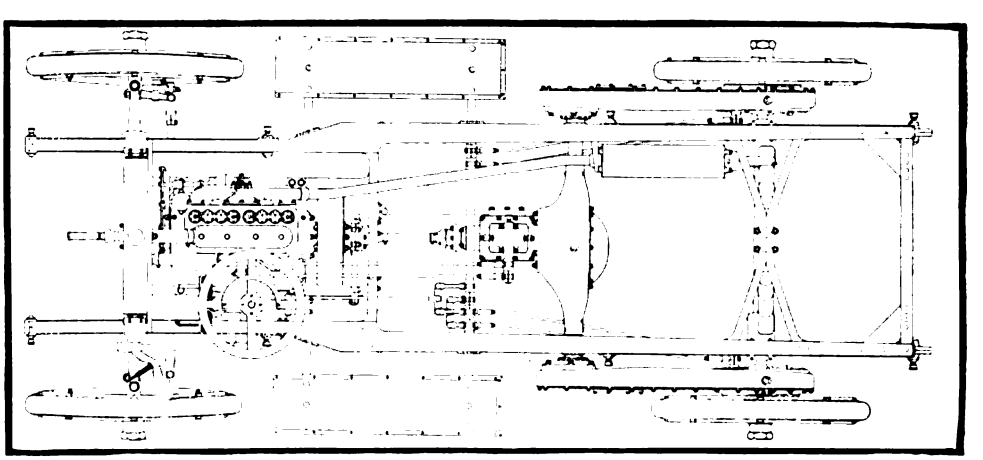
The transmission proper consists of two discs set at an angle to each other, which on low speed and reverse are rotated by the rim of the flywheel being brought into frictional contact with their edges. A friction wheel slideably connected with the propeller shaft and mounted between the discs, receives the power from the faces of the discs. When shifting the friction wheel across the faces of the discs, or to disengage the power when using the transmission, the driver may by a simple movement of the foot, lift the friction wheel out of engagement with the discs and thereby release the contact between it and the faces of the discs. The discs being mounted with their faces at an angle to each other, or in other words, the friction wheel being in wedging contact with the faces of the discs, makes it possible to relieve the frictional contact by lifting the friction wheel instead of moving the discs. To shift from low to high speed, or from transmission to direct drive, the friction wheel, which carries one member of a cone clutch, is moved out of contact with the faces of the discs and into engagement with the other member of the cone clutch formed in the flywheel. Doing this moves the flywheel out of contact with the edges of the discs and leaves them dormant. The power is disengaged when on the direct drive by releasing the clutch with the foot lever.

With reference to the three point suspension it may be said that the drive shaft is encased in a tube which has a slip joint near the rear end. The torque is cared for by this tube, and there are means of taking this away from the drive shaft, these being in the nature of buffers located immediately in front of the back axle. The slip joint is designed to prevent any tendency to transmit radial strains through the transmission or motor.

Final drive is by a Hindley full floating worm drive axle, in direct line with the drive shaft and motor. The axle itself is of the semi-floating type, and an auxiliary cross spring is carried on the back cross member, this being braced on either side to the frame member by pressed steel straps, concaved to add strength and rigidity.

NEW NATCO VEHICLE.

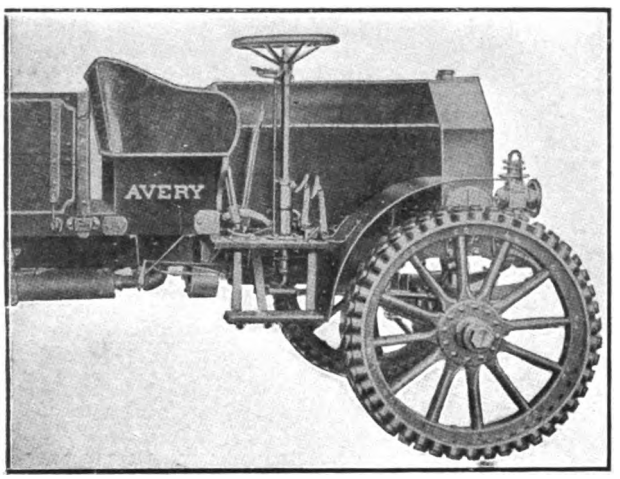
Another new one-ton truck which has attracted no little attention wherever shown this year, is the Natco, made by the National Motor Truck Company, Bay City, Mich. This also has a four-cylinder motor, left hand position of driver and central control levers. The engine is located under a hood in front, but this is so short that it is brought up close to the seat, giving an effect similar to the so-called motor-in-the-cab design. Cylinders are cast en bloc, with bore of 3.5 inches and stroke of five. Cooling is by water, ignition by high-tension magneto, and lubrication by force feed.



Chassis of One-Ton Natco Wagon, Presenting Relation of Parts.

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When the hood is raised the entire mechanism is exposed, the motor and transmission being supported on a sub-frame. The leather faced cone clutch is supported on compression springs. The jackshaft is of the full floating type, the housing being attached to the underside of the frame. Final drive is by double side chains, which are encased and run in oil. An auxiliary spring is carried under a double cross member in the rear, this converging at the centre and supplying an additional brace.



Seat Location and Wood Plug Tires on Avery Truck.

A particular feature is the method of lubrication, in which the oil is filtered through water. The main reservoir of six quarts capacity is attached to the bottom of the engine case, and the pumps, which are gear driven by camshaft, are located in a compartment at the forward end of the motor. The oil is forced from the pumps to the end bearings, through the crankshaft to the connecting rod pins. The excess returns to the main supply tank through the standpipe, which extends to within .375 inch of the bottom of the water compartment, and owing to the difference in specific gravity between water and oil, the latter rises to the top of the water and overflows into the main reservoir. During the passage of the lubricant through the water, carbon which is collected by the oil while performing its lubricating function, is precipitated to the bottom of the water compartment, which can be cleansed thoroughly at certain intervals. In addition to the clarifying of the oil, it also is cooled. Lubricant in the forward pipe line flows through the sight feed on the dash.

AVERY'S WOOD PLUG TIRES.

The matter of tires is a problem which interests the truck manufacturer as well as the user. Several concerns have been trying out substitutes for rubber of one nature or another, and many of these have turned their attention to wood. One of the latter is the Avery Company, Peoria, Ill., maker of Avery trucks and tractors. Rubber tires are still fitted as standard equipment by this maker, although the wood plug members are furnished without extra charge.

An accompanying illustration shows the front wheels of an Avery truck equipped with wood plug tires. It will be noted that the plugs are disposed in regular formation around the periphery of the wheel, which is made with cast steel rims. It is claimed for these tires that they have splendid wearing possibilities and that their construction is such that the truck is able to traverse country which would not permit of the use of rubber.

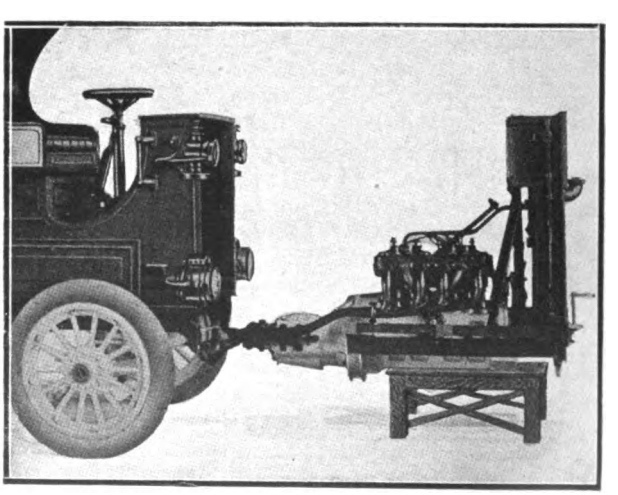
T. W. Thrash of Tarboro, N. C., has an Avery truck thus equipped with which he hauls brick, wood and other merchandise over country ways, making two and three such trips a week, besides covering an oil route. He declares he is very well satisfied with his wood plug tires, and expects that several of his neighbors will order them on their new vehicles.

B. E. Baker of Spooner, Wis., utilizes another Avery truck with this equipment in hauling and general farm work. E. W. Parsons of Jennings Kan., uses one in covering an oil route, and states it does the work of three four-horse teams. All are loud in the praise of the wood plug tires.

ACCESSIBILITY OF SANDUSKY TRUCK.

The subject of motor accessibility is occasioning considerable interest this year, as would appear from the number of attempts to solve the problem and at the same time so dispose of the motor that the greatest possible carrying space may be available. The Sandusky Auto Parts & Motor Truck Company, Sandusky, O., presents a rather novel scheme on its 1.5-ton vehicles.

It will be noted by the accompanying illustration that the power plant is located under the floor on a sub-frame, which can be withdrawn bodily from the chassis. The radiator and fuel tank are connected with the motor, so that the entire assembly is free to

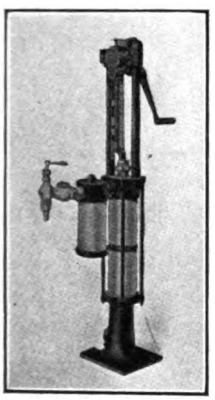


Method of Removing Power Plant on Sandusky Vehicle.

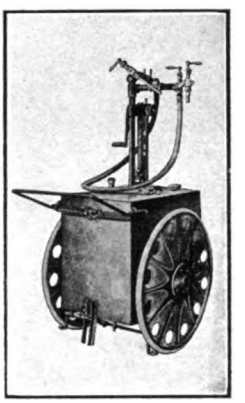
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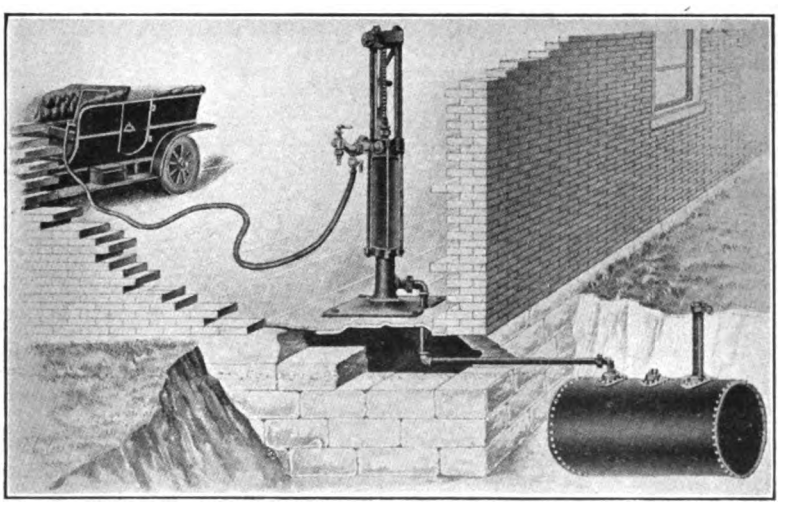


IDEAL OIL HANDLING EQUIPMENTS

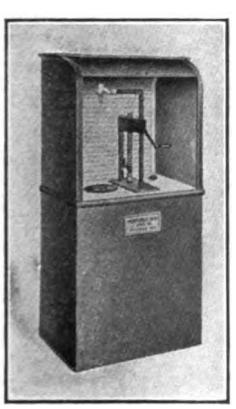


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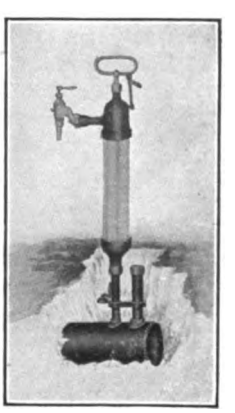
They Will Reduce Your Cost in Handling, Eliminate Waste, and Filter Your Oils



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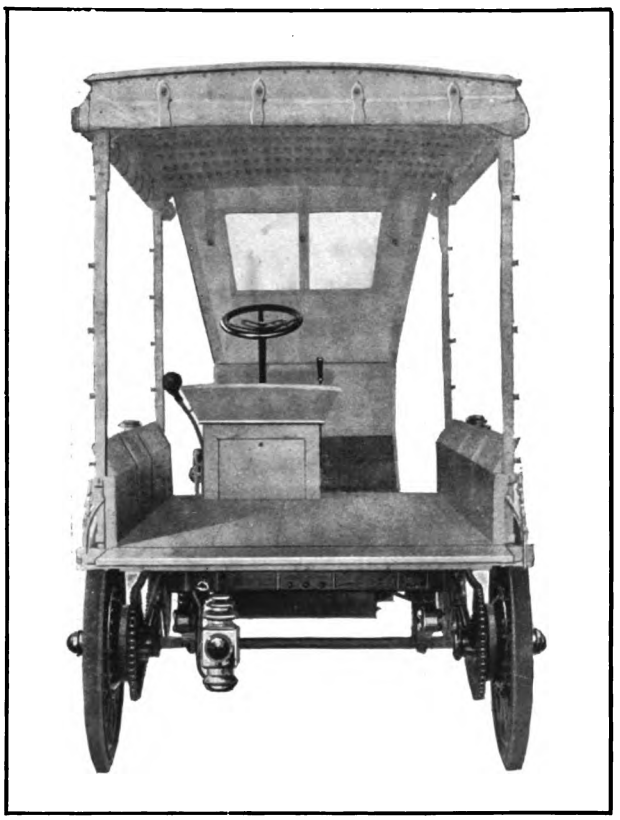


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Sullivan Ice Cream Wagon as Viewed from the Rear.

slide out like a drawer. The removal may be made without breaking water, fuel or electric connections. This is accomplished by withdrawing six spring controlled plungers, raising the steering column and operating two levers. This releases the sub-frame, which drops down onto rollers, and all that is necessary to complete the work is to place the proper support in position to receive the assembly.

SULLIVAN ICE CREAM BODY.

The difficulty presented by the proper loading of certain commodities affects materially the saving which a motor truck is able to accomplish in these fields. Special mention may be made of ice cream delivery, since this product usually is handled in tubs and pails, which cannot well be packed on top of each other. It follows that to secure the utmost value of the truck it is necessary to utilize all of the floor space it is possible to get.

The Sullivan Motor Car Company, Rochester, N. Y., recently constructed the body shown in an accompanying illustration for an ice cream dealer in that city. It will be noted that the driver's seat is designed to take up but half of the room in front, and that it is possible to utilize space on either side for carrying packages of varying size.

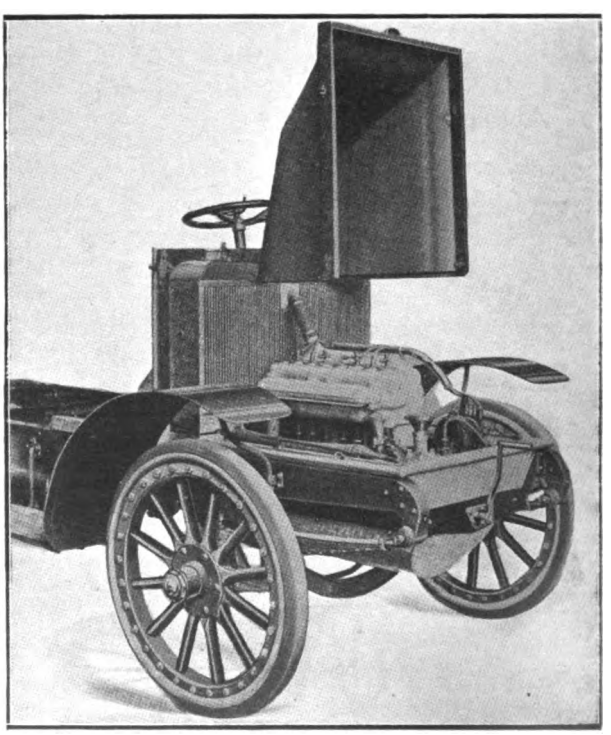
The body has a width of 46 inches, inside, and that portion back of the seat is seven feet six inches in length. One-half of the body has a carrying space of nine feet nine inches, and this additional two feet and three inches is of decided value in the ice cream business.

The vehicle as shown was displayed for the first time at the Rochester automobile show last month, and created a decidedly favorable impression. As has been stated, it was designed especially for the ice cream dealer in question, but several orders for duplicates were taken during the week of the exhibition. Three of these wagons went to plumbers, while a fourth was purchased by a carpet and rug concern, which stated it had been experiencing difficulty in securing a wagon which would accommodate its largest rugs.

ADAMS RADIATOR LOCATION.

It would appear that American makers were giving considerable thought to the matter of radiator location. Recently, several instances were cited in these columns, in which the radiator was located elsewhere than in front, following the practise of certain foreign manufacturers. Herewith is presented another illustration of this nature, the truck being a one-ton Adams, made by the Adams Bros. Company, Findlay, Ohio.

It also will be noted that the hood is hinged at the top so as to afford complete accessibility to the power plant, which is mounted on a sub-frame and can be removed readily. A long propeller shaft connects



Radiator Mounting and Power Plant on Adams Trucks.

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GYREX fits intake pipe. It is a small all-metal device through which the mixture passes. The little nickel-steel turbine spins around at great speed and and "beats up" every globule of gasolene—thoroughly diffuses the real essence of the mixture so that the cylinders get a rich mixture that means more power and speed with one-third less gasolene.

You don't have to disturb engine. GYREX can be attached in five minutes. It economizes, prevents stratification and missing. Those who use the GYREX say that they will never be without one.

Beautifully constructed, made of the best German steel and mounted on imported ball bearings.

Get Your GYREX To-day. Money Back If Not Satisfactory.

WE SEND IT ON TRIAL

Send us $3.00 and we will mail you a GYREX, and if it does not prove its worth you can return it within ten days and your money is cheerfully refunded. Send name, model and year of your car or inside diameter of intake pipe at carburetor flange.

THE ROYAL EQUIPMENT COMPANY

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with the change speed mechanism, supported in front by a single cross member from one point and at two points on another cross member in the rear. The jackshaft bearings are bolted to the underside of the frame members.

SAMPSON ARMY WAGON.

One of the few motor wagons purchased by the quartermaster's department of the United States army is a Sampson, made by the Alden Sampson Manufacturing Company, Detroit, a constituent of the United States Motor Company, New York City. The vehicle is shown herewith, and it will be noted that it does not differ widely from standard practise, with the exception that the tires are 42 inches in diameter, both front and rear. It is claimed that this size is necessary because of the clearance required in traversing rough country roads.



Sampson Wagon Designed Especially Upon Order for the United States Army.

As the mule is called upon to ford streams, travel through open fields and over stones, etc., the government requires that its successor shall be equipped for similar purposes. To haul this car out of mud or places where traction cannot be secured, the wheels are constructed so that winch heads may be attached by means of simple hook bolts. The rope is fastened to some fixed object and a few turns taken around the winch heads. The slipping of the wheels winds the ropes, drawing the car from its psition.

The motor is located under the seat, being a four-cylinder, water-cooled unit, having a four-inch bore and five-inch stroke. The inside body dimensions are nine feet in length by three feet eight inches wide. It may be added that this car was sent to the Mexican border recently, where it will be given a thorough test under severe conditions of service.

ELECTRIC MEN CELEBRATE.

The first anniversary of the organization of the Boston Electric Vehicle Club was celebrated by a dinner in the Hotel Thorndyke, Boston, March 9. About 150 members and guests were present, including many leading business men of the city, electric vehicle agents and representatives of electric car manufacturers. Day Baker, president of the club, presided at the after dinner exercises, and F. S. Mansfield of the Boston Edison Electric Illuminating Company was toastmaster. The principal address of the evening was delivered by P. D. Wagoner, president of the General Vehicle Company, Long Island City, N. Y. He said in part:

"I think it must be conceded that when hundreds of the largest firms in the country officially adopt the electric for their city delivery service, they must consider it perfected, at least to the extent of being superior to horses, and more economical than non-electric trucks for this work. When I tell you that 100 firms already use 1009 electric trucks of one make—that two express companies have purchased no less than 356, three brewers 172, three packers 119, three delivery contractors 93, and three central stations no less than 158, and when you consider that in the case of the express companies, the brewers and the central stations, many of the electrics now operated by them have been in service from six to 11 years, you must admit that such extensive buying not only voices confidence in the electric, but demonstrates as well that the electric truck gives a larger return on the investment that other types of commercial vehicles.

"This is certainly true of city work, and the bulk of the heavy trucking and deliveries is in the city. The fact that in changing from horses to electric trucks it is possible to utilize the old horse driver, does much to simplify the operating and economic problem of many who are adopting motor vehicles. Many of these drivers possess a valuable knowledge of the firm's routes and methods of delivery.

"The motor truck is a money saving proposition, yet the world is going to have it because it is up-to-date—a part of modern business. Electricity provides the solution of most city transportation problems."

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"John! You Must Get Weed Chains For Our Car Today"

Nine-tenths of all automobile accidents are caused by skidding. Hardly a day goes by but the newspapers chronicle some startling mishap entailing broken limbs, smashed cars and tremendous expense.

Careless drivers and foolish "joy riders" are not the only ones who get into trouble. The *most careful driver*—the man who says and thinks *he* never takes chances is often "up against" serious difficulties. When motoring on wet, muddy, snow-covered roads or on icy, slippery, greasy pavements, try as he may, and even if he exercise every possible precaution, he *cannot prevent slipping and skidding* unless his car is equipped with

Weed Anti-Skid Chains



No Trouble to put on

A well known editor of one of the largest automobile papers thus expresses his views: "The fact remains that no other device will do just what *Weed Chains* will do. The Weed invention is one of the most remarkable in the history of the Motor Car industry. When first put upon the market, its *effectiveness* was self evident, but the skeptic said it would ruin tires and that something far better would be forthcoming. The fact is that it *constantly creeps and does not ruin tires* any more than the ordinary use of the tire—without the chains—wears it.

"*Another fact* is that Taxicab companies, who do everything that money can do to minimize accidents, universally use *Weed Chains* because *no other device at any price is equally effective.*"

When Used on the Front Wheels, Too

Weed Chains give comfortable, easy steering; no cramped fingers; no cramped arms; no sore muscles—out of car tracks, ruts, snowdrifts and "heavy going"—*just like steering on smooth roads.*

Even if you don't value your own life—what right have you to imperil the lives of others. *For your own safety*, for the safety of the public, stop at your dealer's today and fully equip your car with *Weed Chains.*



Recommended and sold by all reputable dealers.

Weed Chain Tire Grip Co., 28 Moore St., New York

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CONTINUING the discussion of prominent accessories begun in the last issue of The Automobile Journal, herein is set forth in a comprehensive manner many of the leading makes of supplies and fittings designed for the proper maintenance of the car or the convenience and enjoyment of motoring. As has been stated, many cars are sold today with what is known as complete equipment, but in spite of this the purchasers often have occasion to add details which more nearly approach their ideals, and there are some so-called accessories which require renewal from time to time. In any event it is desirable to become thoroughly acquainted with the standard productions. The illustrations and brief descriptions below will serve to call more forcibly to mind those devices or supplies which have been most extensively exploited and therefore recognized as measuring fully up to the demands of the modern automobile.

SPEEDOMETERS.

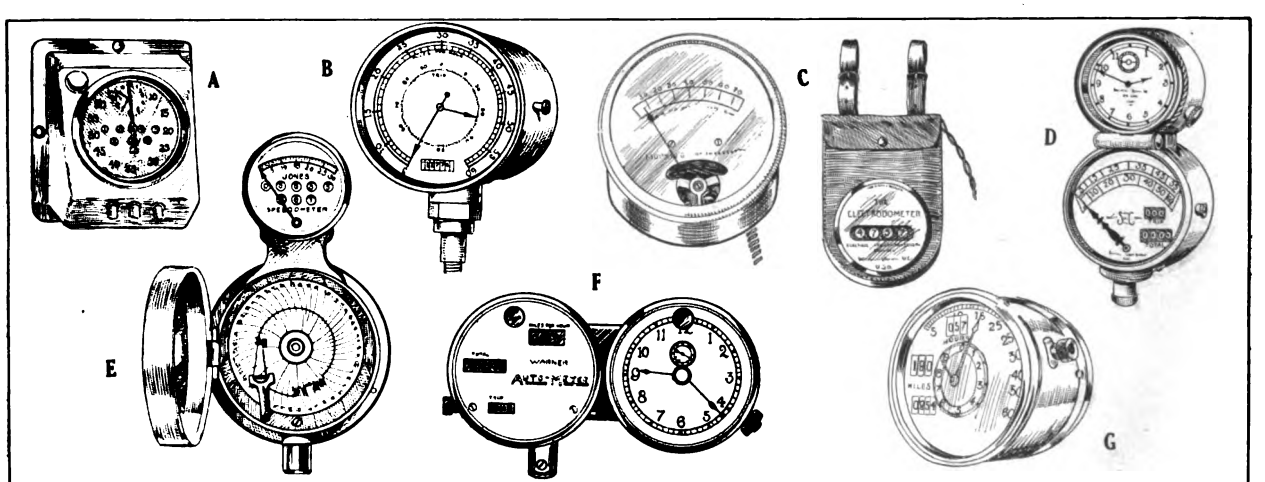
The automobile owner who would comply with the requirements of the laws will find one of the most necessary equipments for his vehicle to be a speedometer, and these instruments have been improved and perfected in many ways. There is a very wide range of qualities and values in these indicators.

Stewart.

The Stewart, made by the Stewart & Clark Manufacturing Company, Chicago, Ill., is produced in numerous models and in combination with clocks suited for all purposes. The principle of operation is by magnetic influence. One feature is a provision for the regulation of some models by micrometer. Another is that the trip register may at any time be set to any tenth of a mile. Besides refining and improving the indicators, the shafts and fittings have been considerably perfected.

Jones.

Besides the standard Jones models, produced by the Jones Speedometer Company, New Rochelle, N. Y., which have been little changed, aside from the use of nickel and black enamel for case finish, the truck service types have been improved by heavier fittings. There is in addition the Jones hub odometer for service wagons and there is as well the Jones recorder, which will register the period of service, distance and speed, when the vehicle is in motion, duration of stops and driving, on a chart that may be removed and preserved for record.



Speedometers: A, Stover-Lang; B, Reliance; C, Hopkins (Electric); D, Sears-Cross; E, Jones; F, Warner, G, Cleveland.

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Warner.

Made by the Warner Instrument Company, Beloit, Wis., the Warner is the pioneer magnetic instrument and has been so perfected that little change has been made in the 1912 models other than to install a reset for the trip register on the bezel types. This is designed for the benefit of those who desire to make deviations from routes and yet be able to employ the routed information without recourse to making notes.

Hoffecker.

The new instruments made by the Hoffecker Company, Boston, Mass., include model D, which has a 100,000-mile register and a trip register that may be set to zero at will by a side button reset, or to a tenth of a mile. Model H is a vertical type of combination clock and speedometer designed for use with cars of moderate cost. The other types have not been changed, save in minor detail.

Veeder.

The Veeder indicator is made by the Veeder Manufacturing Company, Hartford, Conn., and with a tube containing colored fluid mounted in a metal frame carrying a scale. There is a reservoir for fluid and the momentum of a small centrifugal pump carrying this fluid upward into the tube indicates the speed of the car. There is a trip and season odometer, the assembly being operated by a flexible shaft from the vehicle wheel.

Forse.

Produced by the Forse Manufacturing Company, Anderson, Ind., this instrument has been improved by the change of the shaft opening to eliminate a turn in the flexible shaft. The type is centrifugal and the construction well designed, there being double ball bearings for the governor shaft, radial raceways and four point suspension. No springs are required for steadying the indicating hand. The drive is by a special cable of piano wire in a steel-lined brass tube.

Sears-Cross.

The 1912 model of the Sears-Cross, made by the Sears-Cross Company, New York, N. Y., is built with a double governor, the second functioning after a speed of 15 miles an hour has been reached, the one first used steadying the hand. The instrument as built is assembled within a case and this is installed withing the housing. An odometer reset is a feature. There are six sets of ball bearings in the fittings.

American Metric.

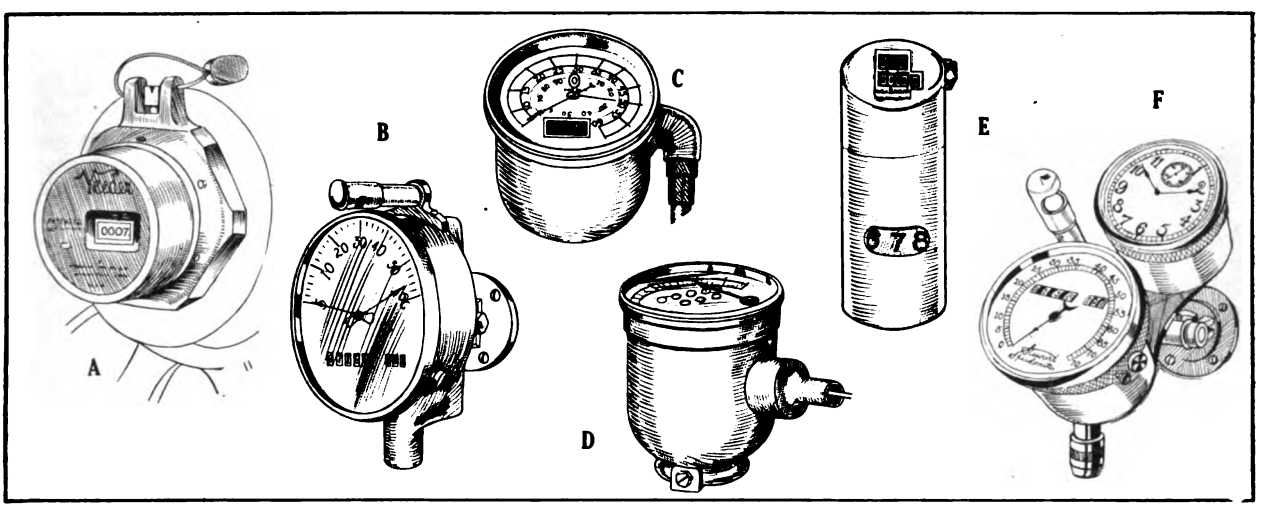
Made by the American Eveready Company, New York, N. Y., these instruments are in 12 models and are of the magnetic type, the former centrifugal constructions being abandoned. They range from 50 to 80 miles an hour indication and vary in size and price. Besides these changes a swivel joint is now used at the steering arm and the flexible shaft has been decidedly improved.

Hopkins Electric.

This device, produced by the Electric Speedometer Company, Washington, D. C., includes a direct current generator geared to the vehicle wheel, a voltmeter, a commutator, an indicator, a revolution counter and an electrodometer. There are gold brushes for the commutator and the voltmeter, sapphire bearings and exceedingly accurate and careful construction. The electrodometer is for the use of the tonneau passengers. The record is of speed, distance, and travel in a given period.

Cleveland.

Made by the Cleveland Speed Indicator Company, Cleveland, O., this instrument is intended to register by indication speed averaged for each 176 feet of distance traversed, trip miles, actual running hours for the trip, average speed for trip or day, complete season's mileage, actual running hours for the season and average speed for the season. The indicator is a clock with registering device governed by a shaft driven mechanism, and it is self-winding.



Speedometers: A, Veeder; B, American Metric; C, Hoffecker; D, Forse; E, Casgrain; F, Stewart.

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Reliance.

Produced by the Reliance Speedometer Company, Boston, Mass., extreme accuracy is claimed for these instruments through the use of a flexible driving shaft carried on ball bearings, which shaft has a swivel union at either end. All extreme movements of the indicating hand are eliminated by this shaft and mounting. The method of attachment is such that the driving pinion is always in the same plane as the ring gear on the vehicle wheel.

Casgrain.

In this speed and distance indicator, made by the Casgrain Speedometer Company, Boston, Mass., the register is by figures carried on a cylinder that is actuated by the motion of the fluid contained within a sealed glass casing. The movement is by a rotary pump turned by a shaft driven by a flexible shaft from the front wheel. The device is carefully calibrated and as the shocks are cushioned by the liquid it is said that it is free of all influences that might in any way disturb its accuracy.

Troy.

The Troy Carriage Sunshade Company, Troy, O., produces the Troy pneumatic speedometer, which is actuated by an air draft forced through a flexible tube and which operates the indicating device. In a test, an instrument was driven 2508 hours at speed of 120 miles an hour, a total of 300,960 miles, and after this run by micrometer measurement no part showed measurable wear.

Stover-Lang.

In the product of the Stover-Lang Company, Boston, Mass., the rate of speed, distance and time are recorded by a combination clock and recorder. A clock escapement is automatically wound by force of air driven through a tube every half-revolution of a wheel by a diaphragm. Every five seconds the wheel revolutions are counted and recorded. There are no springs, cams or magnets used in this device, which is claimed to be absolutely accurate.

HORNS AND SIGNALLING DEVICES.

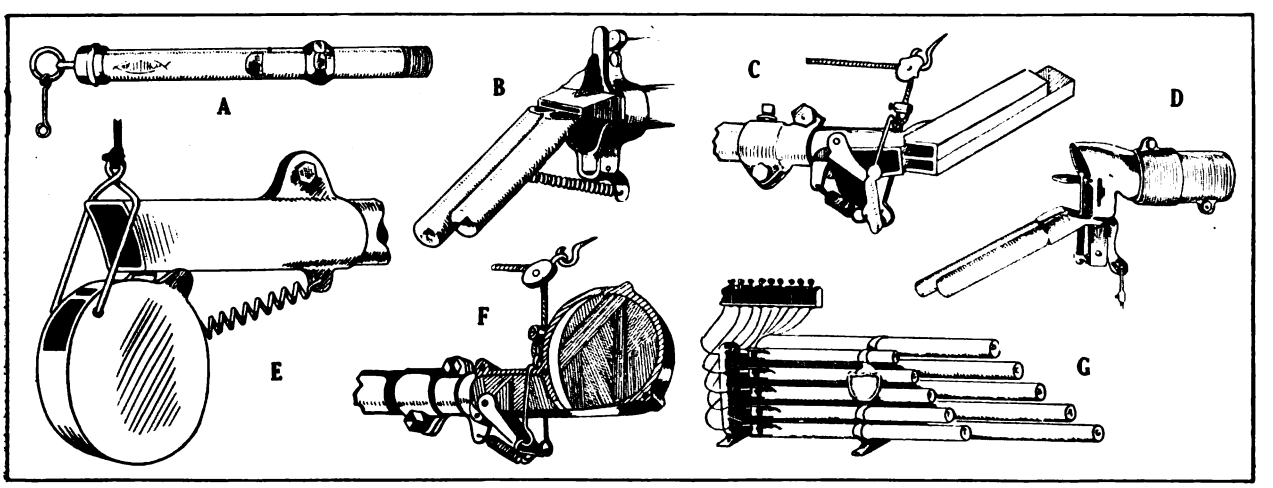
While bulb horns are still offered, many concerns have turned their attention to the production of electrically or exhaust operated devices in addition to the older lines. Some of these present new shapes and designs, and taken as a whole the signalling situation has changed quite as much as any other in the so-called accessory field.

Sonora.

In the Sonora, made by the Sonora Motor Horn Company, New York City, the usual diaphragm has no button or stud riveted into the centre. Instead a little spring member beats against this drum head disc, producing a deep toned whistle. It is claimed that it may be operated an entire season on one set of batteries.

Newtone.

The Auto Supply Manufacturing Company, Brooklyn, N. Y., is featuring the Newtone Torpedo electric horn, in which the motor comprises a field of 75 laminated pieces. By the adoption of a vanadium steel diaphragm .03125 inch in thickness, it is claimed that the consumption of current has been reduced some 40 per cent. The same quality of construction is maintained in other members of the line.



Exhaust Horns: A, Nightingale; B, Exo; C, Jubilee; D, Waymaker; E, Hough; F. Jericho; G, Gabriel.

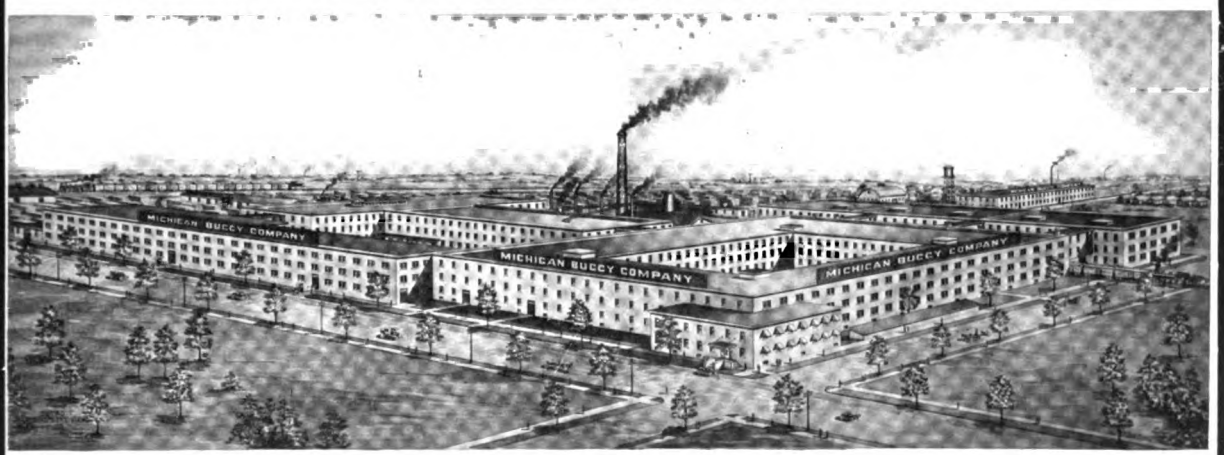
Tuto.

The Dean Electric Company, Elyria, O., continues the Tuto horn, electrically operated, with which a button is attached to the steering wheel spoke, and the cord is encased in a fixture on the steering column. Pressing this button instantly causes the device to give forth a mellow note, while additional pressure brings about a more penetrating sound. An addition to the line is the Tutoette, a smaller replica of the Tuto, and a new bulb horn, known as the Tally-O-Horn.

Monoplex.

The Monoplex is made by the Atwater Kent Manufacturing Works, Philadelphia, being presented in

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The Factory Back of the Car

Means as Much to You as the Car Itself

Suppose you were to put $1,500 on deposit. There are two banks side by side. One old and established, with a capital and surplus of millions. The other a newcomer, unknown, and behind it just a few thousands. Which bank would you choose?

The same principle applies to the automobile business. You want to buy your car from a concern with an *already established* reputation. One of large capital, that will always be right there to back up its cars and take care of its customers.

Such a concern is the Michigan Buggy Company. It has been in existence for thirty years. It will be in existence thirty years from now. It has built up a reputation that is world-wide.

Michigan 40

The Michigan Buggy Company guarantees every car it turns out. Not for one year, two years, or even five years. The Michigan guarantee is for life. If at any time there develops a flaw in material or workmanship, we will be here to make it right—every time.

Every Big Selling Feature Included in the Michigan "40"

Motor—40 horsepower. Four cylinders, 4¼x5¼ inches. Three-bearing crankshaft. Enclosed valves.

Self-starter—absolutely efficient; light in weight; non-injurious to motor.

Dual ignition. Briggs guaranteed magneto.

Three-speed selective transmission.

Three-quarter floating rear axle, possessing all the advantages of both full-floating and semi-floating types with none of the disadvantages of either.

Multiple disc dry plate clutch.

Frame—extra strong, 5-32-inch steel. Four inches deep, 3½-inch flange.

Shortsville wheels, 34x4-inch tires and demountable rims—just to make sure that MICHIGAN owners will not be bothered with that bugbear of motordom, tire trouble.

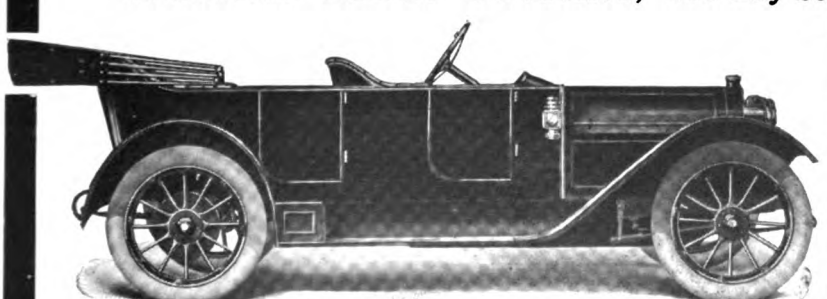
Fourteen-inch brake drums. One square inch of braking surface to every eight pounds.

White nickel mountings throughout.

116-inch wheel base, long 50-inch springs and luxuriously comfortable cushions insure perfect-riding qualities.

A life guarantee on every MICHIGAN car—backed up by an old-established concern.

MICHIGAN BUGGY COMPANY, 166 Lay Street, Kalamazoo, Mich.



Michigan "40"—$1,500

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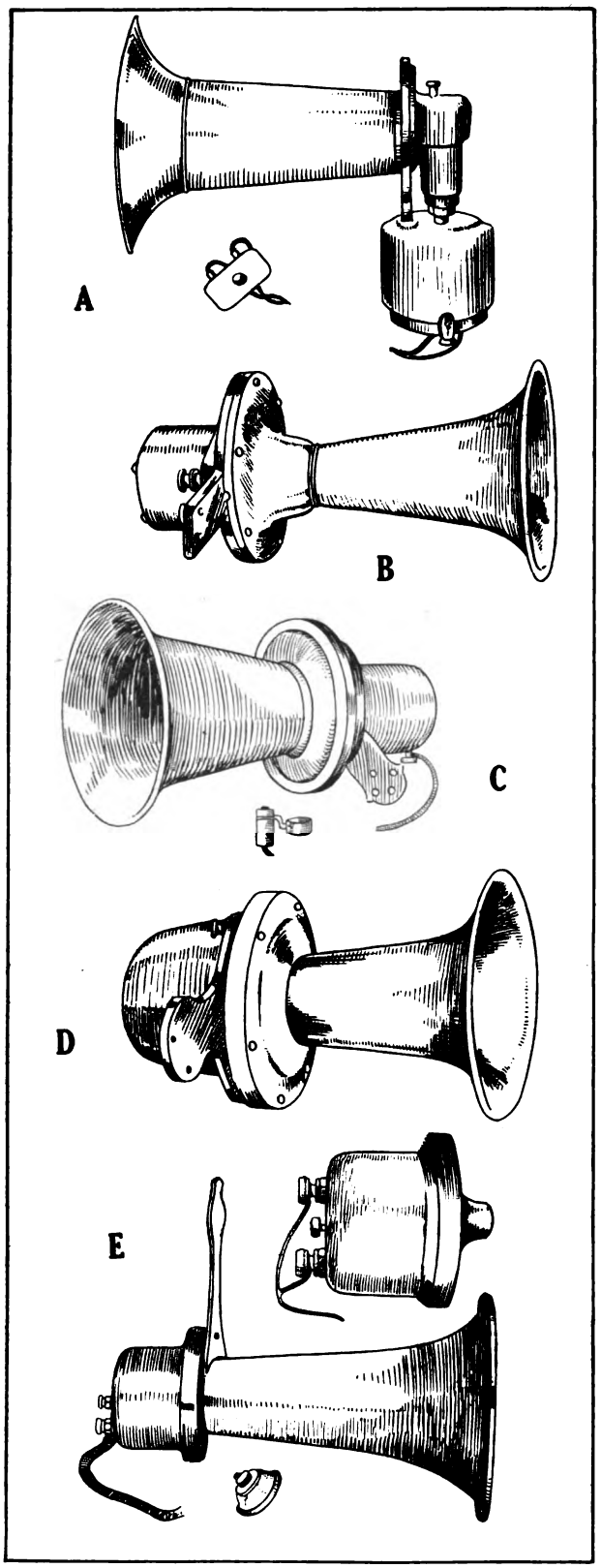
166 Lay Street, Kalamazoo, Mich.

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Electric Horns: A, Klaxon; B, Oneita; C, Duplex; D, Hipwell; E, Typhoon, and Attachment for Bulb Horns.

three types, A and M for automobile service, and D for marine use. The operating button is clamped to the spoke of the steering wheel, and the principle of operation is that of a steel diaphragm being struck by an electro-magnetic mechanism. The sound thus produced is intensified by the bell of the horn.

Klaxon.

The product of the Lovell-McConnell Manufacturing Company, Newark, N. J., is almost too well known to need comment. Practically no change has been made in the Klaxon, but the Klaxonet is now offered as a combination instrument, which may be used as an electric device or as a bulb horn. For the first time the line is being offered in colors to match the cars on which the members are to be used.

Typhoon.

The Typhoon is produced by the Typhoon Signal Company, Chicago, and is a motor driven electric horn. The interior mechanism is new, and patent claims have been allowed, which the company holds is proof that it does not infringe upon any other device. In addition to the regulation Typhoon horn, the compartment containing the sound producing mechanism is furnished for attachment to the ordinary bulb horn if desired.

Hipwell.

An electrically operated horn, for which simplicity of internal mechanism is the prominent feature claimed, is the Hipwell Autophone, made by the Hipwell Manufacturing Company, Pittsburg, Penn. All working parts are sealed and water proof. Operation is by push button on the steering wheel.

Oneita.

The Mutual Auto Accessories Company of America, New York City, is placing in the market the Oneita electric horn, for which it is claimed that it has a tone 50 per cent. louder than usual. A large hammer vibrator is used, striking a 5.5-inch diaphragm, which, due to the peculiar construction of the casting, is held under considerable tension and causes the deep, clear tone. This casting is of solid brass, absolutely water and dust proof.

Duplex.

The Electric Auto Horn Company, Pittsburg, Penn., makes the Duplex, which operates from either the regular ignition or lighting battery, six-volt storage or six dry cells. The construction is held to be so simple as to present nothing to get out of order. With each horn is furnished a special steering wheel push button and three-way cable for connecting.

Jericho and Jubilee.

The Randall-Faichney Company, Boston, Mass., continues its Jericho exhaust horn with practically no change. This is installed in the rear of the muffler, either by clamping over the muffler stem by a double clamp coupling, or by screwing into the muffler by a threaded coupling. A simple pressure of a pedal gives a pleasing tone, clear and distinct, at any speed without racing the motor. This concern also makes the

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Jubilee, a chime horn, operated in the same manner as the Jericho.

Gabriel.

The Gabriel Horn Manufacturing Company, Cleveland, Ohio, has brought out a new form of its 10-tone Gabriel musical horn. Heretofore, this well known signalling device has been designed primarily for use on high powered cars, but the new instrument enables the owner of a 30-horsepower machine to utilize one of these as well. The line also includes musical signals of one or more notes, all operated by the exhaust.

Clymax.

The Nonpariel Horn Manufacturing Company, New York City, presents the Clymax, an electrically operated signalling device. Within the rear end portion is placed a small electric armature, which a flow of electricity causes to rotate and drive forward four striking points, which hit the metallic diaphragm at three spots, set 120 degrees apart around the circumference. The point is that the action is not a continuous hammering on one place, but with this distributed over a series of places.

Long Horn.

The G. Piel Company, New York City, produces the Long horn, operated by hand. Any volume of tone desired is said to be at the command of the operator, a sonorous and penetrating note being obtained instantly. The weight of the Long horn installed complete is about five pounds, which is cited as of special importance in selecting such equipment.

Exo.

The Troy Auto Specialty Company, Troy, N. Y., makes the Exo, which is a double-toned exhaust horn, attached at the rear of the muffler. When in use the exhaust gases pass through the two pipes, giving forth a clear, well defined note. A spring pulls it back out of the way, when not in use.

Waymaker.

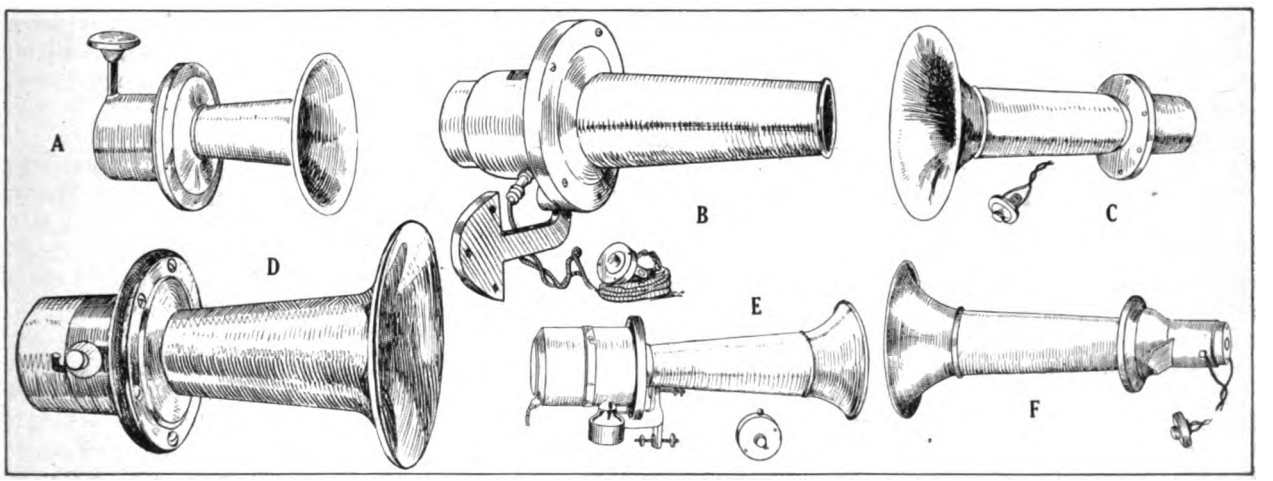
The Lee Tire & Rubber Company, Conshohocken, Penn., produces the Waymaker, a double-toned instrument operated by the exhaust. When brought into use by the depression of a pedal the exhaust gases are deflected by means of a centrally located valve, being thrown through a thick slot immediately across the ends of the chime tubes.

Nightingale.

The Nightingale whistle is made by the Riley-Klotz Manufacturing Company, Newark, N. J. This is an exhaust device, connected at the rear of the muffler, where it causes no back pressure and operates as well at low as at high speeds. The interior is designed so as to present a chromatic scale of bird-like notes.

Hough.

The Auto Improvements Company, Bristol, R. I., presents the Hough exhaust whistle, designed primarily for use on model T Ford cars. It is attached easily and quickly to the rear of the muffler by means of a tapered tube, which is split at one end and locked by a threaded bolt and nut. The other end fits over and partially closes the opening of the drum member.



Electric Horns: A, Long Horn; B, Newtone; C, Sonora; D, Monoplex; E, Tuto; F, Climax.

JACKS.

One of the tools which are indispensable around the garage is a jack. Several forms have been in the market for a number of years and still continue to offer as good service as when they were originally brought out. A few new designs have been produced.

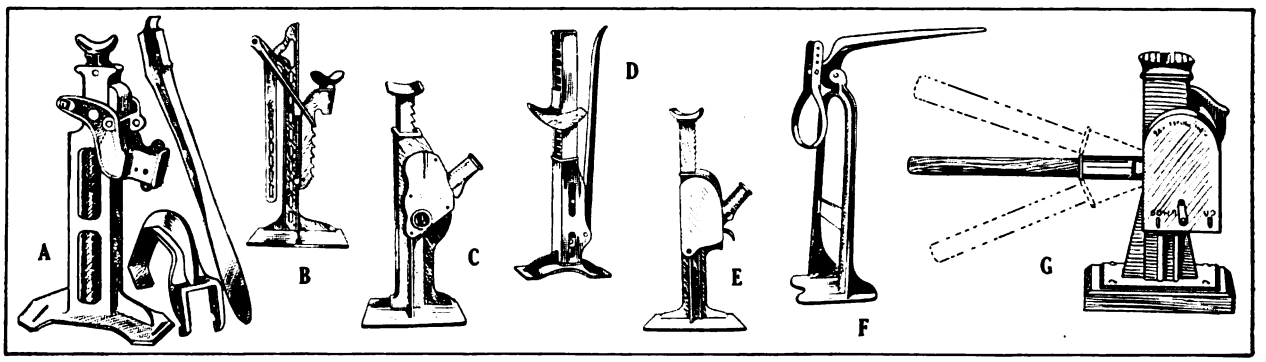
Hartford.

The Hartford Auto-Jack is produced by the Hartford Suspension Company, Jersey City, N. J. It is claimed for it that a pressure of 15 pounds on the handle will lift 1000 pounds on its rack. Gears, cut from steel and hardened, ingeniously arranged, wonderfully multiply the little power applied to the long lever with its short stroke.

Raiswell.

The Raiswell, made by the Lovell-McConnell

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Jacks: A, Peerless; B, Reliable; C, Miller; D, Oliver; E, Buckeye; F, Moore; G, Hartford.

Manufacturing Company, Newark, N. J., has its entire mechanism enclosed in a neat housing, this being a series of gears. The only exposed portion is the thumb wheel on which fits the brace bit designed for turning these gears and lifting the load.

Barrett.

Barrett jacks, made by the Duff Manufacturing Company, Pittsburg, Penn., may be regarded as standard for motor car use. They come in four sizes, designed for light and heavy cars, trucks and general garage work. The construction is simple and compact, and the various models are as light as consistent with the work for which they are intended.

Oliver and Peerless.

The Oliver, made by the Oliver Manufacturing Company, Chicago, has a straight lift of 1.5 inches and locks by passing the centre. The bracket slides up and down on a standard and is instantly adjusted to any height. The same concern makes the Peerless, which not only is smaller in size but may be utilized in removing the tire from the wheel, by placing the bracket between the spokes of the wheel and using the handle as a tire tool.

Miller.

The Miller, produced by Chas. E. Miller, 97-103 Reade street, New York City, is a quick acting, automatic lowering jack, designed especially for automobile use, and is adapted to the factory or garage, as well as being so arranged as to be carried as a part of the regular car equipment. The construction is of the best material and every part is machine finished.

Reliable and Ideal.

The Reliable is made by the Elite Manufacturing Company, Ashland, O. With the Ideal, produced by the same concern, this line is fitted with swivel tops to permit of their being set in the most convenient position for operation. They are strong, compact and small, occupying very little space in the tool box, and yet large enough to do their work well.

Moore.

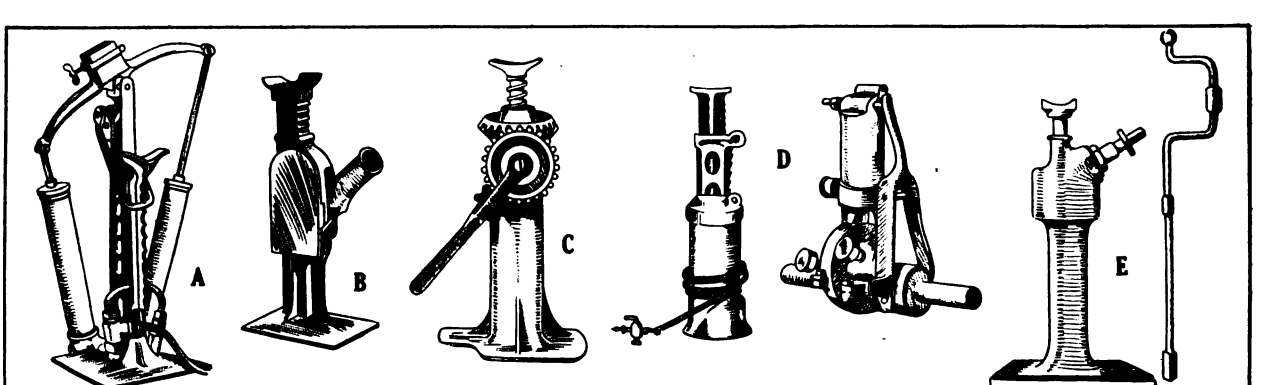
While J. C. Moore & Co., Racine, Wis., has brought out a full line of Moore lifting jacks, suitable for every class of automobile work, the new tire saving jack of this name is of particular interest. The loop is placed over the hub, and the handle pushed down until the car is lifted to the desired height.

Buckeye.

The Buckeye Jack Manufacturing Company, Alliance, O., is making a full line of Buckeye automatic jacks, which are intended for the use of owners who desire a safe, reliable tool, designed with the idea of not being able to drop with the load. The material is drop steel forgings, and the workmanship and finish is of the best.

Ten Eyck.

Designed for use in connection with the Ten Eyck tire pump, the lifting jack of the same name, made by the Auburn Auto Pump Company, Boston, Mass.,



Jacks: A, Warner Service and Pump; B, Barrett; C, Ideal; D, Ten Eyck and Pump; E, Raiswell.

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On the other hand the buyer more than ever respects the dealer's judgment and knowledge of values.

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"The Aristocrat of Speed Indicators"

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is regulated so that when it reaches a certain height, the control valve of the pump is closed and the air from the pump escapes through a vent which is auto-



Lubricants: Havoline and Colonial.

matically opened. The operation of the pump is automatic, the driving clutch being engaged by a small piston which is forced up by the back pressure from the tire, the instant the tube is attached to the valve. Of course, it is operated by the motor.

Warner-Service.

Another combination jack and pump is the Warner-Service Jackpump, made by the Warner-Service Manufacturing Company, Jersey City, N. J. It is claimed that this device will lift the car three inches off the ground with one stroke of the lever. Connected with the jack are two high pressure compound pumps capable of delivering 60 cubic inches a stroke at a pressure of a 150 pounds. These cylinders are made of special heavy gauge seamless brass tubing, and the jack, yokes and levers are of the toughest malleable iron.

LUBRICANTS.

Of prime importance in the proper functioning of the motor and other mechanical parts of the automobile is the matter of lubrication. Most manufacturers of oils and greases produce special preparations for the work they are intended to perform. This is a situation that had been developed with the motor car industry, until it is possible now to secure a grade of oil or grease designed especially for practically every make of car.

Motorists cannot afford to experiment with lubricants of unknown or doubtful quality. The manufacturer of any product adopts a trade mark, or distinguishing feature, for the protection of the public. By continually making this feature prominent the user soon becomes familiar with the product and is intuitively warned against accepting substitutes under the plea that they are just as good.

Manufacturers of motor oils and greases have adopted distinguishing names and special cans whereby it is an easy matter for the motorist to recognize the article which he has found to be best suited to his needs. These names and cans, therefore, become the proper protection of the public, and their continued use insures to the purchaser that he will be able to rely upon the product which they represent.

Too much stress cannot be placed upon the admonition to see that the goods are delivered in the original package. Many makes are extensively exploited, and these have come to be recognized as standard productions. Herewith are presented a number of the better known oils and greases, the illustration of the cans being with the idea of causing them to be even more familiar. A brief description of the various products will suffice to indicate their particular features. The list is by no means complete, but includes those most extensively exploited.

Colonial.

The Colonial brand, made by Borne, Scrymser & Co., New York, Philadelphia, Boston and Fall River, includes Colonial motor oil, Colo grease, Colonial timing gear oil and Silex grease. The concern has been producing lubricants for 30 years and has an enviable reputation for the high standard maintained by its products. Colonial oil is made in varying consistencies for the differing designs of motors, while Colo grease is particularly adapted for use in the transmission gears, being made especially for gear lubrication. Colonial timing gear oil also has a special purpose as indicated by its name. Silex grease is a product designed to lubricate and last, and at the same time to reduce noise in an appreciable degree.

Dixon's Graphite.

The line of graphite products made by the Joseph Dixon Crucible Company, Jersey City, N. J., is most complete. Inasmuch as the object of lubrication is that of providing a film sufficiently viscous to prevent

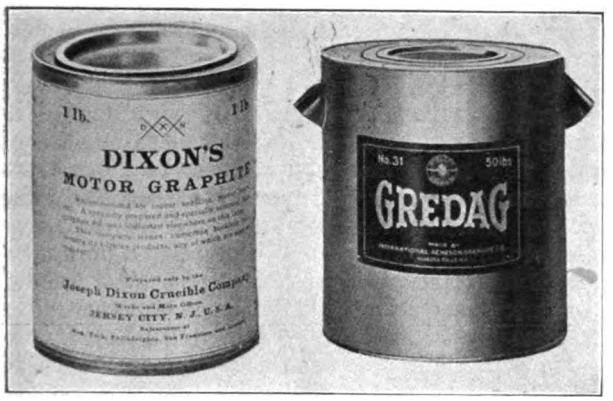


Lubricants: Panhard and Pan-American.

the metal surfaces from coming in contact, it is held that flake graphite will attach itself directly to the metal, filling all the microscopic depressions and

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forming a smooth, tough, durable coating. For transmissions, flake graphite grease is recommended, and in this a proper amount of finely ground fibre is thor-



Lubricants: Dixon's Graphite and Gredag.

oughly mixed. Graphite cup greases are made in six degrees of hardness, varying from the consistency of vaseline to that of tallow.

Eagleine No-Karbon.

Eagleine No-Karbon oil is made by the Eagle Oil & Supply Company, Boston, Mass. It is held to possess the proper viscosity and to be pliable under all conditions of heat and cold, working well in the heat of the cylinder and feeding perfectly from an oil receptacle exposed to severe cold. Special attention has been paid to the matter of carbonization, and the addition of No-Karbon in the name of the product appears to be warranted by the success which has attended its use under most severe conditions. The line includes oils and greases for varying purposes, and Solarine polishes.

Harris.

Harris oils, the product of the A. W. Harris Oil Company, Providence, R. I., are made in various degrees of consistency, each for the special purpose for which it is intended. The highest grade of Pennsylvania crude is utilized as a basis and the process of filtration is carefully watched and inspected. The ingredients which tend to form soot deposits are eliminated by a special process, and the result is such that the maker claims it is impossible to secure a higher degree of quality in this respect. Harris trans-compound is prepared for use with transmission gears and the same extreme care is taken in its production. A heavier bodied lubricant is provided in the gear and transmission oil made by this concern, which also specializes in a superheated steam cylinder oil for steam vehicles.

Havoline.

The Havoline Oil Company, New York City, absolutely controls its own oil fields, thus being supplied with a uniform quality of crude, which forms the basis for the well known Havoline oils. In its four refineries it maintains laboratories in charge of expert chemists who are constantly at work maintaining the standard set by this product. After the laboratory investigation and tests, which include a thoroughly scientific system of filtration for the removal of carbon producing elements, the oils are tested in engines on the block and on the road. Among the recent additions to the line is a special oil of heavier body and higher viscosity for motor truck use.

Invader.

Chas. F. Kellom & Co., Philadelphia, has been producing Invader oils and greases for automobile work since the very inception of the industry, and of course, was interested in the manufacture of lubricants for many years previous to that time. About a year ago, it brought out the Invader gear oil, a special preparation for use in timing gears. This is a semi-fluid compound designed especially for the work it is to perform, and so successful has it been from the first that it has been adopted by numerous manufacturers for exclusive use in their machines. About the same time, a special motor truck oil was brought out as well.

Kincaid.

William T. Kincaid of the Kincaid Oil Company, Providence, R. I., is well known as a racing driver, although his attention has been turned toward the production and sale of lubricants in more recent years. His connection with the racing end of the industry placed him in close touch with the needs of automobile engines with respect to lubrication and this knowledge has been of material aid in the production of Kincaid oils. It does not follow, that Kincaid oils are designed especially for racing machines. The same qualities are needed for every day driving as in winning contests. These qualities, Mr. Kincaid has studied with the mind of an expert, and Kincaid oils are the result of this scientific and practical experience.

Lubroleine.

Lubroleine oils are made by the Fiske Bros. Re-



Lubricants: Harris and Vacuum Mobiloil.

fining Company, New York City, in three grades—heavy, medium and light. They are refined and made from the highest grade Pennsylvania crude, and are

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designed to meet the most exacting requirements of automobile, motorcycle, aeroplane and motor boat lubrication. The line also includes Lubroleine gear-



Lubricants: Lubroleine and Polarine.

case compound, a highly viscous grease of proper proportions; Phoenixo gearcase lubricant, in fluid, semi-fluid and heavy densities; and Slimax-Synovia, a solidified oil or cup grease. Special features claimed for all these products include their purity and uniformity, as well as their adaptability under any working and atmospheric condition.

Mobiloil.

The Vacuum Oil Company, Rochester, N. Y., produces the Mobiloil line. Of the Mobiloils it may be stated that grade E is a light colored oil for cylinder lubrication. A is of medium body and is intended to hold its body under extreme heat. It may be used in electric vehicle lubrication as well as in gasoline engines. C is a heavy dark oil for transmissions and differential gears, especially for ball or roller bearing types. D is a heavy oil for steam cars. Arctic is a light colored oil which flows freely in the coldest weather. Vacuum transmission greases, made by the same concern, are in three densities. Vacuum Mobilubricant is a newer product, especially adapted for use in compression cups and for packing steering gears. All are of the best quality and have enjoyed a world-wide reputation for efficiency under all conditions of service.

Monogram.

The New York Lubricating Company, now consolidated with the Columbia Lubricants Company of New York, has changed the style of its cans materially, the principal object being to insure that the purchaser shall receive Monogram oil just as it leaves the refinery. The cans are filled at the plant, and the sealed pouring spout is attached afterward. Monogram oil, therefore, comes to the user thoroughly sealed, and he must break the seal before it is possible to utilize the contents of the can. The maker has studied carefully the requirements of various cars and the lubricants are made in four grades, light, medium, heavy and V, for different makes of machines. Special attention is paid to the matter of eliminating all carbon producing impurities, and the success which has attended the use of Monogram oils in contest and road work is well known.

Motorol.

Motorol is made by the New York & New Jersey Lubricant Company, New York City, in varying densities to meet the requirements of a large number of cars. This is a cylinder oil designed to possess the most lubricating body with the least carbon. The same concern manufactures Non-Fluid oil for bearings, transmissions and differentials, this being a pure mineral oil lubricant which is claimed to possess decided advantages over greases and compounds. This latter oil is marketed in a patented can, styled Kejex, with a long grease gun spout and a key in the bottom to force the lubricant through this into the various grease cups, etc.

Oildag.

The International Acheson Graphite Company, Niagara Falls, N. Y., is producing a line of graphite products in which the term Dag is used. The word "Dag" is made up of the initial letters of "Deflocculated Acheson Graphite." Therefore, Oildag is deflocculated Acheson graphite in oil, while Gredag is the same substance in grease. Mineral oil is utilized in Oildag, and it is claimed that this mixture will not deteriorate under any change in conditions of use. Gredag is made in four grades, semi-fluid, soft, medium and hard.

Pan-American.

Miller's Pan-American oils are made by Chas. E. Miller, 97-103 Reade street, New York City. They are refined from the highest grade Pennsylvania crude; are pure, distilled, highly filtered mineral oils, possessing a high fire test, low cold test, and are claimed to be unaffected by climatic changes. Three grades



Lubricants: Kincaid and Invader.

are provided for varying requirements. Under the same name is produced Miller's Pan-American transmission gear lubricant, also with low cold test and

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LUBRICANTS

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OILS

You get greater mileage out of HARRIS OILS because they are ALL lubrication—there is no waste. This is an established fact—not an advertising claim. No other lubricants are made with the same conscientious care.

We take pride in our product. We don't try to make as much as we can, but the best. That principle of manufacture has placed HARRIS OILS in the front rank.

We buy the finest grade of Pennsylvania Crude—what is called "Premium" Crude. We pay a premium to get this particular stock and we won't use anything else.

That is why HARRIS OILS cost considerably more to manufacture than ordinary oil. That is why they are best—surely you realize the absolute necessity of giving your engine the highest grade of lubricant the market affords. Nothing else compares with HARRIS OILS.

There's over a quarter of a century of experience back of HARRIS OILS. This experience enables us to "know how"—the extra mileage, the real lubrication efficiency is the result and it's yours in every can of HARRIS OILS. Get a package to-day. You'll be more than pleased.



Made in three bodied consistencies.

LIGHT, MEDIUM, HEAVY. Sold in barrels, 1-2 barrels, 2-5 gals. in wood case, single 5 gal. can cased, and 1 gal. cans. Ask your dealer or garage man.

Ask for HARRIS OILS. If your dealer does not sell them, send 80 cents (for 1 gal. can) or $3.75 (for 5 gal. can) and we will send same prepaid.

A. W. HARRIS OIL CO.

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high melting points. This is made in three densities, light, medium and heavy, for transmission, sliding and planetary gears, respectively, the latter also being intended for cardan joints, ball and roller bearings, etc.

Texaco.

Another oil which is guaranteed not to congeal at any temperature down to zero is the Texaco, produced by the Texas Oil Company, New York City, which has large oil fields in many sections of the country. Special filtration methods are employed for the purpose of entirely eliminating the carbon depositing features, thereby insuring that it will burn up cleanly after performing its legitimate function. The various grades are of uniform quality throughout and each is prepared with a view to performing its work perfectly under all conditions of service.

Panhard.

Panhard oil, made by George A. Haws, New York City, is refined exclusively from Pennsylvania crude and is held to be absolutely uniform in quality at all times. Six grades are provided, light, medium, heavy, extra heavy, special motorcycle and marine motor. They have been in the market since the automobile industry was in its infancy, and have been tested thoroughly in all classes of work. Other members of the line are the following: Panhard heavy gear oil for transmissions and differentials; gear compound, of similar design but of stiffer consistency; anti-fluid transmission greases, in three grades; cup grease, graphite lubricant and cork graphite compound.

Polarine.

It is not surprising that the Standard Oil Company, New York City, should have entered into the matter of producing automobile oils. With its vast resources in the production of crude oil, and its experience in handling oils of all character, it possesses an experience which should be of service in solving the problem of proper motor car lubrication. Polarine oil embodies all the resources and experience of this concern. As its name implies, it has a low cold test, flowing freely at temperatures down to zero. Special processes of distillation, pressing and reducing enter into its manufacture. Other members of the line are Polarine transmission lubricants, Polarine fibre grease and Polarine cup grease.

Wolf's Head.

The Wolverine Lubricants Company, New York City, produces Wolf's Head oils, these comprising a full line of cylinder and other lubricants, each prepared with special care and for a particular purpose. The basis is the best crude, and the process of refining is in charge of experts who have made a study of automobile lubrication since the very inception of the industry. The result is a cylinder oil in which the carbon producing feature has been eliminated and which will burn up cleanly under exacting conditions. Before being placed upon the market, the product is subjected to severe tests to determine that it measures fully up to the standard set by the concern.

Valvoline.

The Valvoline Oil Company, Boston, Mass., owns and operates three large refineries, in which Valvoline oils are produced from the best Pennsylvania crude. This crude is piped directly to the refineries through the company's own pipe lines, and it is claimed that the Valvoline Oil Company thus controls the product from the oil well to the consumer. The refining process is designed to eliminate the possibility of carbon deposits, and the product is not adulterated in any manner whatsoever. The cylinder oil is made in four grades, white, light, medium and heavy. In addition the line includes a solidified mineral oil for gears and differentials and a mineral grease for bearings.



Lubricants: Valvoline, Texaco, Motorol and Monogram.

SPARK PLUGS.

The spark plug industry has been increased the past year by advent of a number of enterprises that produce plugs as a whole or a part of their manufactures, some of them on extensive scales, but there

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has been comparatively little brought out that is really new. There have been no radical changes in principle, and aside from construction or methods of manufacture the variance is trifling. There is no question, however, that there has been endeavor made to secure more enduring and more reliable plugs, and this has led to improved workmanship and more careful production with a view of eliminating conditions that make for failure under the extreme heat and the continuous vibration. Of course the main proposition with all manufacturers has been to develop plugs in which a spark of sufficient proportions will be produced under the widest change of operation, and to obtain such results attention has been directed toward more accurate machine work and especial care in assembly and test of the finished product.

The introduction of highest class machinery has been a reason for material improvement, and the utilization of special gaskets to insure against leakage and loss of compression, the adoption of forms to eliminate or minimize twisting and breaking stresses, the better insulation of the electrodes and the protection of the mica and porcelain cores, the shaping of and placing the electrodes to make certain the creation of a sufficient spark, and the installation of means for visual observation of the spark, are among some of the features of the latest plugs. It will be understood that the use of special machinery means interchangeability of the parts, which makes for decided economy when a motor is in operation for a season in a vehicle. Though there are those who specialize the cheaper forms of spark plugs there are others who are producing the highest classes and the prices range over quite as wide a scale as in previous years.

Bull's Eye.

One of the most interesting of the new plugs is the Bull's Eye, made by the G. C. Blickensderfer Company, Stamford, Conn. This plug has a heavy brass shell with the upper end forming a hexagon seat for the wrench. Three sides of the hexagon are drilled and into these threaded holes are seated heavy quartz lenses. The core is in two sections with the electrode divided to form a spark gap. The lower part of the core is contained in the shell and the upper section in the bushing. The bushing is seated into the shell bringing the electrode ends into correct relation. At the base of the core the electrode projects below the base of the shell and the shell electrode is extended toward the centre, forming the second spark gap of the plug. The core is of porcelain and it is capped with metal, above which is the terminal. As the spark is made it appears in the chamber of the spark plug as it ought to appear in the cylinder. It is claimed that by the use of this plug it is possible to detect a defective circuit, faulty carburetion or leaky valves, and to maintain a condition insuring satisfactory combustion, as well as protecting the engine against carbonization.

Visible.

Somewhat similar to this is the Visible spark plug, made by the Visible Spark Plug Company, Detroit, Mich., which has a porcelain core through which is a transverse hole. This hole is open to the air and it exposes the core electrode which is divided with the parts so set that they require the current passing through the electrode to jump the air gap. Through the hole the size and color of the spark may be observed. Aside from this the construction of the plug is conventional, the core electrode projecting and the shell electrode extending toward and below the centre of the core. For this plug the maker claims that the condition of the electrodes, the quality of the ignition and the efficiency of the battery and the magneto may be learned by observation; the engine may be timed without trouble, and the firing spark is intensified with more instantaneous combustion and greater power.

Rex.

The Rex spark plug, made by the Rex Ignition



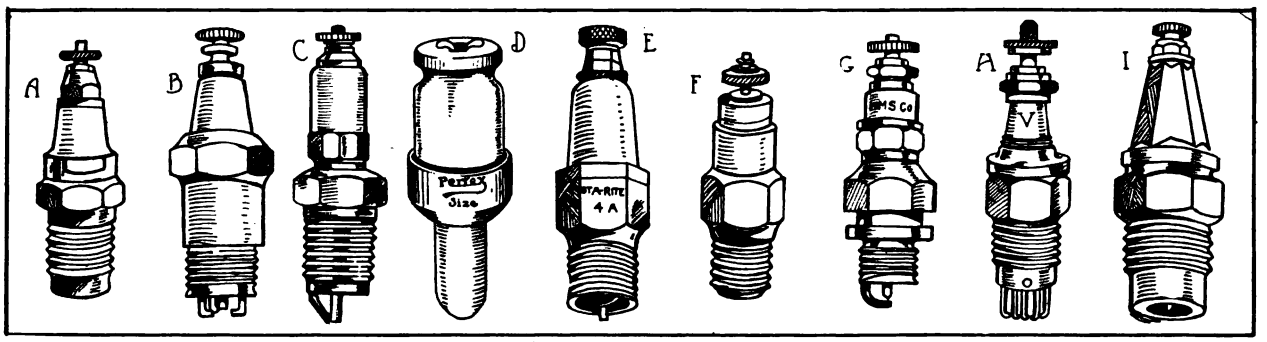
Lubricants: Eagleine No-Karbon and Wolf's Head.

Manufacturing Company, New York City, is another production for which particularly strong claims are made. It is the manner of construction that is maintained to give unusual results, in that the plug is guaranteed not to be short circuited through soot or from any other cause, and it is held that with the unusually hot spark produced the electrodes are constantly free and clear. The plug is exceedingly simple and it is made in all sizes for automobile, yacht and motorcycle engines. The porcelains are of finest material and guaranteed to withstand the heat. The electrodes are of specially imported wire which will not burn under intense heat.

All-in-One.

The All-in-One spark plug, made by the Frontier Specialty Company, Buffalo, N. Y., is of conventional design aside from the installation of a compression relief and priming cock at the top of the shell. These cocks are of differing shapes and lengths to permit in-

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Spark Plugs: A, Miller; B, Bosch; C, Mosler; D, Perfex Porcelain; E, Sta-Rite; F, Hers; G, H. M. S.; H, V-Ray; I, Splitdorf.

stallation of the plugs in motors of various types, whether conventional, horizontal or with recessed plugs. These are specially adapted for engines which are not equipped with compression release cocks, either for automobile or marine purposes. By priming the motor at the spark plugs it is claimed that starting is facilitated under any circumstances, while cleaning may be accomplished without difficulty by use of gasoline on the spark plugs, or kerosene may be utilized for freeing the cylinders of carbon.

H. M. S.

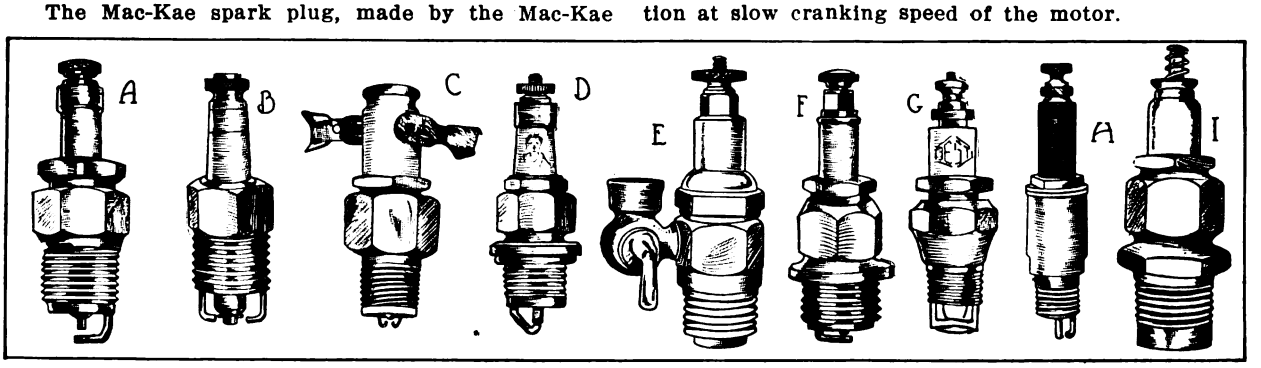
The H. M. S. spark plug is made by the Hartford Machine Screw Company, Hartford, Conn., under pending patents and was designed with experience obtained in the manufacture of more than thirty millions of plugs for others. The porcelain, for instance, is made from imported clay and it is of a form that is claimed to give heretofore unknown strength. The porcelain has but one gasket for making up the joint in the body, the design being such that the expansion and contraction of the core and the metal parts are practically in one direction, minimizing all possible strains. The plug is gas tight and has survived every test. The core and core electrode are assembled as one unit and can be removed from the shell by unscrewing the bushing. The core electrode extends below the shell and the shell electrode curves under it. The design is such that an unusually hot spark is created and it is claimed that if the electrodes are completely immersed in oil the plug will spark continuously and indefinitely and without miss.

Mac-Kae.

The Mac-Kae spark plug, made by the Mac-Kae Manufacturing Company, Boston, Mass., is claimed by the maker to give a very large and efficient spark and to afford superior ignition under all conditions. It is made with either porcelain or mica core. The porcelain cores are made with the core electrode of an alloy of platinum-iridium and nickel baked into the core, and as this electrode has the same coefficient of the porcelain, is not affected by the extremes of heat. The cap of the core is keyed on by a patent process, a solid unit being formed. By unscrewing the brass bushing of the plug the core may be removed as one piece. With the mica cores the centre electrode is wound laterally with sheet mica which is surrounded with mica washers, compressed and securely locked. Both porcelain and mica cores are interchangeable with any Mac-Kae plug. These plugs are sold with a guarantee against any defect of material or workmanship. They are made in all sizes.

Bosch.

The Bosch spark plug, made by the Bosch Magneto Company, New York City, is designed specially for high-tension magneto service. The plug consists of three parts, a steel shell, a one-piece insulator and the core electrode. The insulation is of steatite, which is not brittle and will not deteriorate through extreme heat, great pressure or free lubrication, the material and form eliminating all joints and insuring against leakage under a pressure of 750 pounds to the square inch. The shell electrodes are three in number and are crescent shaped, which form is claimed to have less electrical resistance and to produce a spark that is a sheet of flame, giving an efficient ignition at slow cranking speed of the motor.



Spark Plugs: A, Hot-Spark; B, Jewell; C, Edison; D, Red Head; E, All-in-One; F, Firefly; G, Best; H, Sootless; I, Black Eagle.

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V-Ray.

The V-Ray spark plug, made by the M. M. M. M. Company, Marshalltown, Ia., is assembled with a deep shell from which four long electrodes extend downward and turn sharply toward the centre, penetrating the combustion chamber of the motor to a much greater depth than the average plug. The points of these electrodes are tapering and they converge close to the end of the core electrode, which is made with a semi-circular groove in the end. The core electrode is increased in diameter before it enters the core and it is firmly assembled and retained by a nut at the top, on which is fitted the terminal nut, which is long and tapered. It is claimed that the plug will produce an unusually fat and powerful spark and that it will not soot or corrode, the peculiar form of the electrodes making them self-cleaning. The porcelain is said to be fracture proof and the plug is sold with a very broad guarantee.

Black Eagle.

The Black Eagle spark plug, made by the Progressive Manufacturing Company, Torrington, Conn., is a new product that is popular in price and has qualities that are claimed to be unusually efficient. The shell is of metal into which is seated a brass bushing carrying the porcelain core and electrode. The two shell electrodes are parallel and midway between them is the core electrode, and as the round surfaces of the electrodes are presented to the sparks as they are formed, this minimizes or prevents pitting and destruction of the sparking points. Between the solid cap of the core electrode and the binding nut of the core there is a sliding collar and it is normally kept in contact with the binding nut by a spring between the collar and terminal cap. Any wire winding or terminal placed between the collar and the binding nut is firmly held by the tension of the spring. This device is patented and is known as the Universal Spring Cap.

T-A-D.

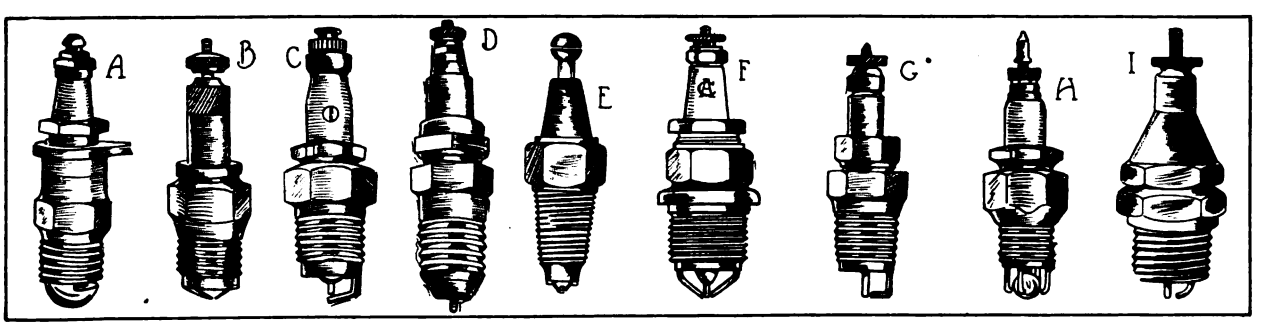
The feature of the T-A-D Flash Ball spark plug, made by the Toledo Auto Devices Company, Toledo, O., is the formation of the end of the core electrode, which is a ball. The shell electrodes are four in number and these extend downward into the combustion chamber and turn sharply at right angles, the ends of the electrodes being in proximity to the greatest diameter of the ball. As the current is distributed four sparks are made simultaneously in the cylinder. The area of the ball is such that the plug is self-cleaning as well as there being elimination of all possibility of pitting and destruction of the electrode points, as might be possible with a single air gap. The plug has a porcelain core and is otherwise conventional.

Splitdorf.

The well known Splitdorf plug, made by C. F. Splitdorf, New York, has been improved so far as the construction of the mica cores are concerned, this being by increased taper of the steel rod forming the core electrode. This rod is wound with selected sheet mica and the mica washers are forced on under heavy pressure, the construction being such as to insure against any possibility of leakage. The appearance of both mica and porcelain plugs has been improved by the addition of ornamental washers at the top and bottom of the external insulation.

Herz.

The imported Herz Bougie Mercedes spark plug, for which Herz & Co., New York City, is American sales agent, has been perfected by installing at the base of the shell in the place of the shell electrode a disc into which four holes are cut so as to remove the centre and leave four points which are equally spaced from the core electrode. When the current is made and broken four sparks are formed simultaneously and there is proportionately increased combustion in the cylinder. The insulation of the plug has been protected by a coating of blue enamel, which adds to its appearance.



Spark Plugs: A, Spitfire; B, National; C, Visible; D, Never-Miss; E, Anderson; F, AC; G, Benford; H, T-A-D; I, Kingston.

AC.

The Champion Ignition Company, Flint, Mich., has produced the AC Star spark plug in which the porcelain insulation is in three parts and the electrode is divided. The base carries the core electrode and there is a recess about the upper parts of the electrode into which a porcelain tube that surrounds the electrode is fitted. Above the tube is a spring that surrounds and contacts with the lower end of the electrode in the upper porcelain section. About the upper section is the bushing that seats into the shell. This construction is said to insure against breakage from vibration, heat or expansion. There are two shell elec-

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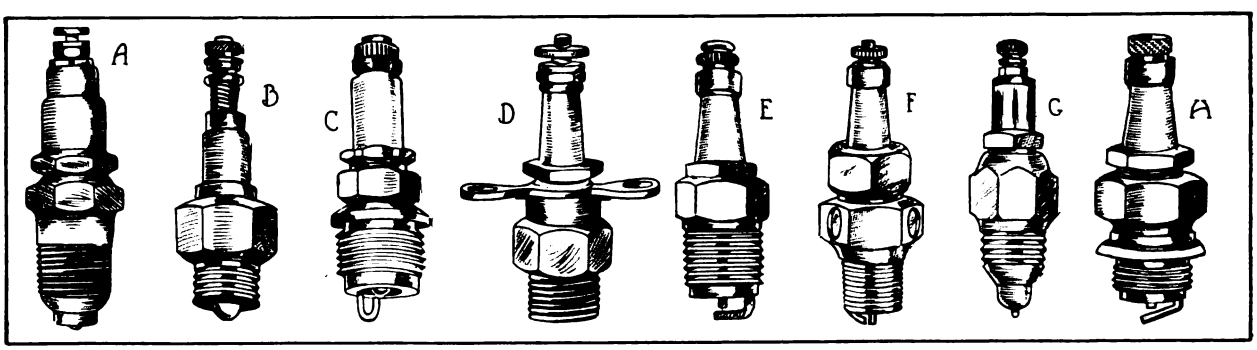
trodes and two sparks are made in the cylinder at the same time. The AC Waterproof plug is made with practically the same construction as the AC Star, but it has a peculiarly formed porcelain hood and combination terminal that is connected with the cable and clamped on to the plug in place of the upper porcelain. The other lines of this concern have not been changed.

Champion.

The line of the Champion Spark Plug Company, Toledo, O., which is said to be produced in the largest spark plug factory in the world, includes six models, five of them with porcelain cores and one with mica core. These are to meet differing needs with different types of motors—in fact the company claims to make a plug for absolutely every type of engine. These plugs are sold with a guarantee against breakage by heat.

Miller.

The Miller spark plugs, manufactured by Chas. E. Miller, 97-103 Reade street, New York City, include mica, porcelain and magneto types. The magneto plug is made with a shell, the circular base of which forms the electrode. From the porcelain core the electrode terminates in a disc with a serrated edge, and between the points of the disc and the shell a number of sparks are formed each time the current is made and broken. The Miller mica plug has been manufactured for seven years and the porcelain plug was produced to meet a demand for this type. It has a deep seat in the cylinder and a long centre electrode, insuring rapid and complete combustion in the engine cylinder.



Spark Plugs: A, Mezger; B, Ballite; C, Reliance; D, E-Z; E, Mac-Kae; F, Bull's Eye; G, Sharp; H, Rex.

Flash Light.

The Flash Light spark plugs, made by Janney, Steinmetz & Co., Philadelphia, Penn., have been continued without material change in design and are produced with the same care and with the superior facilities and material that has established them as a standard product in the market.

Standard and Reliance.

The Jeffery-Dewitt Company, Detroit, Mich., has increased its product by the addition of the Standard, a popular priced spark plug which has many of the qualities and features of the Reliance line, which is finished a dull black. With the Reliance plugs a feature is that the core electrode is a fine platinum wire baked into the porcelain and finished flush with the lower end, this being amply protected, while the intense heat generated by the spark has a cleaning influence. This company also produces the Edison Double Spark plug, which has not been changed in design.

Sta-Rite.

The production of the R. E. Hardy Company, Chicago, Ill., which includes the Sta-Rite, Venus, Vulcan and Gotham spark plugs, have been practically unchanged, these products being sold under a broad guarantee of satisfaction. The Hardy line has been developed and manufactured on nine years' experience.

Best.

The Best plug, made by the Best Ignition Equipment Company, New York City, is designed with a bushing that affords direct pressure on the porcelain core without a twisting stress, and the core electrode is a circular disc centred in the base of shell, the spark forming at varying points the entire circumference of the disc.

Delta.

Practically no change has been made in the models made by the Delta Manufacturing Company, Bloomfield, N. J., these being continued because of the extreme satisfaction obtained through long and continued use.

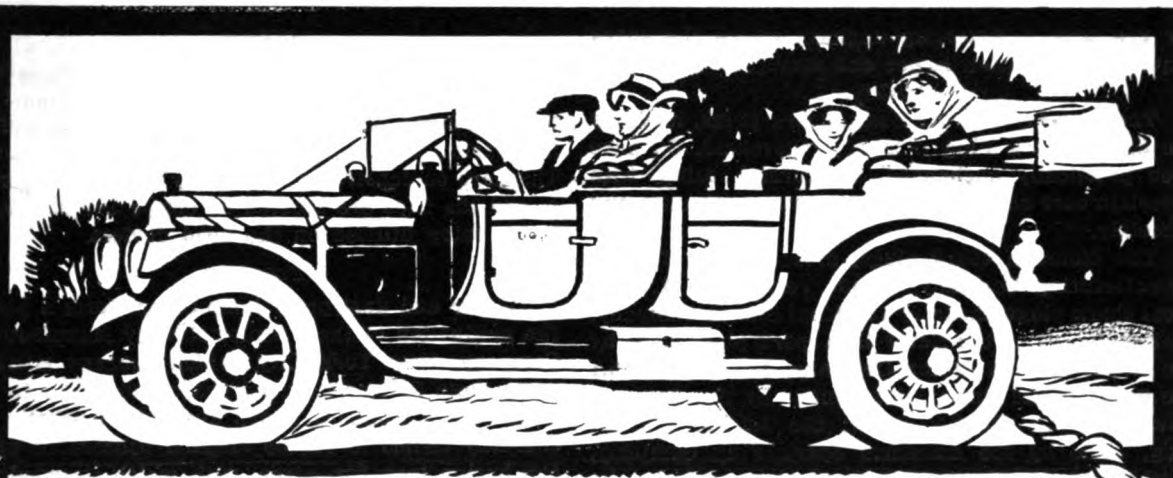
Spitfire.

The buyers of Mosler Spitfire and Breechblock plugs are now offered the option of purchasing porcelain cores in which the electrodes are tipped with platinum, as a further resistant to deterioration. Other than this the plugs are made to the original designs by A. R. Mosler & Co., New York City.

Hot-Spark.

The Hot-Spark spark plug, made by the Hot-Spark Plug Company, Detroit, Mich., is composed of five pieces, the shell, bushing, gasket, porcelain core and electrode and the terminal nut. These are solidly constructed and the bushings are case hardened to resist contact with wrenches. They are especially designed

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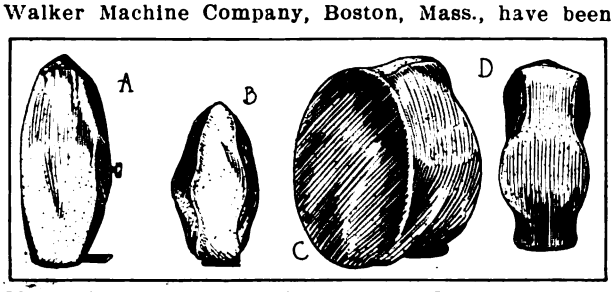
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for use with self-starting engines, where the spark required for ignition is hot and strong.

Fire-Fly.

The Fire-Fly and the Sharp spark plugs, made by the Sharp Spark Plug Company, Cleveland, O., have been practically unchanged, the former being with porcelain core only, and the latter with both mica and porcelain.

The Monarch spark plugs, made by the Benford Manufacturing Company, Mount Vernon, N. Y.; the Ideal spark plugs, made by the Ideal Switch Company, Plainville, Conn.; the Never-Miss spark plug, made by the Lockwood-Ash Motor Company, Lansing, Mich.; the Sootless and Comet plugs, made by the Oakes & Dow Company, Boston, Mass.; the Anderson spark plug, made by the Anderson Spark Plug Company, Washington, D. C.; the E-Z spark plug, made by the Autoparts Manufacturing Company, Jersey City, N. J.; the Kingston spark plug, made by the Kokomo Electric Company, Kokomo, Ind.; the Mezger spark plug, made by C. A. Mezger, Inc., New York, N. Y.; the Jewell, made by the Pittsfield Spark Coil Company, Dalton, Mass.; the Ballite, made by the G. A. Walker Machine Company, Boston, Mass., have been



Hopewell Lamp Covers: A, Square Side; B, Tail; C, Searchlight; D, Round Side.

continued practically without change. These are all standard plugs, are well known in the market and are e: ısively used.

LAMP COVERS.

The benefits accruing from fitting covers to the lamps of the motor car are numerous, and there is a growing tendency to protect the lights from moisture and the inclemency of the weather. Where gas and oil members are employed particles of dust find their way into the burners, etc., impairing service. In traversing muddy roads the covers not only prevent the accumulation of dirt but preserve the brightness of the metal.

Hopewell.

The design of the lamp covers manufactured by Hopewell Bros., Newton, Mass., is such a perfect fit is assured, and these members are made to conform to the shape of any standard lamp. They are made for head, side and tail lights, and generators as well. The lamp covers are of rubber, fleece lined, although fabric leather in colors is produced. The devices are fastened easily by a patent clasp, are inexpensive, and are unaffected by heat, water, grease or dirt.

Gilbert.

The Gilbert Manufacturing Company, New Haven, Conn., makes a specialty of covers for side, head and tail lights for automobiles. These are manufactured in a variety of designs to meet different requirements. They are so constructed that they fit the lamp snugly and the flaps are secured by clasps and straps, the latter being utilized on the head devices.

Premier.

Water and dust proof lamp covers form a part of the production of the Premier Novelty Manufacturing Company, New York City, which concern manufactures these devices in many shapes and sizes to conform to the standard lamps upon the market. The company claims to be the original concern to utilize the button lock flap cover, with which its goods are equipped.

Cowles.

C. Cowles & Co., New Haven., Conn., produce a large variety of lamp covers, these being made in standard forms to fit oil, gas and electric lamps. The covers are water proof, with seams sewed and cemented, and the material comprises a lustre or a dull finish. The concern makes a specialty of covers for limousine lamps, these being of the seamless head type.

BUTLER MAGNETO TESTER.

A device for locating ignition troubles, known as the Butler magneto and electrical apparatus, has been brought out by the Butler Manufacturing Company, Carthage, Ind. It is a small, compact device mounted on a cast aluminum bedplate, at one end of which is located a supporting table, provided with adjustable means to accommodate all types of magnetos, and for making rigid attachment of the instrument to be tested. The spindle of the device is equipped with a universal chuck which permits of coupling to any shaft or flange. This spindle is revolved by a small hand crank, affixed to the flywheel. A protractor, graduated to 360 degrees, is mounted on the headstock of the spindle, and this is provided with means which enable it to show distinctly the exact point at which the ignition spark occurs in each cylinder. The device may be operated by power or hand crank, the stock model being designed for the latter method.

GEORGIA CLUB'S OFFICERS.

The recently organized Automobile Club of Georgia at Atlanta, Ga., has selected the following officers: President, George W. Hanson; vice president, Edward M. Durant; treasurer, J. D. Rhodes; secretary, Howard Gilbert; governors, Walter P. Andrews, Inman Gray, W. G. Humphrey, Charles I. Ryan, R. R. Arnold, John J. Woodside, Jr., Charles H. Black and J. T. Tucker.

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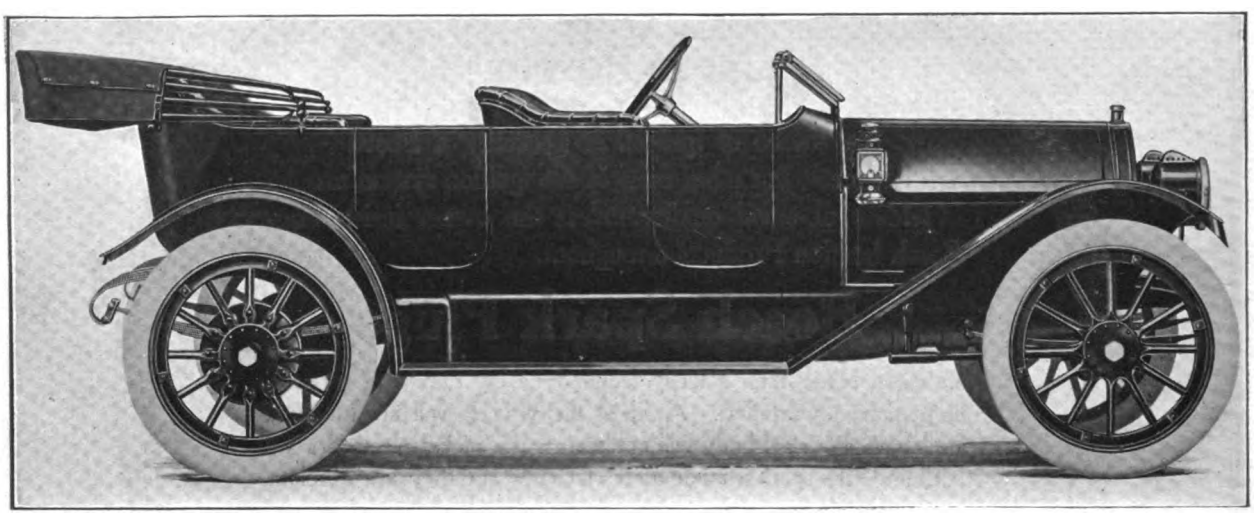
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FOUR MODELS OF 1912 IMPERIAL CARS.

THE Imperial Automobile Company, Jackson, Mich., is building this season two types of chassis, that for model 44 being the larger, while the other, for models 34, 33 and 32 differs principally in minor proportions. Of these models 44, 34 and 33 are fitted with five-passenger touring bodies and model 32 with a roadster body. Model 44 chassis has a floating rear axle, and the other models have semi-floating rear axles. Other than this there is practically but one design.

The main feature with Imperial cars is the power plant, which has motor clutch and transmission gearset in a unit assembly, and is installed on three point suspension. The three elements are carried in the chassis protected from every influence that might cause wear, loss of power or failure, and it is maintained that the design insures the greatest efficiency and economy, and unusual endurance under severe and continued service. The unit power plant construction has been adopted by a considerable number of the leading makers of cars and this is evidence of the approval given by those who have had abundant experience with differing types.



The Imperial Model "44" Five-Passenger Touring Car.

For the purpose of description the power plant of model 44 chassis is sufficient, it differing with the others merely in proportions. With this the cylinders are four in number with bore of 4.5 inches and stroke of 5.25, the stroke being 1.167 in excess of the bore. The cylinders are of the L type with the valves at the left side. They are cast in pairs with the water jackets integral and with space below the valve pockets so recessed that the valve stems, springs, tappet rods and guides may be completely enclosed. The water jackets are liberal in size and the cylinder units are with the valve pockets so designed that they are covered with a plate carrying the spark plugs and the compression relief cocks. These plates are retained by seven studs each and by removing them the valve pockets and valves are exposed, so that the valves may be ground or the compression chambers and the pistons cleaned of carbon.

The valves and ports are 2.25 inches in diameter, a size permitted by the cylinder design, affording full charges of fuel and complete scavenging of the cylinders. The water jacket inlets are at the right side, centred at the base of the jacketing, and the outlets are centred in the heads of the units. The pistons are 5.375 inches in length and are of the same metal as the cylinders, a soft gray iron, weighing 4.75 pounds each. The cylinders are carefully bored and ground to size. The pistons are turned and ground accurately. The pistons carry four rings each, .37 inch width, split at a bevel and ground on the edges.

Engine Case in Three Sections.

The engine case is of aluminum and in three sections, there being upper and lower halves and the cover for the timing gear. The rear ends of the main sections extend and house the flywheel, to this extension being bolted the circular section containing the clutch and the transmission gearset. In the flywheel and the clutch housings are large handholes, and a plate covers the gearset, these mechanisms being readily accessible. At either side of the flywheel casing is a heavy arm that supports the rear of the assembly in the chassis frame, the forward end being carried on a chassis cross member.

The crankshaft is drop forged from high quality steel, specially ground and heat treated. It is carried on three die-cast main bearings of Parson's white bronze having a total length of 11.5625 inches, the forward and rear journals being three and five inches length respectively. The crankpin bearings are 2.75 inches in length. The single camshaft of crucible steel is one inch in diameter and it has bearings as

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liberal as the crankshaft. The connecting rods are drop forged and the piston wristpins are fixed in the small ends, oscillating in bosses on the piston walls, having about 20 per cent. more bearing surface than were the wristpins fixed in the pistons. Oil pockets on the small ends of the connecting rods supply the lubrication direct to the wristpin bearings.

Turning Gears Are Adjustable.

A web across the forward end of the engine case sections carries the forward main and camshaft bearings and the bearings for the timing gears. The gears are one inch face and are cut spiral so they may run noiselessly and without material wear. There is an eccentric adjustment for the idler gear by which timing gears may be adjusted, this being an extremely desirable quality and a distinct advance in motor design. The magneto is installed at the right side of the motor and is driven by a shaft having a bearing four inches long, and the connection with the magneto driving shaft is made with an Oldham coupling, the coupling being enclosed.

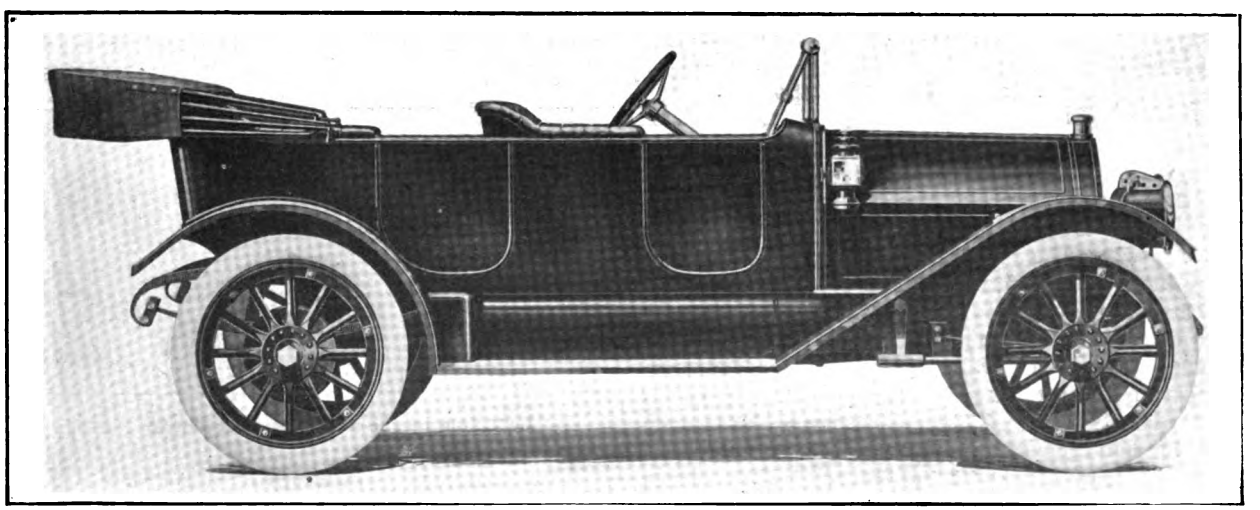
pacity is six quarts. A gauge gives external indication of the quantity of oil in the engine.

Bearings Retained by Through Bolts.

All the bearings of the motor are die-cast Parson's white bronze. Every main bearing and the connecting rod bearings are retained by through bolts instead of studs, this insuring against a journal loosening under strain.

The carburetion of the fuel is by a standard carburetor of the automatic float feed type, with hot air intake. The ignition is by low-tension magneto and coil, having a high-tension system, with a battery of dry cells for starting or for a reserve.

The clutch is of multiple disc type and is composed of a series of 51 saw steel discs beveled to an angle of 20 degrees, with bearing surface .315 inch in width and a mean radius of 6.27125 inches. Into the flywheel are cast lugs which support steel pins on which the disc assembly is mounted. The transmission is a selective type with nickel steel shafts and gears fitted with New Departure bearings, giving three for-



The Imperial Model "34" Five-Passenger Touring Car.

The cooling is by thermo-syphon system, there being large water manifolds and connections, using a large radiator and a fan mounted on the forward cylinder and driven by a belt from a pulley on the extension of the camshaft. By an eccentric in the fanshaft mount the belt may be adjusted for tension by loosening and tightening a single belt.

The lubrication is by splash, the base of the engine case being divided by webs that form reservoirs into which the big ends of the connecting rods sweep. The overflow from these reservoirs is carried to the sump at the rear of the case and the excess is drained to the base of the flywheel housing, where it is picked up by the flywheel and carried to a reservoir at the top of the housing, where it flows by gravity through a large channel and is distributed to the several chambers. All sediment in the oil is deposited in the sump and with the large channels there is positive flow of oil and no possibility of clogging. The oil ca-

ward speeds and reverse. At the centre of the transmission case is located the speed-changing lever, as well as the emergency brake lever, this affording centre control and removing the levers from any connection with the chassis frame.

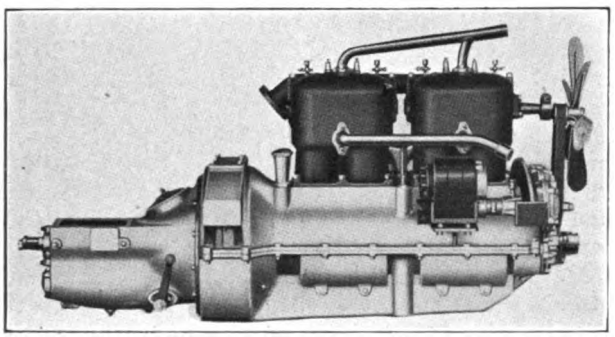
Power Plant Suspension.

At the forward end of the engine case, directly centred above the crankshaft main bearing and behind the timing gear case, is anchored the support for the forward suspension of the motor assembly, which is attached to a curved steel member that is firmly fixed at either side of the chassis frame. The power plant is not subjected to strains because of the stresses from the distortion of the side members of the frame.

Directly behind the extension of the transmission main shaft is a heavy frame cross member, to which is attached the yoke ends of the housing of the driving shaft. Within this yoke is the universal joint con-

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necting the transmission and the driving shafts, the shaft housing having a movement corresponding to the rise or fall of the body on the springs. This yoke

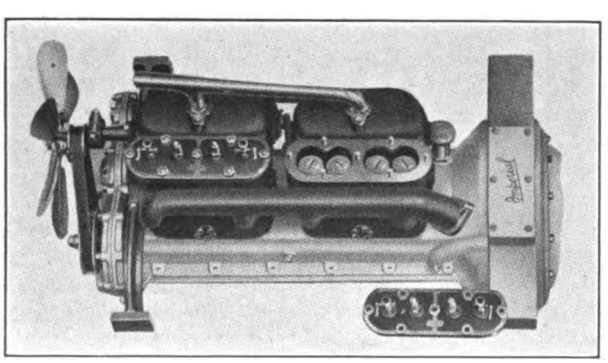


Right Side of the Imperial Unit Power Plant.

carries the forward bearing for the driving shaft. Directly behind this yoke is another smaller yoke to which is made fast the ends of the radius rods, which are carried to and fastened under the spring seats of the rear axle. The driving shaft housing is a heavy tube that is carried to and is bolted on to the rear axle differential housing.

Rear Axle and Frame Details.

The rear axle is the full floating type with a shell of steel. It has a differential of large proportions with extra large nickel steel gears. The pinion shaft is 1.37 inches diameter and the axle shafts are 1.625 inches diameter. The bevel gear is of unusual size and strength. The pinion shaft, axle shafts and the differential are mounted on large double New Departure ball bearings throughout. The brakes are operated on drums 14 inches in diameter on the rear wheels. The service brake is actuated by a pedal and the external contracting bands about the drums are lined with Raybestos. The emergency brake is operated by hand lever and is internal expanding, the shoes also being faced with Raybestos. The rear wheels



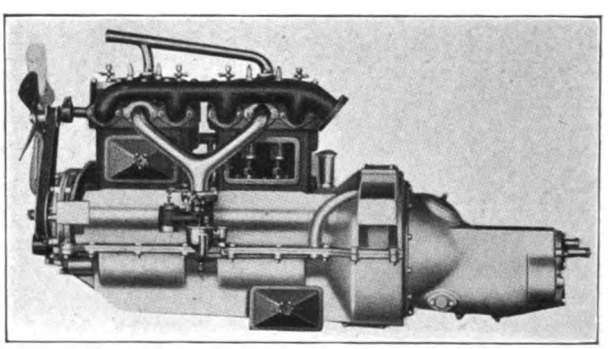
Top of Cylinders with Valve Pocket Cap Removed on Rear Unit, Showing Accessibility of Valves and Combustion Chamber.

are mounted on New Departure ball bearings.

The chassis frame is of pressed steel channel section, the edges of the channel being widened for that portion between the spring shackles to insure against sagging. The frame has heavy cross members and these are reinforced by gusset plates. The front axle is an I section steel drop forging with the spring seats integral and with very large steering knuckles. The wheels have ball and cone bearings. The tiebar is placed behind the axle to protect it against contact with road obstructions. The frame is mounted on semi-elliptic forward springs 37.5 inches in length and two inches in width, and on three-quarter elliptic rear springs 49.5 inches in length and two inches in width. The rear springs are mounted outside the frame, this giving increased steadiness in rough riding.

The control is by an 18-inch steering wheel with a right and left worm with double cam movement, there being no backlash or lost motion. The ignition advance and the throttle lever are mounted at the top of the steering column. The service brake and the accelerator are operated by the right foot with pedals, and the left pedal is the clutch.

The wheels are 36 inches in diameter, of the wood artillery type and have very large hub flanges, every spoke being bolted. These are fitted with demount-



Left Side of the Imperial Unit Power Plant.

able rims and with 34 by four-inch tires all around.

This brief description gives a general idea of the mechanical features of the chassis, which has a wheelbase of 120 inches. The capacity of the fuel tank is 15 gallons.

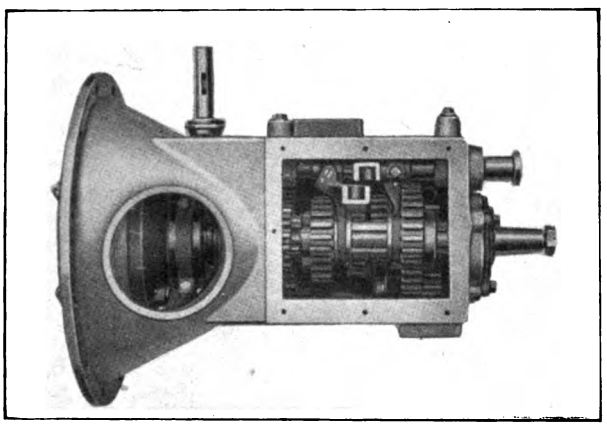
Details of Smaller Chassis.

With model 34 the motor has a cylinder bore of 4.3125 and stroke of 5.25, this giving a ratio of stroke to bore of 1.217, this being an increase as compared with model 44. Of course the power plant components are proportionate to the changed dimensions. The specifications stated for model 44 apply to this to the rear axle, which is of the semi-floating type and it is constructed with high duty Hyatt roller bearings throughout; to the wheelbase, which is 116 inches, and to the wheels, which are fitted with 34 by four-inch demountable rims and tires.

Model 33 and 32 motors have cylinder bore of 4.125 and stroke of 5.25 inches, this giving a ratio of stroke to bore of 1.272, this being the longest stroke of the Imperial engines. This necessitates a change of dimensions for components as compared with the other

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two power plants. Beyond this, however, the only other changes are 12-inch brake drums and 114-inch wheelbase and 34 by 3.5-inch demountable rims and



Top of the Clutch and Transmission Case, Showing the Large Inspection Holes.

tires. These models have 15-gallon gasoline tank, save model 33, which has 20 gallons capacity.

Upholstery and Body Finish.

With these chassis models 34 and 32 are five-passenger touring bodies, and model 33 is a two-passenger gentlemen's roadster. The upholstering for model 44 is somewhat higher in quality, and special Turkish back springs and Rough Rider cushion springs are used. With the model 44 body the entire finish is black with fine striping of ivory white. Model 34 is with Brewster green gear and body finish with the hood and fenders of black. Model 33 is with Brewster green gear and body finish with single line glazed carmine stripe and black hood and fenders. Model 32 is with French gray gear and blue body finish with single blue stripe.

All models except model 32, which is brass trimmed, are trimmed with nickel fittings. All are furnished with equipment, there being some difference according to the model and price, and all purchasers have the option of a self-starting device at a charge additional to the list price.

The Imperial machines are designed with regard to comfort. The suspension is such as to insure ease in riding and minimum wear of the mechanism, the upholstery is luxurious, the bodies are spacious and the seats are wide and amply cushioned, the workmanship and finish are of uniform excellence throughout, and construction is in every way mechanical and with sufficient margin for safety. The bodies are comparatively low, without sacrificing road clearance, and the centre of gravity is established to afford unusually good balance. The touring bodies are all with fore doors, and with the centre control either side of the vehicles may be next the curb without obstruction to the ingress or egress of the passengers. The roadster body is equally satisfactory as to comfort and abundance of space.

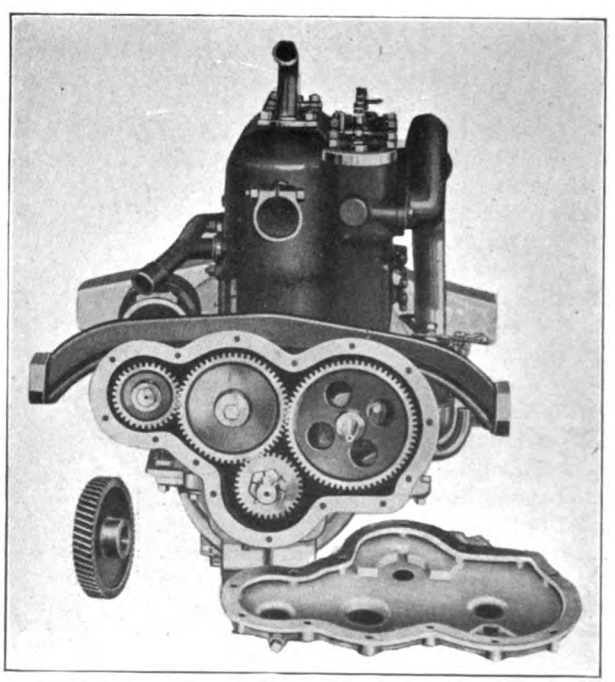
The body designs are such as to give conservative torpedo effect with models 44 and 33, and there is a striking scuttle dash for the roadster, which is fitted with exposed tank behind the seat and a large trunk on the after deck. The fenders are ample and of graceful design and there are body skirts that effectually protect the passengers from dust and mud.

Throughout all models there has been an attention to detail that will appeal to the experienced motorist. Every phase of use has been considered and the machines are suited for every purpose and every condition in which an automobile vehicle may be used.

FIRESTONE TIRE DATA.

The Firestone Tire & Rubber Company, Akron, O., is issuing a booklet entitled "Minor Repairs and the Care of Tires," which contains information of more than ordinary interest to users of tires. The most effective methods of repairing shoes and inner tubes are outlined and a number of suggestions made on the care and preservation of these members. The booklet will be sent free upon application.

The company is also mailing a brochure calling attention to the important features of the Firestone quick detachable demountable rim. The publication calls particular attention to the fact hat the base of the rim is unbroken, either across the rim or around



Timing Gearcase Removed, Showing the Spiral Gears and the Eccentric Adjustment.

it, also that the inner tubes may be changed with the rim on or off. The mechanical features and others are illustrated clearly.

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IDEAL OIL AND FUEL EQUIPMENT.

In storing and handling gasoline, unless the equipment be designed especially for that purpose, the loss

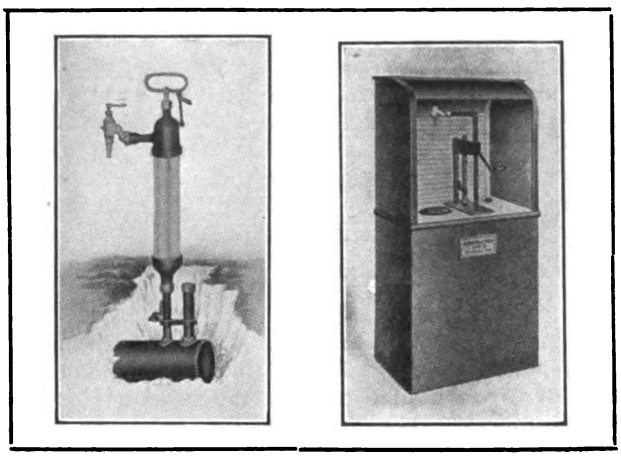


Fig. 1—Ideal Tanks and Pumps: At Left, Equipment Designed for Yard or Driveway; at Right, Roll Top Cabinet with Self-Measuring Pump.

by evaporation will be considerable. When the fluid is stored in ordinary cans this depreciation is very marked and more or less danger of explosion or fire is experienced. When the highly volatile commodity is stored in properly constructed containers buried in the ground and these connected to a pump by suitable piping, there is absolute protection against fire and evaporation; buying in large quantities is permitted and convenience is an item for consideration as well. When such a system is utilized the economy will pay for the original investment.

The Ideal Oil Pump & Tank Company, 146 Summer street, Boston, New England distributor for the equipment produced by Kupferle Bros. Manufacturing Company, St. Louis, Mo., markets a number of different equipments, these being constructed to meet the requirembents of both the public garage and the owner. The tanks are made of heavy galvanized sheet steel, painted with three heavy coats of best mineral paint and are rust proof. They are guaranteed to be air tight and to eliminate evaporation. They are equipped with a double heavy metal filler tube, the lower end of which is enclosed in a fine mesh screen and rests upon the bottom of the tank, and the top of the tube is fitted with a screen for straining, also a removable locked and vented cap.

The Ideal pumps are a combination force and suction, constructed entirely of metal and so arranged that a gallon, half-gallon, quart or pint may be drawn accurately at each stroke. They are fitted with double brass valves, brass stuffing boxes, automatic brass checks, anti-drip nozzles with lever shut-offs, 10-gallon discharge registers and a special locking device. The latter makes it impossible for anyone to operate the pump without adjustment, and this may be locked with a separate key lock attachment on the outside.

At Fig. 1 is depicted an equipment designed to meet the demand for a low priced storage tank and pump to be buried underground in the yard or near the driveway. The pump is a suction member fitted with hose connection, and is detachable so that it may be removed when not in use. With this equipment the fuel tank may be filled easily and accurately.

At Fig. 2 is presented a more complete equipment. Here the tank is buried underground outside and piped to the pump in the garage. This is styled the long distance self-measuring equipment and is fitted with a hose for filling the fuel tank of the car, this arrangement permitting the use of the pump in the usual manner. The latter may be adjusted to measure the desired quantity of gasoline and is equipped with the improved gallon meter which registers accurately all fluid drawn by the pump from the tank. It also acts as a check on losses and mistakes. The meter registers up to 9999 gallons, then repeats. It is so constructed that it is impossible for anyone to tamper with its working or mechanism. By this device a daily, weekly or monthly record of sales may be ascertained readily.

In addition to tanks for gasoline the company produces a number of oil equipments, the tanks of which are constructed of heavy galvanized sheet steel. The pumps are self measuring and can be so adjusted as to discharge quarts, pints and half-pints at a stroke. Anti-drip levers are employed and metal is utilized throughout. That illustrated at Fig. 1 is the roll top cabinet design. These are constructed of metal and equipped with a gauge to check up receipts and to show the amount of lubricant in the container. The Ideal Oil Pump & Tank Company markets oil equipments to meet all requirements.

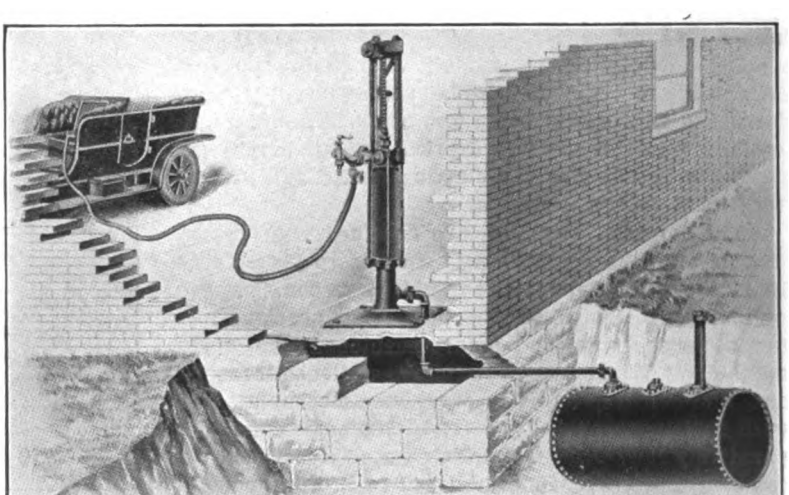
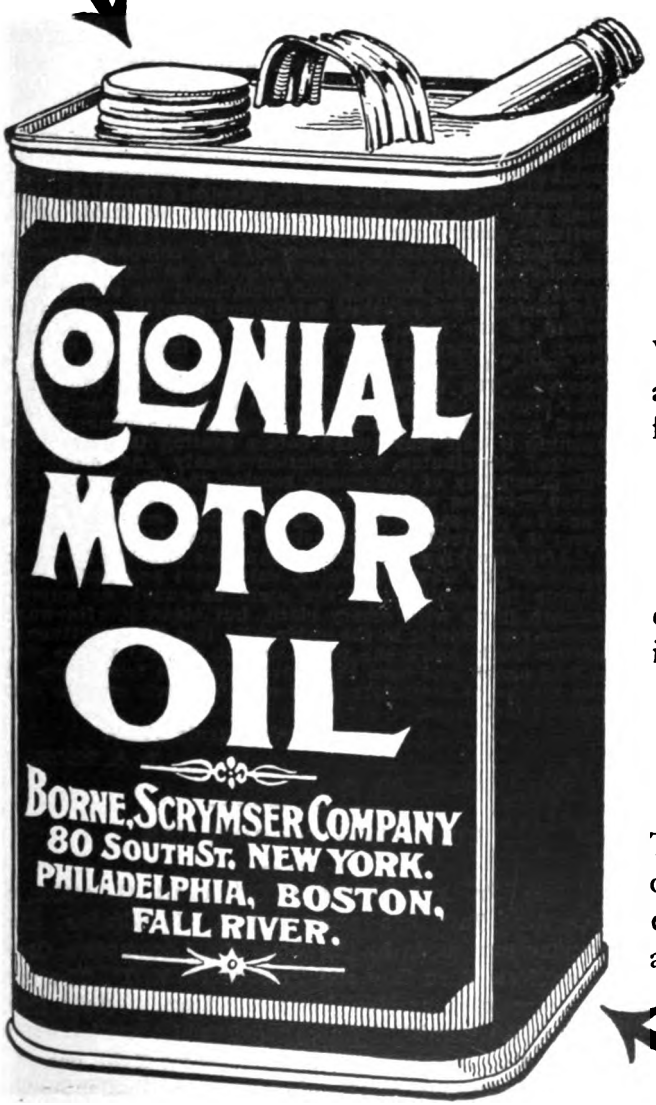


Fig. 2—Ideal Long Distance Self-Measuring Equipment Which Makes for Convenience and Economy in Handling Gasoline.

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Efficient Lubrication

is more important than what the lubricant costs. That is why you should always say Colonial—because it is a high-class product and can always be depended upon.



Use COLONIAL and NOTE the DIFFERENCE

COLO GREASE

A real transmission grease.

Will make your gears run smoothly and quietly because it is made especially for gear lubrication.

COLONIAL Timing Gear Oil

overcomes all trouble with your timing gear. Use it and NOTE the DIFFERENCE

SILEX GREASE

The greasiest grease made.

The real test of a grease is not its looks or the feeling but its lubricating properties. SILEX is made to lubricate and last.

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VALVE ADJUSTMENT AND GRINDING.

MOTORISTS who enjoy working about their own cars are interested in suggestions concerning the proper care and maintenance of their machines. The following communication on valve adjustment and grinding is submitted by T. A. Peck, manager of the technical department of the Abbott Motor Company, Detroit, maker of the Abbott-Detroit line. While it is to be presumed that Mr. Peck's advice holds particularly true of cars made by his concern, it will be found equally applicable to other makes and should prove decidedly timely and instructive.

Editor, Automobile Journal:—

Automobile owners as a class are growing more intelligent, more discriminating, and consequently less arbitrary. This is a most encouraging sign of the times to manufacturers and dealers in general, and this condition particularly applies to the firm whose product is sensibly designed, substantially constructed and sold under a life guaranty.

An automobile has to stand rougher usage and gets less attention, as a rule, than any type of mechanism in the world. The machine is yet to be made which will operate without proper lubrication and occasional adjustment. Fortunately, automobile owners are coming to recognize this fact and to realize that one-tenth the energy expended in grooming a horse will keep a car in commission indefinitely.

It is my opinion that a fair proportion of gas engine troubles arises from a failure to accord attention to minor details, a negligence which is not necessarily wilful, but is due, rather, to ignorance of the real function of each particular part and of the importance of keeping the same in condition for it to perform its duty properly. To reduce the upkeep to the minimum and insure safe motoring, it is advisable to be always on the alert for possible derangements, thoroughly inspecting the mechanism as frequently as is convenient. No eccentricity of action should be neglected and the trouble must be traced to its source and remedied immediately. I do not wish to convey the impression that the average car requires continual inspection, but I do believe that an odd half-hour spent now and then in cleaning and tuning up, even though the machine be giving perfect satisfaction, is productive of both pleasure and profit to the owner. He is amply repaid for the time and trouble by the improved action of his engine and the man imbued with the spirit of the true motorist derives a pleasure from adjusting and understanding the power plant of his car, which is second only to the joy of driving it. All of which brings us to the question of valve grinding and adjustment. If the average car owner only realized the importance of keeping all valves properly seated!

A great many car owners make a practise of adjusting valves while the motor is hot. This is a grievous error. It is proper to note any abnormal condition like this which develops but advisable to wait until the engine is cold before making any changes. If this suggestion is not heeded, particularly with motors of overhead valve design, the adjustment will be inaccurate, valves will not seat properly, resulting in weak compression and the entire action of the engine will be impaired on account of trying to correct one fault by committing another.

An adjustment too tight on intake valve or too loose on exhaust valve permits the fuel to escape, thus reducing the compression and diminishing the power of the explosion stroke. An adjustment too loose on intake valve also reduces the compression by shortening the length of the compression stroke. The exhaust valve under loose adjustment opens late. This retards the engine action as the exploded gases do not have prompt exit and a portion of the power intended for compression stroke is wasted in recompressing dead fuel, which would have been expelled had the exhaust valve opened soon enough.

Bear in mind these remarks are confined to one cylinder only. When one remembers there are four cylinders each requiring equal exactitude of adjustment to keep the valves of one cylinder from "crossing" or overlapping those of another, the importance of doing the work right is emphasized. That is one of the reasons why an engine throbs and lunges and misses and backfires and "lays down" on a hill; improper valve adjustment nine times out of 10. This leads up to the point of valve grinding.

Too much emphasis cannot be placed on the necessity of examining the valves carefully at regular intervals, even though the compression is apparently normal and uniform in each cylinder. The exhaust valves are especially susceptible to corrosion on account of the intense heat of the escaping gases. The seats soon become pitted, the carbon dust and vapor is caught and confined in every little crevice and in an incredibly short space of time the valves, if neglected, will be covered with a deposit of carbon which will affect the running of the motor to a marked degree. The only remedy is to grind them.

There are several good grinding compounds on the market. It is advisable to use a coarse grade in the first operation and then finish off with a finer one to impart a nicely polished surface. A very good home made mixture is obtained by making a thin paste of a couple of teaspoonfuls of kerosene, a few drops of oil and enough fine flour emery to thicken the preparation to a consistency where it will not run too freely.

Remember, even the minutest particle of this grinding abrasive must be kept from finding its way into the combustion chambers. Pack a good, generous quantity of waste or rags well soaked in gasoline around the valve seat and take due precaution to leave the inside of the cylinder casting perfectly clean.

Apply a moderate coating of the compound to the bevel face of the valve and return it to its seat. Next rotate the valve forward and back until the entire bearing surfaces are polished bright and smooth and the full width of the face. If the guide be worn or the stem bent, great care must be exercised or the valve will not be "true," i. e., the bevel face will not be flat but a trifle convex. The valve should never be turned the whole way round. Oscillate it back and forth a quarter-turn at most under light pressure, lifting it up frequently and turning it half way round before seating it again. This method distributes the friction evenly and eliminates the possibility of the emery scoring the bearings. If no valve grinding tool be available, I would recommend the use of a carpenter's bit stock as a much smoother movement is obtained than by using a screw driver.

After working up a good clean seat entirely free from spots or pits wash the valve, valve seat and guide thoroughly in gasoline. If the stem be rough or gummy, smooth it up with emery cloth, but clean it afterwards before replacing it in the guide. To test the effectiveness of the work, mark the valve seat in several places with a lead pencil and turn the valve around a few times. If the marks be entirely rubbed off, the work may be considered well done.

Very truly yours,

T. A. PECK.

Detroit, Mich., Feb. 26.

BUYS ALCO TOURING CAR.

Mrs. Frank L. Perin, of Cincinnati, O., sister of President Taft, has purchased a six-cylinder Alco touring car, made by the American Locomotive Company, New York City and Providence, R. I. The machine selected by Mrs. Perin has long, straight lines and is distinguished by a broad white stripe about the body. It is fitted with an electric light beneath the tonneau door which when opened illuminates the step at night.

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MOTORING NEWS OF NATIONAL IMPORT.

Commercial Vehicle Manufacturers Confer with Reference to Standardization and Overloading---Splendid Business Marks Exhibitions in Many Sections of the Country---Canada Holds Biggest Display at Toronto.

About 40 representatives of commercial vehicle manufacturers met in New York City, March 4-5, for the purpose of discussing the matter of motor truck standardization. Several points were brought up for discussion, and it practically was decided to accept the recommendations of the Society of Automobile Engineers in this respect and to co-operate with that organization in furthering this line of action.

Perhaps the most important decision of the meeting was that it was inadvisable to encourage the belief that a truck is designed to carry any weight in excess of its rated capacity, or to permit a warranty to apply to any truck which is overloaded. A standard form of warranty was adopted and it was suggested that all motor truck manufacturers use it in the future. This incorporates the above recommendation with respect to overloading.

In the matter of speed ratings, it was decided that 16 miles an hour should be the maximum for half-ton vehicles, and that this should be reduced by half-miles to and including five miles for 10-ton trucks. A standard body weight of 500 pounds was recommended for the half-ton wagons, this increasing by 100 pounds for each half-ton up to and including 2400 pounds for 10-ton vehicles. This means that a five-ton truck, for example, should be fitted with a body weighing 1400 pounds and that the maximum speed should be nine miles an hour. Under the same rule, a three-ton vehicle should have a 1000-pound body and the speed should be 11 miles an hour.

Those present included: S. D. Waldon, Packard, presiding; W. E. Metzger, Everitt; Charles Clifton, Pierce-Arrow; Benjamin Briscoe, Sampson; B. A. Gramm, Gramm; F. I. Harding, Peerless; H. Kerr Thomas, Pierce-Arrow; G. J. Loomis, Speedwell; Vincent Link, Universal; M. T. Pilcher, Federal; Albert L. Pope and W. C. Walker, Pope-Hartford; C. E. Stone and P. K. Hexter, Gramm; A. M. Chase, Chase; E. O. Sutton, Knox; A. W. Robinson, Locomobile; A. J. Doty, Lansden; Will H. Brown, Mais; Walter C. White, White; H. F. Flowers, Alco; Peter Dumont, Baker; H. S. Diller, Lauth-Juergens; Morris Grabowsky, Sampson; H. S. Stebbins, G. M. C.; C. H. Wallerich, General Industrial & Manufacturing Company; Herbert G. Streat, Knickerbocker; J. T. Langhorne, Packard; E. W. Curtis, Jr., General Vehicle; Alfred Reeves; David Beecroft; S. V. Norton; C. W. Fletcher, Walter; G. A. Hedges, Mack, Hewitt and Saurer; David S. Ludlum, Autocar; George B. Kelly, Baker; H. E. Coffin and R. D. Chapin, Hudson.

BIG BUSINESS MARKS SECOND DISPLAY IN BROOKLYN.

The success which attended the first annual show of the Brooklyn Motor Vehicle Dealers' Association, in the 23rd Regiment Armory, Brooklyn, N. Y., in 1911, was repeated at the second display of the organization in the same building, Feb. 24-March 2. Although so close to the big national exhibitions in New York City that it would appear at first thought that residents of Brooklyn might visit these easily, there seems to be every reason why the dealers of that section should call the attention of their immediate clientele to their wares in a more direct manner. From a business viewpoint, the second Brooklyn show was amply justified this year.

The decorative scheme was based upon the Spanish order, and blue and white bunting was used unsparingly in transforming the ceiling and side walls. The floor space was divided by six aisles, each marked by lattice work uprights, bearing the name of the exhibitor, connected by low railings. Electric effects brought out the particular features of the display and helped to make the interior of the building as light as noonday.

Charles H. Green, who has had long experience in the management of events of this character, was in direct charge of the exhibition, while the show committee consisted of W. H. Kouwehoven J. D. Rourk, C. F. Batt, I. C. Kirkham and C. M. Bishop. Eighty-two makes of pleasure and commercial cars were shown, as well as 23 exhibits of accessories. The complete list follows:

Pleasure cars—Bishop, McCormick & Bishop, Cole, Ford; I. M. Allen Company, Stevens-Duryea; American Locomotive Company, Alco; L. J. Bergdoll Motor Company, Bergdoll; A. W. Blanchard, Case, Fiat; Bruns Automobile Company, Chalmers; Buick Motor Company, Buick; Cartercar Company, Cartercar; Carpenter Motor Vehicle Company, E-M-F, Flanders; Central Motor Company, R-C-H, OttoMobile; Cumberland Garage, Speedwell, Velie; Detroit-Cadillac Motor Car Company, Cadillac; Detroit Electric Car Company, Detroit electric; A. Elliott-Ranney Company, Hudson; Elmore Sales Company, Elmore; Empire City Auto Company, Paige-Detroit, Warren; Farrell Auto Company, Apperson; Franklin Automobile Company, Franklin; Grant Square Auto Company, Cino; Jackson Auto Sales Company, Jackson; Thomas B. Jeffery Company of New York, Rambler; I. C. Kirkham, Columbia-Knight, Maxwell; Lion Auto

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Sales Company, Lion; Marion Motor Car Company, Marion, American; Mitchell Motor Company, Mitchell; Montauk Garage, Pope-Hartford; Ormond Motor Car Company, KisselKar; R. M. Owen Company, Reo; Premier; Packard Motor Car Company of New York, Packard; Parry Auto Sales Company, Pathfinder; Pastries Auto Garage, Firestone-Columbus; Peerless Motor Car Company of New York, Peerless; Penn Motor Car Company, Penn.; Poertner Motor Car Company, National, Herreshoff; E. F. Rau, K-R-I-T; I. S. Remsen Manufacturing Company, Locomobile; Regal Automobile Company, Regal; J. D. Rourk, Haynes; Sterling Place Garage & Sales Company, Norwalk; Stoddard Motor Car Company of New York, Stoddard-Dayton-Knight; C. T. Silver, Overland; F. B. Stearns Company of New York, Stearns-Knight; Thomas Motor Car Company of New York, Thomas; M. J. Wolf, Knox, Hupmobile; White Motor Car Company, White; Woods Automobile Garage & Sales Company, Oakland.

Commercial vehicles—American Locomotive Company, Alco; Buick Motor Company, Buick; Bruns Automobile Company, Durable Dayton; E. D. Boldman, Decatur; Bishop, McCormick & Bishop, Ford; Carpenter Motor Vehicle Company, Garford; Farrell Auto Company, Cass; Hexter Motor Company, Gramm; Lewis Commercial Car Company, Poss, Knickerbocker; Montauk Garage, Pope-Hartford; Ormond Motor Car Company, KisselKar; Packard Motor Car Company of New York, Packard; Peerless Motor Car Company of New York, Peerless; Prospect Park Square Garage & Sales Company, Crawford; New York Auto Wagon Company, Brooks; Sterling Place Garage & Sales Company, Lippard-Stewart; Universal Truck Company, Universal; M. J. Wolf, Autocar, Knox; Wyckoff, Church & Partridge, Inc., Commer.

Accessories—Chas. E. Miller, Julius Bindrum, Brooklyn Auto Top Company, Buckley & Rodger, C. T. Cross & Co., G. O. Graves, Golde Patent Manufacturing Company, Henry Manufacturing Company, Martin, Evans & Co., Paul M. Marko & Co., Mechanical Rubber Tire Company, Nugget Polish Company, Newmastic Tire Company, O-Tak-A Tire Company, Pyrene Manufacturing Company, Pioneer Auto Top Company, Regemhard & Stanley, Schaap Auto Company, George Sumner, Trautmann Tire Company, John H. Taylor Company, Wenz-Ludy Equipment Company, Hercules Waterproofing Company.

TORONTO'S SECOND OPPORTUNITY TO VIEW SEASON'S MODELS.

Toronto is following the example of many cities in the States this year by holding rival shows. The second event, this being under the auspices of the Toronto Automobile Trade Dealers' Association, was held in the Armouries, Feb. 21-28. The other display was handicapped materially by the fact that several American machines were held up over customs difficulties. Several of these secured space later in the Armouries exhibition, although it was found necessary to erect tents in the rear of the main building for the overflow.

Forty-five exhibitors displayed 76 makes of cars, of which 56 were of American manufacture, 17 Canadian, two English and one Italian. Several models of commercial cars were shown, and these attracted widespread interest. In every way, it was the largest and most representative display of automobiles and accessories ever held in Canada. The attendance was decidedly satisfactory and much business is expected to result. The exhibitors follow:

Automobiles—Automobile & Supply Company, Pierce-Arrow, Stoddard-Dayton, Reo, Hupmobile; Baker Bros., Cole; Brockville Atlas Auto Company, Brockville Atlas; Imperial Motor Car Company, Oldsmobile, Oakland; Hyslop Bros., Cadillac; Pope-Hartford Motor Company of Canada, Pope-Hartford; Montreal Locomotive Works, Alco; Russell Motor Car Company, Russell; Tudhope Motor Company, Tudhope; Ontario Motor Car Company, Packard, Detroit electric; Ford Motor Company of Canada, Ford; White Company, White; KisselKar Sales Company, KisselKar; Schacht Motor Company, Schacht; E-M-F Company of Canada, E-M-F, Flanders; A. E. Wilson, Jackson; Riverdale Garage & Rubber Company, Lion; Dominion Automobile Company, Peerless, Napier, Stevens-Duryea, Hudson, Autocar; Warburton Bros., Maxwell, Inter-State; McLaughlin Motor Car Company, McLaughlin-Buick, Fiat, Rauch & Lang electric; Shaw Overland Sales Company, Overland, Garford, Gramm truck; Auto Sales Company, Mitchell, Moon, Colonial electric; G. E. McCulloch, Kelly truck; White-American Sales Company, American; Bouvier & Son, Winton; Virtue Motor Sales Company, R-C-H; Clinton Motor Car Company, Clinton; T. Easton Company, Lozier, Chalmers, Waverley electric, Saurer truck; Wolseley Tool & Motor Company, Wolseley; Krit Motor Car Company, K-R-I-T; Industrial Motors, Ltd., Commer trucks; Canadian Motors, Ltd., Galt; Rambler Motor Sales Company, Rambler; Petrolia Motor Company, Petrolia truck; J. A. Fitzsimmonds, G. J. C.; Peck Electric, Ltd., Peck electric; Jones & Glassco, Foden steam wagon; Watson Carriage Company, Watson-Commerce; E. A. Greene Company, Ward electric truck; International Harvester Company, International truck; Flanders Electric Vehicle Company, Flanders electric.

Motorcycles—F. H. Lemon & Co., Indian; Percy A. McBride, Excelsior, C. C. M.; Motorcycle & Equipment Company, Flanders, Rudge-Whitworth, N. S. U.; Walter Andrews, Pierce; Tangent Cycle Company, Triumph; License Bros., Harley-Davidson; Humphrey Bicycle & Motor Company, Merkel.

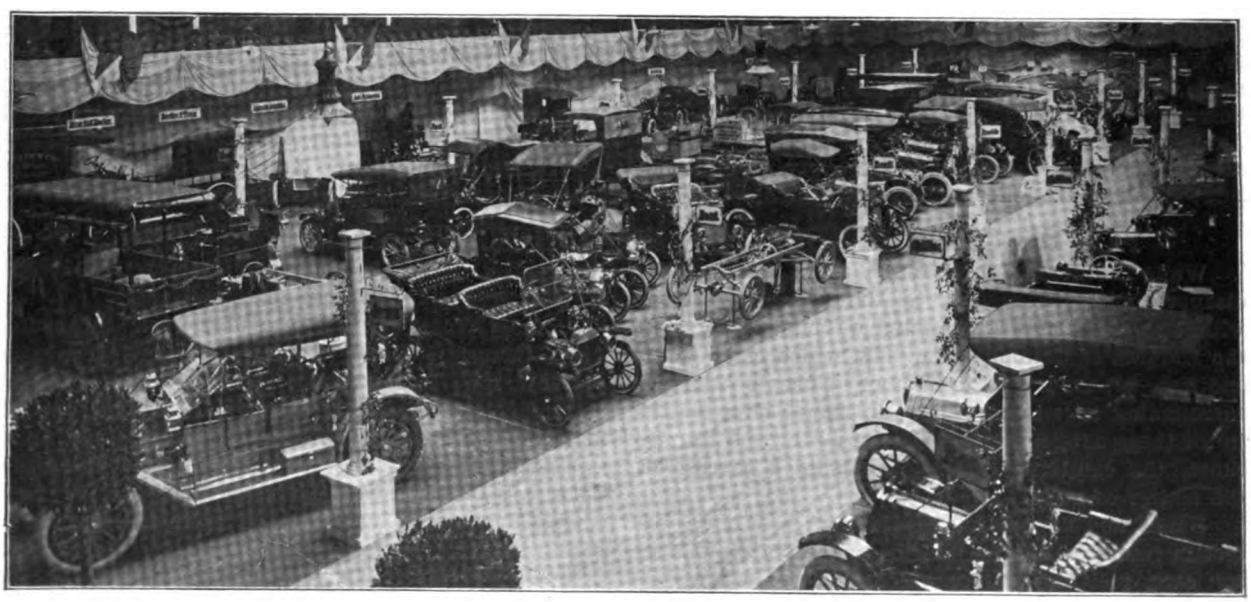
Accessories—Canadian General Electric Company, K-W ignition specialties, etc.; Canadian National Carbon Company, batteries; Queen City Oil Company, Polarine oils; Leather Tire Goods Company, Wood-

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worth treads; Gutta Percha & Rubber Manufacturing Company, Kelly-Springfield tires; J. Millen & Son, Simms magnetos; Russell Motor Car Company, Remy and Connecticut magnetos, Stewart speedometers, Motorol, Michelin tires, Shaler vulcanizers, Pittsfield coils, etc.; Marburg Bros., Inc., Mea magnetos; Triple Tread Manufacturing Company, triple treads; McCord Manufacturing Company, McCord radiators; Canadian Consolidated Rubber Company, Canadian tires; Electrical Specialties, Ltd., Weston shock absorbers, Ford specialties, etc.; Stepney Motor Wheel of Canada, Ltd., Stepney wheels; Bosch Magneto Company, Bosch magnetos; Dunlop Tire & Rubber Company, Dunlop tires; S. F. Bowser & Co., Bowser storage systems; Independent Tire Company, Independent tires; Hall Motor Supplies Company, Red Head spark plugs, etc.; Canadian Carbon Company, Ltd., batteries; Warner Instrument Company, Warner autometers; Pollock Manufacturing Company, lamps, generators, etc.; Diamond Tire Company, Diamond tires; Auto Tire Company, Goodrich tires; National Equipment Company, Wayne storage systems; Death & Watson, Ltd., batteries and lamps; Conboy Carriage Company, windshields; Toronto Auto Top & Body Company, bodies, tops, windshields, etc.; Croftan Storage Battery Company, batteries and lamps; Indian Refining Company, Havoline oils; Goodyear Tire & Rubber Company, Goodyear tires.

PATERSON THOROUGHLY ENJOYS ITS FIRST SHOW.

The first organized show in Paterson, N. J., was held in the local armory, Feb. 26-March 2. Many of the cars which were seen at the Newark display during the preceding week were arranged for the inspection of Paterson people, and the recently organized Paterson Automobile Trade Association was so well pleased with the success of the venture that an annual show is a foregone conclusion.



Paterson Armory During the Progress of the First Automobile Show Held in That City.

The hall was prettily decorated with bunting, the association's colors, pale green and blue and white bsing displayed at every turn. The large girders were entirely hidden by its folds, and the tints were blended in a most pleasing manner. Each exhibit was marked by pretty white colonnades, and the cars were disposed so as to make a decided impression on the visitor.

Cars were displayed by the following: Eastside Auto & Repair Company, Marion; Riverside Garage, Abbott-Detroit; Bender Motor Company, Havers; B. F. Clicker, Velie; Vernon Ettinger, Reo; Paterson Fire Department, combination chemical and hose wagon; Auto-Shop, Chalmers; Hudson Company, Hudson; Penn Motor Car Company, Penn; Studebaker Corporation, E-M-F, Flanders; E. A. Browne Auto Company, Maxwell, National; J. Garlick, Stearns-Knight, White; Ford Auto Company, Ford, Everitt, Thomas; Hughes Garage Company, Franklin, Buick, Kelly truck; Pope-Hartford Company, Pope-Hartford; Centre Garage, Overland; W. J. Tynan, Columbia-Knight; Autocar Company, Autocar; Crescent Automobile Company, Mack and Saurer trucks; Veerac Sales Company, Elmore; Passias Auto Company, Cutting; Paterson Vehicle Company, International; S. F. Holden, Metz.

Other exhibitors were: Alling Rubber Company, rubber goods; W. F. Davis, typewriters; F. Dorant, valveless motors; N. E. Heil, motorcycles; H. L. Smith, sundries; Suspended Pneumatic Tire Company, tires; Standard Oil Company, Polarine oils; Wayne Oil Tank & Pump Company, Wayne storage systems.

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SNOW DELAYS RECEIPT OF EXHIBITS IN DES MOINES.

The third annual show of the Des Moines Automobile Dealers' Association was held in the Coliseum, Des Moines, Ia., March 4-9. Owing to the heavy snow storm of the previous week, several of the dealers were disappointed in not receiving their show cars in time for the opening night. Many of these machines were shipped direct from the factories, and while demonstrators were on hand to take their places, the beauty of the display was slightly marred in consequence.

An entirely new decorative scheme was worked out, in which an elaborate electric illumination played a prominent part. W. E. Moyer, president of the association, was chairman of the committee and was assisted by C. G. Van Vliet in making the event one long to be remembered in local motoring circles. The business transacted was quite satisfactory in every way.

Among those who displayed cars were: Brown-Corley-Ellis Company, Marion, R-C-H, Auburn, Lozier, Everitt, Flanders electric; Moyer Automobile Company, Hudson, K-R-I-T; Bernhard & Turner Auto Company, Columbus electric; Van Vliet-Fletcher Automobile Company, E-M-F, Flanders; Herring Motor Car Company, Ford; Riddell Auto Company, Overlang; Thomas B. Jeffery Company, Rambler; White Motor Company, White; Cole Motor Company, Cole; Iowa Motor Truck Company, Gramm truck; D. S. Kruidenier, Cadillac; Means Auto Company, Marathon, Moline; Ryan Motors Company, Paige-Detroit, Pierce-Arrow, Chalmers; Sears Auto Company, Mitchell, Hupp-Yeats electric; Stearns Auto Company, Stearns-Knight; Strong Motor Car Company, Winton; J. I. Case Threshing Machine Company, Case; United Motors Des Moines Company, Columbia-Knight, Stoddard-Dayton-Knight; Ideal Auto Company, Oakland; Interstate Auto & Supply Company, Reo, Apperson; Capital City Carriage Company, Jackson; Cunningham Auto Company, American, Hupmobile, Clark; Buick Motor Company, Buick, Marquette; Spaulding Manufacturing Company, Spaulding; Great Western Automobile Company, Great Western; Iowa Auto & Supply Company, National, Marion, Staver, Locomobile, Woods electric; Cartercar Iowa Company, Cartercar; Port Huron Machine Company, Havers; Kissell Motor Company, KisselKar; Ohio Motor Sales Company, Ohio gasoline, De Tamble; Auto Distributing Company, Cutting; Alpena Motor Car Company, Alpena; Johnston Motor Company, Abbott-Detrit; Olds Motor Works, Oldsmobile; Velie Motor Car Company, Velie; Dain Manufacturing Company, Great Dain truck.

FORT DODGE EXHIBITION DRAWS MANY TO THAT CITY.

While the dealers in Fort Dodge, Ia., feel a trifle disappointed with respect to the attendance from within the city, the first annual automobile show in the Knights of Columbus building, which came to an end Feb. 24, drew a large number of people from the surrounding towns and cities. Inasmuch as a majority of these out-of-town people came prepared to purchase, the exhibition was an unqualified success in the matter of sales.

Palms and flowers were utilized with splendid effect in transforming the interior of the building. Racing cars, included among which was the Abbott-Detroit, one of the winners at the Elgin road races of last summer, proved an attractive addition to the makes on display. At the conclusion of the show, the dealers held a banquet and discussed the possibility of arranging for more space next year.

Among those who made display were: Duncome Auto Company, Ford; Johnston Motors Company, Pierce-Arrow; P. J. Tierney, Stearns-Knight; Cadillac Sales Company, Cadillac; Tremain & Rankin, Indian motorcycles; Fort Dodge Auto Company, Snow Auto Company, Black & Kirkpatrick, Eilers Automobile Company, International Harvester Company, Reimer-Gibson Company, Rice & Dayton Manufacturing Company, Leighton Supply Company, Cedar Rapids Oil Company, Plymouth Clay Products Company, R. M. Stevens & Co., H. E. Peterson Company, Herring Auto Supply Company, Marshall Oil Company, Monogram Oil Company, Standard Tire Protector Company.

THIRD DISPLAY IN DAVENPORT A SUCCESS.

The third annual show of the dealers in Davenport, Ia., was held in the Coliseum in that city, Feb. 28-March 2. Every inch of available space was utilized with the best effect, and the attendance was much larger than ever before. The event was under the management of F. W. Skinner, who left nothing undone to bring about success.

Among the exhibitors were the following: Scott County Mercantile Company, Columbia-Knight, Maxwell; H. E. Ross Electric Company, Ohio electric; Oldsmobile Sales Company, Oldsmobile; P. C. Petersen Auto Company, Pope-Hartford; Buck Motor Car Company, Velie, Packard; L. P. Strayer, Hevers; Thomas Auto Company, Thomas; J. A. Zeman Auto Company, Mitchell; Roeske & Sindt, Ford; Witt & Lembrecht, Firestone-Columbus, Columbus electric; Klemme Auto Company, Buick; Brown-Burnap Auto Company, White; Iowa Auto & Tire Company, Cadillac; Yeggy-Don Sales Company, Knox, Woods electric; H. F. Bierkamp, Overland; Trevor & Snider, Stearns-Knight; Mason Carriage Works, Pierce-Arrow, Chalmers, Baker electric; Inter-State Auto Company, Inter-State, E-M-F, Flanders; Toten Auto Company, Abbott-Detroit; Plow City Garage, Warren; Davenport Auto Company, K-R-I-T, Michigan; H. W. Neuman Machine Company, Auburn, Gramm truck; Western Implement & Motor Company, Colby; Horst & Streiter, Moline; Harry Schuttler, Case; Midland Motor Company, Midland; Shallberg Auto Company, Stoddard-Dayton-Knight, Rauch & Lang electric.

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NEW PRICE LIST IN EFFECT OCTOBER 1, 1911, Cancelling all former price lists

The 8-DAY HIGH GRADE "BOSTON" AUTO CLOCKS

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST— PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch . . .	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices.—A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

The 8-Day High Grade "BOSTON" AUTO CLOCK For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.

If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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BIRDS SING AS ELMIRA INSPECTS LATEST MODELS.

Under a gorgeous canopy of pale blue, dainty pink and pure white, the second annual show of the Elmira Automobile Club was held in the State Armory, Elmira, N. Y., Feb. 27-March 2. Dozens of canaries were hidden away among the greenery of the decorative scheme and added their song to the martial music of the band. It was a decidedly inspiring scene, but of still more importance, the various models were so disposed that the flood of electric light set them off to the best advantage.

The event was under the management of Louis Blumenstein, assisted by the following show committee: F. C. Ogden, Fred M. Jones and George W. Middleton of the automobile club, and Guy Shoemaker and Ward LaFrance of the local automobile dealers' association. The attendance throughout the week was such as to inspire confidence in the local situation, and there is much reason for believing that the season of 1912 will be the most prosperous the Elmira dealers have known.

Cars were shown as follows: J. W. Cook Company, Cutting; C. W. Bishop Company, Buick; Gates & Strong, E-M-F, Flanders; LaFrance Garage, Reo, Chalmers, Hupmobile; South Tier Motor Company, Overland, Peerless, Franklin; Wolcott Motor Car Company, Pierce-Arrow, Cole; A. M. Zimbrick, Stoddard-Dayton-Knight, Haynes, Flanders electric, Gramm truck; R. H. Wickwire, R-C-H; F. E. Smith, Warren; T. Wrayburn Keeton, Rambler; E. T. Crane, Winton, Maxwell; Hatfield Motor Truck Company, Hatfield trucks; Bishop & Whitney, Ford; Electric Garage, Detroit electric; J. F. Rhoades, K-R-I-T; Genesee Motor Car Company, Cadillac; Chemung Motor Car Company, Hudson, Oakland, Oldsmobile, Marmon.

Other exhibitors were: Elmira Arms Company, Harley-Davidson motorcycles; P. B. Rutan & Son, Indian, Merkel and Excelsior motorcycles; G. B. Ellis, motorcycles; F. C. Tomlinson, insurance; Barker, Rose & Clinton Company, sundries; Standard Oil Company, Polarine oils; W. D. Barron, Hanna self-starter; George O. Baxter, tires; Frontier Specialty Company, spark plugs; F. A. Hilliker, tire tools; B. W. Hollingshead Company, Whiz polishes; Wayne Oil Tank & Pump Company, Wayne storage systems.

FIRST MOTOR CAR EXHIBITION IN NORTH CAROLINA.

The increasing interest which has been manifest in automobiles during the past year or two in the South had its culmination in Charlotte, N. C., during the week of Feb. 26-March 2, when the first motor car show ever held in North Carolina was held in the Auditorium in that city. The event was under the auspices of the recently organized Charlotte Automobile Dealers' Association, and was quite as pretentious as any display ever held in the smaller cities of the country.

The interior of the hall was transformed by the liberal use of bunting and greenery. From the centre of the ceiling the white and green bunting fell in tent-like folds to the railings of the balcony, and 3000 bunches of smilax and wisteria aided in producing the desired effect. The attendance was thoroughly satisfactory and betokens an excellent year's business in this section. It is probable the Charlotte show will become an annual feature.

Those who displayed cars were: United Motor Charlotte Company, Columbia-Knight, Maxwell; C. C. Coddington, Buick; American Motor Car Company, Everitt, Whiting; Osmond L. Barringer Company, Reo, Packard; R-C-H Corporation of Atlanta, R-C-H; Charlotte Motor Car Company, Hudson, Hupmobile; Mecklenburg Automobile Company, Pullman, Marathon; Piedmont Motor Car Company, Lozier, Stoddard-Dayton-Knight, Rauch & Lang electric; Woodside Motor Car Company, E-M-F, Flanders; Corbett Automobile Company, Corbett.

KEENE MOTORCYCLISTS HOLD FOURTH ANNUAL DISPLAY.

One of the few motorcycle organizations in the country to venture upon the scheme of holding an annual motor vehicle show, which includes automobiles as well as the two-wheeled mounts, is the Consolidated Motorcyclists of Keene, N. H. For four years this plan has been in vogue and each season has seen an increasing interest in the display with a corresponding success for the promoter. The fourth annual display was held in the City Hall, Feb. 22-24, under the management of C. C. Wilber, formerly vice president of the Eastern District, Federation of American Motorcyclists.

The hall was decorated with flags and bunting, and numerous potted plants were utilized to good effect. Inasmuch as the initial Keene show was the first held in New Hampshire this annual event still retains its important place in the industry in that state. The list of exhibitors was somewhat larger than usual this year, and several makes of machines were seen for the first time in Keene.

Among the exhibitors were the following: Lester M. Lane, Overland cars and Hydraulic windshields; Robertson & Bennett, Stanley steam cars, Jackson and Stoddard-Dayton-Knight; Louis E. Roundy, Ford; F. A. Ordway, Hudson; Guy F. Fairfield, Cadillac; O. L. Blake, Chalmers; Wellington & Webster, Maxwell, Regal; Henry D. Allison, Rambler; Manley Bros., Lion; J. H. Watson, New Way engine for farm use; C. C. Wilber, Harley-Davidson motorcycles; James L. Perry & Co., Pope motorcycles and accessories; Keene & Manchester Oil & Supply Company, lubricants; C. H. Stoddard, vulcanizing; B. F. Walsh, Indian motorcycles; W. F. Mann Motor Company, Thor and Merkel motorcycles.

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PRIVATE ENTERPRISE ARRANGES TAUNTON'S INITIAL SHOW.

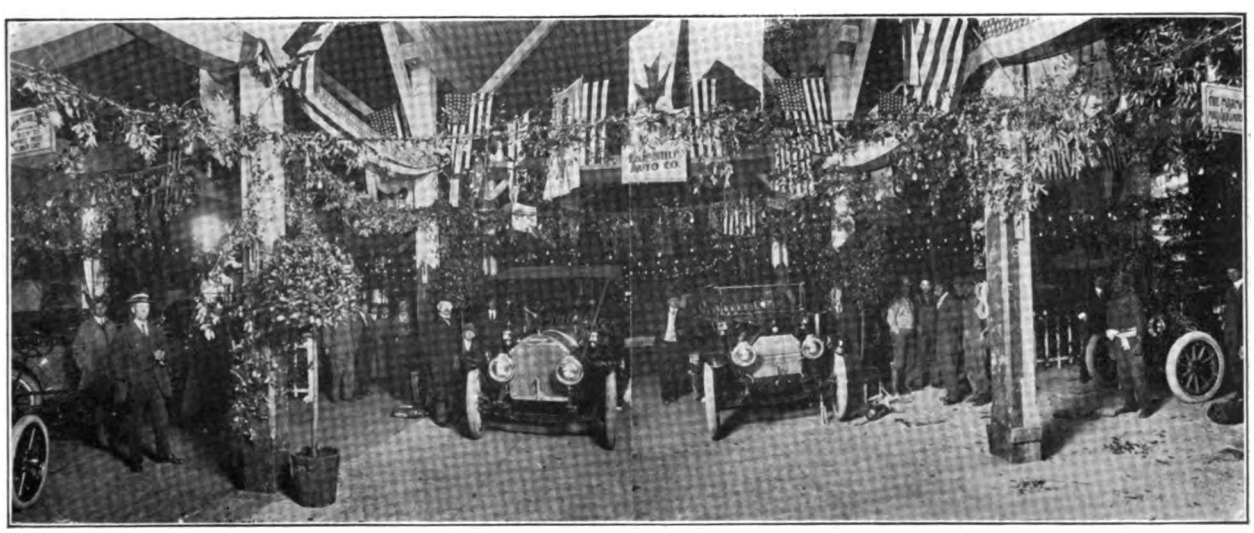
Last year O. D. Corbett of New York City held an automobile show in Fall River, Mass., and while some of the local dealers did not respond as readily as he expected, he found many of the agents in Taunton, Mass., anxious to take space and present their cars for inspection. This year, the Fall River dealers were organized and held their own show. As a result, Mr. Corbett moved on to Taunton.

The first automobile display ever held in Taunton took place in Odd Fellows' Hall, Feb. 24-27. The available space was decidedly limited but good use was made of what there was, and the exhibition was representative in every sense of the word. Floral decorations combined with bunting was utilized in transforming the interior of the building, and the attendance was sufficient to warrant the probability of an annual event in the future.

The following were the exhibitors: Brownell & Burt, E-M-F, Flanders; Perry Motor Car Company, Reo, Ford, Rambler; Fred Fuller, Mitchell; Sumner Staples, Paige-Detroit; Pugh Bros., Palmer-Singer, Marion; Providence Motor Car Company, Stoddard-Dayton-Knight; Washington Street Garage, Warren; Watuppa Auto Company, Crawford; ————, Everitt; Easternhouse Engine Company, Pearl Marine Motors.

NEW ORLEANS EXHIBITION A MARDI GRAS FEATURE.

As is the usual custom in New Orleans, the annual display of the Automobile Dealers' Association in that city was held in conjunction with the Mardi Gras celebration, Feb. 21-25. The event was under the management of T. C. Campbell, and was held in Washington Artillery Hall. The decorative scheme was that of a springtime scene, in which Southern flowers played a prominent part. From the ceiling were draped numerous flags, adding to the holiday aspect of the display.



Interior of the Washington Artillery Armory During the Progress of the Recent Automobile Show in New Orleans.

Among those who exhibited cars were: Zilberman & Fogarty, Oakland, Commerce truck; Joseph Schwartz Company, Buick, G. M. C. trucks; Crescent City Auto Company, Hudson, Thomas; Gus D. Revol, Cadillac, Chase truck; Demack Motor Company, Knox, Detroit electric; Myatt-Dicks Motor Cab Company, Marmon, Stoddard-Dayton-Knight; Day-Rice Auto Company, Paige-Detroit, Alco, Winton; Chalmers Motor Company, Chalmers; Russell Motor Car Company, Ford; Shep D. Hogue & Son, Overland, Garford; Abbott Automobile Company, Abbott-Detroit, Packard, Baker electric; Lyons-Barton Motor Car Company, Pierce-Arrow; Fairchild Auto Company, Peerless, Pathfinder, Reo; Gulf Motor Company, De Tamble; Commercial Truck & Automobile Company, Gramm truck; A. L. Ducote, E-M-F, Flanders; Cooke Auto & Taxicab Company, Locomobile. In addition Chas. E. Miller had on display his complete line of accessories.

WEEK OF SALES MARKS NEW HAVEN'S ANNUAL DISPLAY.

If sales are any indication as to the success of an automobile show, and there seems little question that the displays are held for that purpose, the second annual exhibition of the dealers in New Haven, Conn., Feb. 26-March 2, was a decided success. The doors of Music Hall hardly had been thrown open before announcements of sales were recorded. Cars were sold to people residing along the Connecticut shore as far east as New London, and throughout the entire Naugatuck Valley.

Seventy-one cars were disposed about the interior of the building, each separate exhibit being marked

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with lamp posts of colonial design. The color scheme of the decorations was red and white, and hundreds of electric lights were utilized in the illumination. In every way it was the most complete automobile exhibition ever held in New Haven, and one which drew many people to the city for the week.

Cars were displayed as follows: Knight's Garage, Velie; Brown & Underwood Auto Company, Cadillac; Howards Company, KisselKar; Biever Motor Car Company, Columbia-Knight, Maxwell; Bradford-De-Bussey Company, Locomobile, Alpena, K-R-I-T; Yale Auto Garage Company, R-C-H, Cutting; R. L. Bishop, American, Hupmobile; Bunnell & Doolittle, Regal; Marion Garage, Marion; Elm City Auto Company, Buick, Dart; General Motors Service & Truck Company, G. M. C. trucks; D. W. Flint, Ford; J. F. Goodrich & Co., King; National Motor Car Company, National; S. E. Campbell, Rambler.

MISSISSIPPI VALLEY DISPLAY LIMITED TO QUINCY.

Although it was termed the second annual Mississippi Valley automobile show, the display at Highland Park, Quincy, Ill., Feb. 26-March 2, was limited in its scope to the dealers of that city. Last year, a few out-of-town agencies were represented, but for some reason it was deemed best to eliminate these this time. The attendance was unlimited, however, and it is anticipated that the event will prove of decided benefit to Quincy dealers.

The decorative scheme was in purple and white, the ceiling and side walls being draped with bunting. Special attention was paid to the illumination, thousands of electric lights being utilized to good advantage in bringing about the effect sought. Fifty makes of cars were represented, among them being the following:

Fischer Motor Car Company, E-M-F, Flanders, Brush, Abbott-Detroit; Beatty Automobile Company, White, Rauch & Lang electric; Reid Motor Company, Hudson; Gem City Auto Exchange, Cartercar, Elmore, Michigan, Metz, Great Western; E. W. Fuhr, Maxwell; H. A. Geise, Cadillac; Laughlin & Dick, Buick; Charles Johnston, Mitchell, Hupmobile; T. C. Nichols Motor Car Company, Chalmers; John E. Dick, Glide; Kurz Machine Company, Overland; Collins Plow Company, Richmond.

COLUMBUS AUTOMOBILE CLUB REVIVES EXHIBITION PLANS.

Utilizing the old Postoffice building in Columbus, O., the Columbus Automobile Club held the first motor car display in two years in that city March 2-9. Practically 30 per cent. more space was afforded than under the old arrangement, and still there was insufficient room for all who desired to exhibit. The event was in the hands of the following committee: Perin Moneypenny, Charles E. Firestone and D. Hoch.

The decorative scheme was thoroughly in keeping with the magnitude of the undertaking, bunting, potted plants and electric lights being utilized to splendid effect throughout. The attendance was decidedly encouraging, as has been true of all the shows held in the Middle West thus far this year, and indications point to a successful business season. It is probable the club will hold another show next year.

Among those who made display were: Edward Miller, Premier; Ohio Auto Sales Company, Ford; Kimmel Bros., Speedwell, Cole, Empire; Snyder Automobile Company, Abbott-Detroit; W. D. Short, Metz; United Motor Columbus Company, Columbia-Knight, Maxwell; Broadway Motor Car Company, Paige-Detroit; Oscar Lear Motor Car Company, Oldsmobile, Oakland, Kelly truck; United States Carriage Company, Great Eagle, Rauch & Lang electric; De Tamble Sales Company, De Tamble; Frank J. Girard, R-C-H; Bausch-Selbach Wagon & Auto Company, Marathon; Gwinn Sales Company, Davis, Alpena; Adamson Auto Company, Jackson; J. C. F. Mott, Grabowsky truck; E. E. Avery, Packard; Broad-Oak Company, Chalmers; S. W. Schott, Brush; Hudson Sales Company, Hudson, American; Columbus Auto Inn, Reo; Winton Motor Carriage Company, Winton; White Company, White; Ohio Motor Car Company, Ohio gasoline; Simplex Automobile Company, Simplex; Columbus Buggy Company, Firestone-Columbus.

CONCORD PRESENTS SEASON'S MODELS FOR FIRST TIME.

For the first time in the history of Concord, N. H., an organized automobile show was held in the City Auditorium under the auspices of the Capitol City Automobile Association, Feb. 22-24. The attendance was by no means confined to Concord, large delegations coming from Manchester, Nashua and still more distant points. The number of sales was quite sufficient to warrant the holding an annual event of the same nature.

White and blue bunting was utilized in the decorative scheme, and an entirely new system of electric lighting aided materially in bringing out the general effect. While all the available space was taken, there was sufficient room to display the cars so that it was an easy matter to compare their respective merits. Each exhibition space was marked by potted plants and palms, adding a touch of greenery to the other coloring.

Those who displayed cars were: Concord Auto Sales Company, Cole, Hudson, R-H-C; Fred S. Johnson, Buick; H. G. Fletcher Auto Company, Elmore, Metz; John K. Martin, Bergdoll; L. Dale Brown, Rambler; Perley Badger, Maxwell; H. S. Putney, Cadillac; L. E. Gray, Overland; A. C. Pollard Auto Company, Stevens-Duryea, Chalmers. A large number of accessory exhibitors also were represented.

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THE SELDEN CAR

Five Beautiful Models
$2500—$3750

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The Selden possesses all these desirable features in a high degree not possessed by any other car but the most costly.

The Selden challenges comparison with cars of the highest price.

Selden Motor Vehicle Company
Rochester, N. Y.

WHITNEY-BARNEY COMPANY
Agents
823 BOYLSTON STREET, BOSTON, MASS.

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BOSTON RETAINS ITS LEAD.

In the matter of attendance and sales the 10th annual Boston automobile show has surpassed even the best expectations of the management and the industry. There is no gainsaying the fact that the national exhibitions in New York and Chicago were a trifle disappointing in the matter of attendance and business transacted. While the figures indicate that more people were present throughout the week in each case than was true last year, the increase was by no means as large, proportionately, as previous experience would lead the industry to expect.

At Boston, conditions were exactly reversed. The result of the shows in the larger centres had been such as to offer the suggestion that the Boston show could not expect to attract in the same degree as in the past. However, the management and the industry were pleasantly disappointed. From the opening night, the attendance was much larger than on the corresponding dates last year, and Wednesday, Society Day, when the admission fee was doubled, Mechanics' building was uncomfortably crowded.

That it was by no means a crowd bent upon satisfying its curiosity alone is borne out by the announcements of sales made. Of course, this feature cannot be judged entirely, until complete returns of the business transacted are at hand, but there is every reason for believing that in this respect, as well, the 10th annual Boston show far outranked all its predecessors.

One point stands forth pre-eminently in this consideration, and that is that New England has lost none of its prestige as the greatest motor vehicle and accessory market in the world. Nothing can indicate more clearly the attitude of the prospective purchasers in this section. The display of commercial vehicles is yet to come, and if the success of the pleasure car division is any criterion, the business transacted during the second week should exceed that of any previous display, no matter where held.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

RECIPROCITY IN NEW JERSEY.

It is indeed welcome news that the lower house of the New Jersey Legislature has decided in favor of complete reciprocity in the matter of non-resident motorists. The public is now awaiting similar action on the part of the Senate. Those who claim to be familiar with the situation in that commonwealth say that there is little doubt the bill will be passed in practically its present form.

New Jersey has earned an unenviable reputation since it began to discriminate against motorists from other states. Its position that the roads of that commonwealth were so excellent that tourists should pay for the privilege of riding over them did not hold good. Tourists have found that other states possess good roads as well as New Jersey, and the business men of that commonwealth have learned that the deflection of trade of this character is of decided importance.

However, if New Jersey places the present, very liberal reciprocity bill upon the statute books, motorists will be disposed to forgive and forget. It will take the state some time to regain that which it has lost, but it is safe to predict it will find in the end that touring motorists leave quite as much money behind them as they cost in road repairs.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

OVERLOADING THE TRUCK.

The action of some 40 representatives of the motor truck manufacturers at their meeting in

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New York City early in the month marks a somewhat new departure in the matter of commercial vehicle rating. While other features of the business were discussed, it hardly will be denied that the most important result of the meeting was the decision that it is inadvisable to encourage the belief that a truck is designed to carry any weight in excess of its rated capacity, or to permit a warranty to apply to any truck which is overloaded.

This is a subject which has occasioned considerable discussion in the industry and among prospective purchasers. There never has been any real justification for the suggestion that a truck will carry a substantial overload, except that users are prone to exceed the rated capacity and it is best to provide for this. However, this is a decided fallacy, in that it is just as probable that users will attempt to carry more weight than the truck is designed to handle, even considering the permitted overload. In other words, there is no reason for calling a five-ton vehicle a three-ton truck, because if the user is informed he may overload to that limit, he is just as liable to carry it still further and attempt to haul loads of six tons or more.

Educational campaigns are now considered necessary in furthering the intelligent use of industrial transports. One of the first principles which should be enlarged upon is that if a motor truck owner habitually carries more load than that for which the vehicle is intended, he does so at the expense of his investment. Obviously, the manufacturer is taking the proper stand when he decides not to provide for overloading and makes his warranty apply only when the vehicle is used as intended in the design and construction.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

AS TO NEXT YEAR'S SHOWS.

The decision of the National Association of Automobile Manufacturers to hold the 1913 New York show (there will be but one next year) later in the season, appears to be in line with the plan followed by the Boston dealers. The Chicago display is to be held later as well, so that the two big national exhibitions will come nearer to the date of the Boston display, and therefore much nearer the actual opening of the motoring season.

Within the past year the so-called minor show circuit has been extended very rapidly. The main object with these appears to be that of stimulating business in the immediate community, and there is little question that the manufacturers may support the local dealers with decided profit. In many instances, an effort has been made to hold these displays before the national exhibitions, and it will be possible to carry out this plan more advantageously under the new arrangement.

As a result, the three largest shows of the year, those at New York, Chicago and Boston, should prove to be the culmination of a nation wide campaign for the exploitation of the 1913 models. The minor circuit will stimulate business locally, and at the same time awaken interest in the larger displays. The plan ought to be of decided advantage to the industry.

It may be suggested here that the personal campaign which was waged both in 1911 and 1912 in connection with the commercial vehicle show in Chicago has demonstrated its value sufficiently to warrant its being tried at New York and Boston. If the manufacturers will co-operate to the fullest extent with the dealers in the minor shows, it will be possible to secure a valuable list of "prospects," which can be followed up in this manner, and the national displays will reap the benefit of the entire campaign.

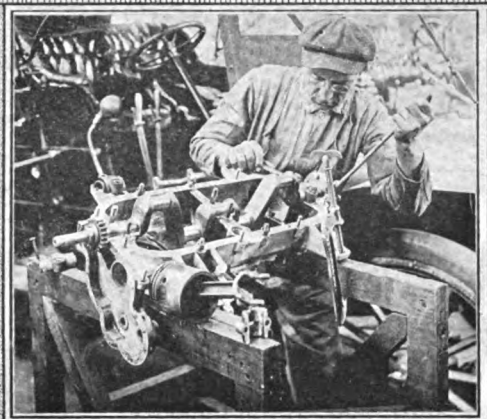
Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

THE LEGISLATIVE SITUATION.

That the introduction of radical automobile legislation is by no means a thing of the past is borne out by the number of such bills which have made their appearance in various states during the past few weeks. Some legislators still retain the opinion that they were elected for the purpose of imposing unwarranted hardships upon owners and users of motor vehicles. It is a hopeful sign of the times, however, that in most instances the legislatures as a whole are more kindly disposed toward the motorist, and there is little attempt to rush radical measures through without proper hearings.

The continued appearance of these proposed statutes indicates clearly the necessity for watching the state house, while the legislature is in session. Organized motorists have the opportunity at this season to give a decided reason for their existence. Incidentally, it may be remarked that automobile owners and users owe much to these bodies, and the least they can do to show their appreciation of the efforts in their behalf is to become identified with those who are working for better conditions.

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

MOTOR STANDS FOR THE OVERHAUL.

With the approach of spring the progressive motorist begins to make his arrangements for the annual overhaul of the car. While many make it a practise to have the work done at a repair shop it is interesting to note that there is a growing tendency among owners to do their own repairing. And many are

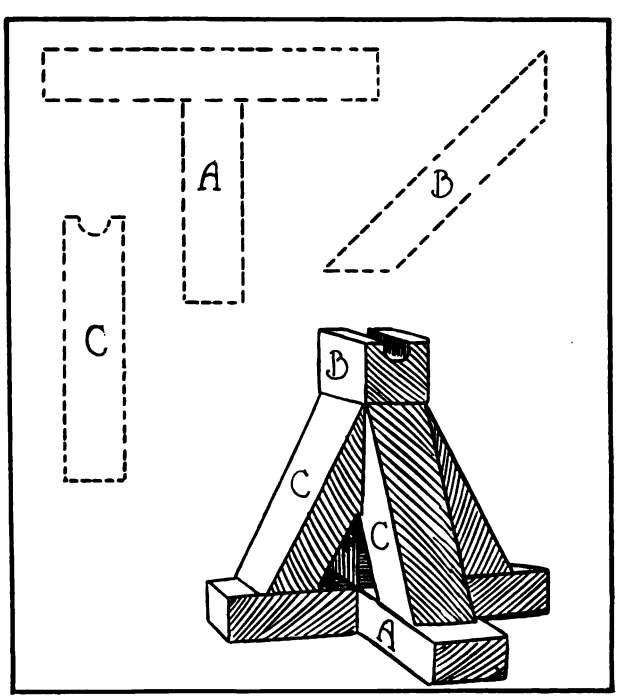


Fig. 1—Plan of Wooden Supports Made of Joist for Suspending the Chassis During Its Overhaul.

quite proficient in this respect, displaying a familiarity with the components of the motor car and the proper methods of assembling.

While the majority attend to their own repairs as a matter of economy, it is noted that some owners like to work around a machine although fully able to have the work done elsewhere. There is a fascination about the automobile and many excellent amateur repairmen have been developed through curiosity leading them to study its components and their relation to one another. Others merely become acquainted with certain factors in order to know what to do in the event of trouble on the road.

Many owners in overhauling the car lose considerable time and expend labor unnecessarily because of the lack of proper equipment. This should not be taken to mean that an extensive outfit is essential to place a car in first class shape as the work can be performed with ordinary tools aided by a few devices which may be constructed with little or no expense. These will depend upon the thoroughness of the overhaul. Some make it a practise to pull down the motor only, while others give the transmission and rear system attention, as well as the steering gear, springs, etc.

Regarding the motor, the amount of work to be performed will depend upon its condition. If the car has been in service but one season it may be possible to overhaul the power plant without removing it from the frame, the work calling for taking up the main bearings, connecting rods, camshaft bearings, removing carbon, grinding valves, etc.

If the engine has seen considerable service and the owner desires to make a thorough job the work will be facilitated by removing it from the chassis and dismantling so that a thorough inspection of each component may be had and new parts secured if needed.

A motor stand may be constructed easily and is not expensive. Although made in several forms and so constructed that the engine may be attached and swung to permit work on the bearings as well as cylinders, one of this type is not necessary. One may be made easily with pieces of joists, these being bolted or nailed together, and if the work be done properly will answer all requirements.

At Fig. 2 A is depicted a stand made of two-by-four joists, a type requiring but little knowledge of carpentry to build, as all that is needed is a hammer,

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saw, nails and a try square to mark off the corners of the material and to line up the supporting members. The side members consist of two supporting legs with a top piece, and it will be noted that a brace is fitted, these members being so arranged as to strengthen the structure. Two cross pieces are attached at each end to take care of side stresses.

This plan makes for sturdiness and will support the heaviest of motors and permit of heavy work being done. No dimensions are given because of the different designs of motors and their manner of suspension in the frame. In planning a stand the supporting arms of the engine should be measured carefully and the stand made wide enough so that when the former is lifted out and set upon the side rails, there will sufficient room to permit the use of a wrench in removing the lower half of the crankcase. The bolt holes in the arms should be in the centre of the supporting members of the stand and the power plant may be bolted down if desired by screw bolts, or holes drilled through the wood and bolts and washers utilized for fastening. In considering the height of the stand it should not be made too low for comfort in working as a backache will be the result of improper dimensions.

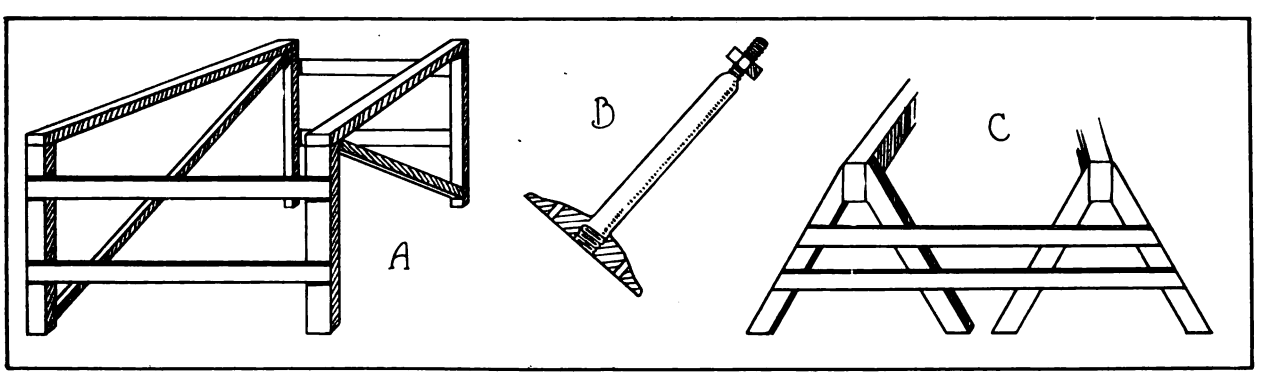


Fig. 2—Forms of Motor Stands for Facilitating the Overhaul of the Power Plant: A, Support Made from Joists; B, Bench Stand, Four of Which Provide an Adjustable Device; C, Method of Utilizing Sawhorses.

Where the garage is equipped with a substantial workbench the repairman may desire to transfer the motor from the chassis to a point where the light is better and the tools handy. At B is shown a stand or support which has the advantage of being adapted to any size of motor inasmuch as its construction permits of this service.

It consists of a piece of 1.25 or 1.5 round steel of sufficient length to permit the bottom of the crankcase to clear the bench at least three inches. The bottom of the support is threaded and screwed into a foot plate and the latter is drilled to take three screws or bolts for fastening the device securely. The upper part is turned down to the size of the holes in the motor arms and then threaded to take a nut. About .625-inch threaded part will fit the average motor. Four of these supports are constructed and when attached to the bench will enable one to get at the bottom half of the crankcase easily.

Sometimes there is a pair of substantial saw horses available and these may be utilized as shown at C. They are spaced apart, the distance being determined by measuring the motor arms. After the engine has been removed from the chassis and set upon the supporting members, strips should be nailed to the saw horses as depicted in the drawing.

If the plan of overhaul calls for the removal of the wheels and extensive work upon the chassis, supports should be constructed for the front and rear axles. If the machine has been jacked up for the winter and wooden supports utilized, these may be used in the overhaul. If the garage be not equipped with these members a set should be made, and at Fig. 1 is presented a substantial support which may be made from two-by-four joists. Six pieces are required. The first step is to cut two members and fasten together as shown at A. The member B is recessed at one end as indicated and the wheels measured to provide for the proper height. This may be accomplished by measuring from the centre of the hub cap to the ground and adding about three inches so that the tires will clear the floor when the supports are in place. The member B is then nailed to A as shown, and three braces made as outlined at C.

Four of these supports are constructed, one for each wheel, and when the chassis is raised from the floor will facilitate the examination of the steering gear and connections, bearings, etc., as well as adjusting these members after overhauling.

In connection with the work it is an excellent plan to secure several wooden boxes for the nuts, bolts, etc., and by using a number and marking these according to the part of the chassis dismantled, the work of assembling will be made easier and considerable time saved that would otherwise be lost in searching for the proper nut, etc.

GEAR SHIFTING HINT.

With some multiple disc clutches, especially in cold weather, the operator experiences more or less difficulty in effecting a change of gears. This is especially true when starting from a standstill and the

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first speed is utilized. The same trouble is experienced as when in going from the low to the second. This is usually caused by engine shaft revolving at too great speed, or in other words the motor is being fed too much gas, even with the throttle apparently fully closed.

If the carburetor be examined it may be found that the locking device or set screw that regulates the closing of the throttle valve will permit of shortening or lengthening as the case may be so that the amount of mixture fed to the cylinders may be cut down. The locking member should be loosened and the screw adjusted with the motor running until the engine operates as slowly as possible without stopping. If the valves be seated properly and there are no leaks in the induction members and the mixture correct, a motor should throttle down so that the explosions may almost be counted. In making these changes the leads connecting with the lever on the steering wheel will have to be shortened or lengthened as needed to compensate for the change made at the carburetor.

After making these adjustments the car should be tried out and the speed changes should be made easily without the clashing of gears as formerly. In connection with the multiple disc the average operator is apt to neglect this member, not cleaning it until the gear changing becomes troublesome. It should receive attention after being operated a certain number of miles.

ROCKING THE MAGNETO.

When the careless methods employed by many motorists in cranking the car are considered the number of accidents are remarkably small. Much has been written and said relative to the proper way of starting a motor, but in spite of the warnings the automobilist continues to endanger his bones. Some cars are fitted with a dual ignition and this arrangement sometimes breeds carelessness upon the part of the operator, who when his batteries become exhausted relies upon the magneto if it be of the true high-tension type. Some cars will start with this device upon a quarter-turn of the starting handle while others require spinning. To obtain momentum enough some drivers push down on the starting handle. While this is bad practise, what is worse is to rock the handle up and down as in testing the compression.

The construction of a magneto is such that when the armature reaches a certain point the current produced is at its maximum or the point where ignition takes place. If the spark occur before the piston has reached the top of its stroke or dead centre, the result is a premature explosion or a backfire. The rocking motion being a slow one and the piston not being brought up to dead centre or enough energy being brought to bear on the starting handle to cause the piston to pass by this point, the result is that the starting handle flies backward or anti-clockwise, endangering the operator.

FREEZING PUZZLES THE OPERATOR.

An unusual case of the steering gear freezing was noted recently and for a time it puzzled the operator. The car had just come off the washstand when the owner appeared in the garage and took the machine out. It was an exceedingly cold day and after driving a short distance the operator noticed that steering became more and more difficult. Finally it became so bad that the vehicle was almost uncontrollable. In response to a telephone message to the garage a workman appeared and by setting upon the dash he and the owner managed to steer the car back to the garage.

The front wheels were jacked up and an examination of the steering gear and connections made. It was found that the wheels responded more easily to the steering member and a further examination developed the fact that ice had formed on the steering connections. After this had been thawed out the machine operated as well as could be desired.

CARE OF THE STEERING GEAR.

The failure of any part of the steering mechanism is, without exception, the most serious mechanical accident which can happen to a motor car. A failure of the steering control is almost sure to result in an accident of more or less severity, and too great care cannot be exercised in keeping all of the connections in a perfectly secure condition and the moving parts well lubricated. Backlash, or lost motion, should be eliminated as far as possible. After a car has been used for some time, it may become necessary to correct this looseness by adjustment of the joints or other parts. Means are usually incorporated for the taking up of the lost motion and in performing this work the front wheels should be jacked up to test the mechanism which should not be adjusted too snugly. If the spindles be worn these should be bushed to eliminate the side play which might become dangerous especially in the spring when the roads are full of deep, frozen ruts. Under such conditions the strain upon these members is unusual.

WILL MAKE ELECTRICS.

William E. Pratt of the Pratt Manufacturing Company, Joliet, Ill., has purchased the personal property of the Economy Motor Car Company of that city, and expects to acquire the real estate owned by it as well. It is announced that Mr. Pratt will turn his attention to the manufacture of electric vehicles of the light delivery and roadster types.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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Self Starting System

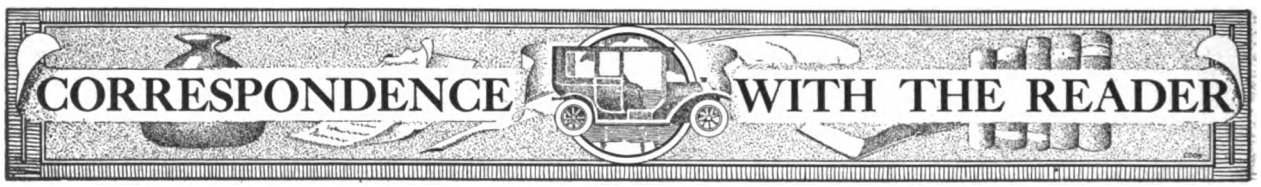
¶ We will equip any car in our line with our most practical self starting system (not including gas tank) for only twenty dollars additional.

¶ This system we believe to be the best made. So simple a child can operate it. Nothing complicated or intricate. Put on the car in less than one hour.

¶ Write at once for full particulars.

The Willys-Overland Company
Toledo, Ohio

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Insulating Magnetism.

(1343)—Has any substance been found that will insulate magnetism? G. F. LEWIS.
Renfrow, Okla., Feb. 25.

As far as the writer can ascertain from reliable sources there is none.

Proper Wiring.

(1344)—I have a two-cylinder, four-cycle automobile and employ dry cells for ignition. Will you advise me as to the proper wire to use? Shall I employ a high-tension cable or a low-tension wire, and which is the best? I. K KIRTTEN.
Kenyon, Minn., Feb. 20.

Wires utilized in connection with the ignition systems of motor cars are distinguished by their insulation. These are termed primary and secondary. The former may be recognized usually by their size, being much smaller in diameter than the other type, and this is due to the insulating material employed.

The primary wire does not require as large an amount of insulation because the current which flows through the copper strands is a primary current. This type of wire is suitable for connections from the batteries to switch and frame. The high-tension wire or cable, as it is sometimes called, is employed to convey the electricity from the coil or magneto where the primary current in the former has been built up or strengthened, which is brought about by the windings in the coil. This is necessary to enable the electricity to jump across the gap of the spark plug. This current seeks to escape and to prevent this the metal wires are covered with several layers of rubber and specially prepared material.

This form of wire should be employed in connecting the terminals of the coil and those of the spark plugs, and from a high-tension magneto to the plugs. If primary wire were utilized the electricity would escape, jumping to the nearest metal or ground, and would not cross the gap of the spark plug as previously explained.

Loss of Power.

(1345)—A small car loses power, or at least does not develop that which it should. Will the replacing of the present piston rings with new members develop the power expected? Are new valve springs fitted frequently to save compression? Will a carbonized condition of the engine cause a depreciable loss of power? L. A. ENOS.
San Luis Obispo, Cal., Feb. 29.

Loss of power may be the result of a number of causes such as poor compression, faulty ignition, valves not seating properly, valves out of time, etc. The fitting of new rings will improve the power if the old members are worn badly, but the gain would not warrant the expense if the cylinders were scored badly or worn out of true. As to grinding the rings the writer believes that they should be stoned smooth before fitting to the cylinders unless they are already ground by the manufacturer. This may be accomplished with an oilstone and it is an easy matter to polish them. New valve springs should be fitted when the old members have lost their elasticity, but this is not common, as when constructed properly these members will give long and efficient service. If a motor be carbonized it should be cleaned. Carbon will cause a loss of power and when there is a large amount present preignition is likely to occur and create trouble.

Relative to the Knight Motor.

(1346)—Will you kindly inform me what automobiles are equipped with the silent Knight engine? What machines are fitted with the electric starting device, same as is employed on the Cadillac, and what makes, if any, furnish the Edison instead of the Exide battery, for storing the current? HORACE P. TOBEY.
Wareham, Mass., March 1.

The machines licensed in this country to fit the Knight engine consist of the Columbia, Stoddard-Dayton, Stearns, Atlas and Edwards, the latter having been announced recently. Regarding the machines fitted with the Delco starting and lighting system the Dayton Engineering Laboratories Company, Dayton, O., maker of the device, could supply the necessary information. As to the battery, the Edison Storage Battery Company of Orange, N. J., would be the proper concern to give the information required.

Dual Ignition.

(1347)—Will you please explain the dual ignition? I visited the Boston show recently and secured a number of catalogues and note some makers state their car is fitted with dual ignition consisting of battery and high-tension magneto, but the cars I looked over had but one set of spark plugs and no timer or distributor. Another machine has two sets of plugs and both a magneto and dry cells. One representative informed me that his machine had a dual system, but it was fitted with a magneto and a single unit coil. J. E. RATHBUN.
Wood River Junction, R. I., March 5.

The term dual ignition is not generally understood and as employed is slightly misleading. This same holds true of magnetos, as some of these are called high-tension when they generate a low-tension current which is built up by a coil or a transformer. Many machines are fitted with magnetos alone and their construction is such that the current from dry cells or storage battery may be employed through the distributing mechanism for starting and operating the motor and this form is called a dual ignition system. The true dual ignition, however, consists of

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two separate systems, one operated by cells or storage battery, timer or distributor, and coil, and connected to a set of spark plugs. The other member is a true high-tension magneto with wires leading direct to the other set of spark plugs. The advantage of such a system is obvious. Should the magneto fail to operate the battery and coil system could be utilized or vice versa.

Choice of Ignition.

(1348)—I have a four-cylinder car which is equipped with a timer, four-unit coil and storage battery for ignition. The coil has been giving me considerable trouble and as I am about to overhaul the machine, am thinking seriously of changing the ignition to a distributor and single coil or a magneto. There is a place to attach a magneto. Which would you advise?

W. R. BROWNING.

Stonington, Conn., March 7.

Disregarding expense the magneto would be preferable. These may be obtained of the true high or low-tension type, but with the latter a step-up coil or transformer would be necessary. With the former a coil could be dispensed with and the motor started without a battery system. The writer suggests retaining the old coil and fitting another set of spark plugs for the magneto, which arrangement will provide dual ignition. The exhaust valve caps could be drilled and tapped for fitting the plugs connected with the battery system and the usual members employed for the magneto. In ordering a magneto care should be exercised to state whether it is to be driven clockwise or anti-clockwise. Any maker of magnetos will give information as to the best model to employ with the car as the make is not stated.

High Speed Slips.

(1349)—I have a two-cylinder ——— car fitted with a planetary transmission, and of late the high speed slips in starting and after a while it grips all right, but slips when I open the throttle. I have tightened it up, but it still slips. I adjusted it once so tight that the car started ahead with the brakes off and besides it makes the engine hard to crank. Can you advise me as to what is the trouble?

W. L. TUCKER.

Westerly, R. I., March 8.

The trouble would indicate that the high speed plate is cracked or broken and this member should be examined. It will be impossible to repair the break satisfactorily and will be cheaper to install a new one, which is not expensive. The reason the clutch slips is that the plate spreads when an attempt is made to lock it. To install the new part it will be necessary to remove the transmission and dismantle the member. It is impossible to assemble it improperly as it will only go together as it should.

NEW REMY SERVICE STATIONS.

Arrangements have been completed with Child, Day & Churchill, Inc., Spokane, Wash.; Washington Auto Supply Company, Seattle, and the Archer & Wiggins Company, Portland, Ore., to act as Remy service stations in their respective cities. Each station will handle a full complement of the products of the Remy Electric Company, Anderson, Ind.; retain a corps of skilled ignition experts, and in every way care for the users of Remy equipment. This is following out the announced policy of the Remy company to establish service stations in all large centres.

EDISON GARAGE IN BOSTON.

Plans are announced for the erection of a private garage for electric and gasoline cars by the Edison Electric Illuminating Company, Boston, which is to be one of the largest, if not the largest in the country. Accommodations will be provided for 150 cars, and the structure will be located on Massachusetts avenue, near the tracks of the New York, New Haven & Hartford Railroad.

The building will face Massachusetts avenue at a slight angle, and will have a depth of nearly 340 feet and a width of 110 feet. The front portion will be three stories in height and the rear only one. In reality it will be two buildings, as the two sections will be entirely separated by a wall.

The front portion will be 110 by 80 feet, and the ground floor will be utilized for the storage of gasoline cars, space being provided for about 50. There will be all the modern facilities for handling these machines, including washing, polishing, filling with oil and gasoline, etc. Additional garage space for about 20 vehicles will be arranged on the second floor, reached by stairs and automobile elevator. The remainder of this floor is to be reserved for the use of chauffeurs. On the third floor will be located the repair shop and paint room, so that all necessary work can be done on the company's premises.

The electric vehicle garage in the rear is to be 110 by 250 feet, with entrances on the sides and end. Four rows of vehicles can be stored on the floor with plenty of room for handling the smallest runabout or the largest truck. This garage will accommodate at least 100 vehicles. Besides the usual facilities for washing, etc., there will be ample opportunity for charging batteries, and for removal and replacing these.

Next to the garage on one side will be the stock building of the company, where all supplies, except the heaviest, will be carried. There will be a street between the garage and the stock building, although this will be covered by glass, the idea being to make it possible to load motor vehicles with the greatest dispatch. As much of this work is done at night, the covered street will aid materially in having the cars ready for the morning deliveries.

Still another building for the heavy stock will be located just beyond the first stock building. The entire group will be lighted by electricity supplied by a transforming station still further back. Merchandise will be received from a spur track, and it is expected that the plant will be completed ready for occupancy within the coming year.

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The president of Uruguay has sent to Congress a bill to place certain omnibus motor cars intended for public service on the free list. The proposed law consists of one brief article, as follows: "Omnibus automobiles capable of carrying more than eight passengers and intended exclusively for public service are hereby exempted from the payment of customs duties."

In his message to Congress concerning this bill, the president advocated its immediate passage in order to enable the rural districts to obtain rapid and inexpensive transportation. As soon as the law is passed a firm expects to place two automobiles in trial service between the cities of Fray, Bentos, Mercedes and Dolores.

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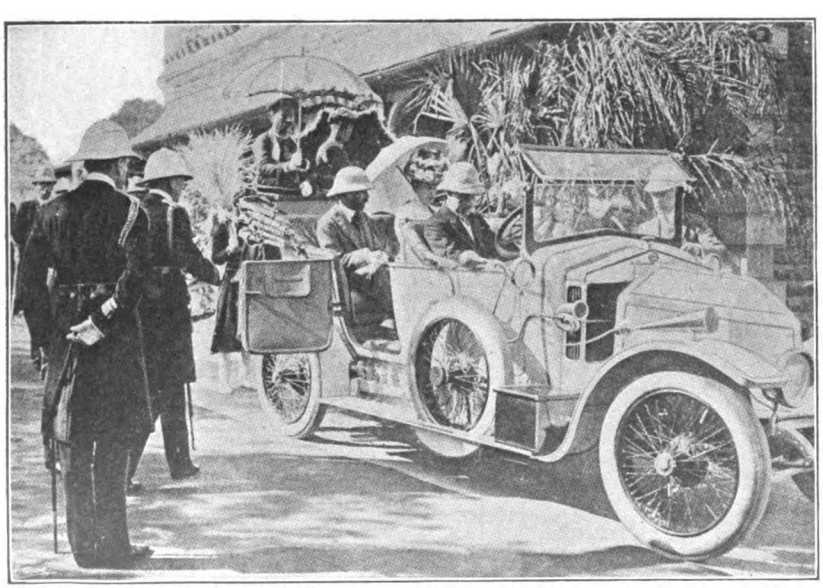
Previous to Nov. 30, 1911, motor car chassis and parts, the product of British manufacturers, were admitted into the commonwealth of Australia free of customs duty. The new revised tariff went into effect on that date, since which time British chassis have been paying a duty of 10 per cent., while those of foreign make pay an additional fee of five per cent. Parts of chassis, in no way assembled, are still admitted free from Great Britain.

★

An accompanying illustration presents King George V and Queen Mary of Great Britain in a Siddeley-Deasy car, upon the occasion of their recent visit to India for the purpose of being crowned Emperor and Empress of India. The photograph was taken in front of the residence of the chief commissioner of the central provinces.

★

The winner of the Winter cup in the annual winter trials of the Royal Automobile Club of Sweden early last month, has been announced as Capt. John Neren with an Opel car. As is well known the route lay from Stockholm to Gothenburg and return, a distance of approximately 600 miles. Owing to the severe cold weather and the poor condition of the roads, the results this year were not as satisfactory as has been the case heretofore, and it was some time after the close of the contest before the judges were prepared to announce their finding.



King George and Queen Mary of Great Britain in a Siddeley-Deasy Car During Their Recent Visit to India.

Ten cars completed the trials without penalization, but with one exception all these were marked for failure to meet the schedule. Capt. Neren's Opel was the exception, so that his was the only perfect score. The Gothenburg cup, for light cars, went to H. Karlsson in a Darling, while the King's cup, a special prize for cars of Swedish manufacture, was taken by Nies Lundberg in a Vivinus.

The classification of the drivers and cars at the close of the contest for large machines follows: First, Capt. Neren, Opel; second, H. Hjellgren, Vauxhall; third, W. E. Klund, Mathis; fourth, Has Osterman, Minerva; fifth, C. Johansson, Cadillac; sixth, N. L. Lundberg, Vivinus; seventh, Hugo Falck, Fiat; eighth,

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C. Shurmann, Minerva; ninth, Mr. Andrezen, Benz; 10th, Erik Akerlund, Mors; 11th, P. C. Kidner, Vauxhall; 12th, Carl A. Eck, Pope-Hartford.

★

It is expected that the action of the Russian government in granting triptyques will result in increased touring in Russia and Finland during the coming summer. The duty on cars with four seats or more is about $117, and the decision of the officials to adopt the same method employed in other Continental countries will make it possible to enjoy a new touring country without meeting this expense.

★

Numerous motor agricultural implements were shown in connection with the annual cattle show in Paris last month. As in former years the live stock was displayed in the Grand Palais, while the motor equipment occupied nearly the whole of the Esplanade des Invalides. America was represented by the J. I. Case Threshing Machine Company, Racine, Wis.

Several tractors and motor plows were exhibited, but it is possible that none attracted more widespread attention that the vehicle from the factory of Heinrich Lanz, Mannheim, Germany, shown in an accompanying illustration. The chief distinguishing feature about this machine, aside from its size, is the method of operating the plow.

As is well known the usual form of plows is such that the act of turning over the earth has a retarding effect upon the motor. In the Lanz machine, the plowshares, if such they may be termed, are designed to dig into the ground and throw the earth backward. This has just the opposite effect from ordinary, in that the plows aid in pushing the machine forward. This is a result of much experimentation.



Lanz Motor Plow Displayed at the Annual Cattle Show in Paris.

The engine is rated at 70 horsepower, and is a four-cylinder unit. Self-starting is accomplished by means of compressed air, stored in a large vertical tank by the vehicle motor. Parallel with the motor shaft is a secondary shaft geared down in relation to the first, from which the drive is taken to the live axle of the rear wheels by means of a single chain. From the outer end of the secondary shaft, a long enclosed chain transmits power to the rear transverse shaft carrying the revolving blades.

★

The deputy postmaster-general of Australia has announced the purchase at Melbourne of a motor car for $2750, which will be utilized in the transportation of mails between the postoffice, railway station and steamers at Hobart.

★

J. D. Ellis, mayor of Johannesburg, South Africa, is deeply interested in the matter of mechanical transportation and has given the subject extensive study. He declares that no firm of any size can carry on business economically without the use of motor cars. It would appear that an excellent market is being worked up for automobiles, both of the pleasure and commercial types, in the Transvaal.

★

An item of some interest to motorists comes from Germany in the announcement that the German navy is about to test a Diesel engine on its warships. The type has been improved somewhat, and has the approval of several expert engineers in that country. The advantage of using an internal combustion engine in such work is that boilers and stacks would be abolished, thereby giving considerable additional space for the disposition of ammunition, etc. Some of this room would be the result of dispensing with coal bunkers, as it is estimated that a Diesel engine will require less than half a pound of oil a horsepower-hour. The principle object of the experiments now under way is to secure perfect combustion to enlarge the cylinder units and to solve the problem of having the explosion transpire on both sides of the piston. German engineers claim to have obtained satisfactory results.

★

An exporter of automobile supplies and accessories on the Mediterranean has informed the American consular agent that he desires to get in touch with American firms manufacturing any of the following articles: Horns and alarm signals, lamps of all kinds, windshields, repair kits and tools, bolts, nuts, washers, oil cups, pumps, solderers, soldering lamps, holders for flower vases, drinking cups, clocks, speaking tubes, speed indicators, cyclometers (marked in kilometers), vulcanizers, steering wheels, jacks, springs, shock absorbers, ball bearings, goggles and a general line of fittings of any kind applicable to the automobile. The

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address may be obtained of the bureau of manufactures, Department of Commerce and Labor, Washington, D. C.

★

The report of the Department of Commerce and Labor for the year ending Dec. 31, 1911, shows that the exports of motor cars and parts increased from $13,190,296 to $19,178,484, or practically 46 per cent. during the past year, while the imports have dropped from $2,737,208 to $2,446,248, a decrease of about 10 per cent. Canada still remains America's best customer in this respect, the figures for that country being $5,549,998 for 1911, or more than 25 per cent. of the total. The following tabulation gives the number and value of automobiles exported and imported during the year, so far as these figures are given by the report:

Exports

	1910		1911	
Country	No.	Value	No.	Value
United Kingdom	...	$2,755,592	4,021	$3,380,266
France	...	753,204	420	449,757
Germany	...	331,754	115	124,615
Italy	...	377,750	176	199,986
Other Europe	...	764,463	795	718,360
Canada	...	5,021,043	4,987	5,549,998
Mexico	...	689,903	298	492,974
West Indies	...	412,588	300	343,281
South America	...	519,160	1,116	1,356,445
British Oceanica	...	748,933	2,476	2,217,762
Asia	...	599,756	813	795,576
Other countries	...	216,150	280	295,341
Totals	8443	$13,190,296	15,807	$15,924,361

Imports.

	1910		1911	
Country	No.	Value	No.	Value
United Kingdom	94	$212,969	173	$403,506
France	556	1,066,356	341	770,643
Germany	129	314,577	160	350,239
Italy	169	312,478	131	203,733
Other countries	76	174,175	167	370,360
Totals	1024	$2,080,555	972	$2,098,481

By comparison of these figures, it is noted that the value a car of those exported during the last year was about $1000, whereas those for 1910 averaged $1550 each. If the figures for 1909 be included in the comparison, the average price for that year was $1675. In the matter of imports the valuation has been drifting the other way, the figures showing: Average value for 1909, $1875; 1910, $2000; 1911, $2100.

It also will be noted that the so-called American invasion has had its effect upon the British possessions. Canada has done little more than hold its own, but the British Isles and British Oceanica have been purchasing American cars in so much larger proportions that the total gain is approximately 31 per cent. for the year.

The most notable increase is in connection with South America. In 1909 automobiles to the value of $225,263 were shipped to that continent. This changed very little in 1910, but the increase for 1911 is a little better than 196 per cent., indicating the advisability of exploiting this market.

At the February monthly meeting of the graduates of the Institution of Automobile Engineers in England, Harold Burchall gave an exceedingly interesting and informative paper on the subject of "Pneumatic Tires." The paper was illustrated with sections from tires, showing the effect of various classes of ill treatment, such as the rubbing of the side of the tire against the curb, rust on rims, admission of wet through cuts, etc.

Suggestions were given as to the best arrangement of non-skid devices on the four wheels with a view to meeting the various road conditions. Special attention also was drawn to the necessity of maintaining the correct pressure of air.

★

Cape Colony, South Africa, offers a splendid market for automobiles and motor trucks, according to recent advices from Cape Town. The interest is by no means confined to the cities, many prosperous farmers in the up-country districts having begun to invest in motor cars, some of them owning small fleets. Physicians and other professional men, whose business takes them long distances into the interior, are splendid prospects.

★

K-R-I-T cars, made by the K-R-I-T Motor Car Company, Detroit, Mich., are to be represented in Great Britain in the future by a local concern. The K-R-I-T Motor Car Company, Ltd., has been organized with offices at 24 and 25 Long Acre, London, W. C., and F. W. Berick & Co., Ltd., is acting as the London agent.

COLLEGE MEN AND TIRES.

According to W. D. Shilts, manager of salesmen for the Goodyear Tire & Rubber Company, Akron, O., the development of the finer details of the tire industry was never more forcibly exemplified than at present. "Rubber and tire manufacturers are reaching out in every direction for experts, for trained men," says Mr. Shilts. "The Goodyear Tire & Rubber Company has in its employ, in the experimental and other departments, not less than 17 alumni of Massachusetts Institute of Technology, to say nothing of those of other first class colleges. Tire makers realize that there is a difference between modern and old time business methods, and they are equipped accordingly. University men have had a great deal to do with bringing the tire industry to its present state of advancement and perfection. Goodyear university men could form a football team that would include names very well known on the gridiron, and their achievements in the laboratory are not less noteworthy."

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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PORTO RICO PROSPECT EXCELLENT.

Trade prospects in Porto Rico are excellent, according to John B. Tower, manager of the expert department of the United States Tire Company, New York City, who has returned from a visit to that island. He adds: "Every ship bound for Porto Rico has from two to six American cars, yet the residents do not seem to be able to get them fast enough. At present there are 726 machines owned on the island which has a population of 118,000. The island is a fine market for good cars. The rich can afford to buy them while the other class is too poor to pay any price. Practically all of the motor cars are American products. The roads are fine and provide excellent facilities for touring. Porto Ricans are extremely enthusiastic over the automobile and use them continuously." Mr. Tower visited the principal places and announces that the distributing point for United States tires will Be at San Juan.

BOWSER SALESMEN CONVENE.

Salesmen and officials of S. F. Bowser & Co., Inc., Fort Wayne, Ind., met recently in that city for the annual convention of the prize winning salesmen. The meeting occupied several days and representatives from all over the country were in attendance. A special issue of the paper devoted to the interests of the company was issued, and among matters of interest concerning the convention was the information that W. H. Brown of the Atlanta, Ga., office, won the loving cup and that J. W. Merickel, of Toronto; E. J. Klotz, San Francisco, Cal., and S. D. Stoddard of the same city, had won the honor of having their names inscribed on the bronze tablet that adorns the office wall at the factory. During the convention addresses were made upon subjects pertinent to the industry, and a feature was a banquet at which covers were laid for 125.

INDIANA ENGINEERS ORGANIZE.

Twenty-three automobile engineers met recently in Indianapolis, Ind., to effect a temporary organization of the Indiana section of the Society of Automobile Engineers. Those who will form the nucleur for the branch are: George Weidley, Premier Motor Manufacturing Company; William C. Wall, National Motor Vehicle Company; William H. Reynolds, American Motors Company; E. A. Ryder; Charles S. Crawford, Cole Motor Car Company; Chester S. Ricker; D. T. Brownlee, F. W. Spacke Machine Company; W. H. Buderus, mechanical engineer; Max H. Thoms, Nordyke & Marmon Company; A. W. Tyler, Jr., Auto Parts Manufacturing Company; E. E. White, American Motors Company; William Beaser, Whitmore Manufacturing Company; J. P. Kandel, Auto Parts Manufacturing Company; Henry G. Hoss, Vonnegut Machine Company; C. H. Mohler, American Motors Company; C. M. Barlow, F. W. Spacke Machine Company; Robert D. Zener, Premier Motor Manufacturing Company; Bruce Isthimer, B. F. Goodrich Company; J. O. Fink, Premier Motor Manufacturing Company; A. J. Schumacker, Atlas Engine Works; W. A. Englehart, Premier Motor Manufacturing Company; Karl Felicke, Motor Car Manufacturing Company.

REO INCREASES OUTPUT.

The daily output of Reo cars, made by the Reo Motor Car Company, Lansing, Mich., has been increased to 60, according to R. E. Olds, president of the company. This is due to the better financial conditions of the country and the selling organization of the R. M. Owen Company, New York City, distributor of the Reo line.

The demand of this concern for more machines means the addition of 2500 more workmen to the payroll of the factory, which now comprises seven large buildings, the distance around which is stated to be about a mile. The company maintains its own electric lighting plant and water works and the protection against fire is most modern. The telephone system maintained serves 120 heads of departments.

All vehicles are tested over a banked track, one-third mile in length including an incline of 30 per cent. leading to a trestle over the buildings to the shipping dock. Another large platform constructed recently provides loading facilities for 30 carloads of machines daily. Another recent acquisition is a dining room seating 750 employees. The Reo Motor Car Company cordially invites all motorists as well as those interested in the manufacture of automobiles to visit the plant through which they will be shown by competent guides.

SPLITDORF RACING DATA.

The resume of the racing season, the performances in the different events, are always of interest to the motorist. C. F. Splitdorf, New York City, maker of Splitdorf ignition specialties, has issued an interesting publication which contains a resume of cars fitted with his ignition in competition on road, hill and track and it provides a useful book of reference. It is copiously illustrated and the leading events of 1911 are depicted clearly. The records are authentic and exhaustive and summarized show that Splitdorf ignition has a record of 10 firsts, seven seconds, seven thirds in road racing; 84 firsts, 56 seconds, 30 thirds in track events; 45 firsts, 24 seconds, 16 thirds in hill climbs, and 29 firsts, 20 seconds and 16 thirds in beach races, besides victories in motor boat racing, motorcycle and aviation. A free copy of the brochure can be had upon application to C. F. Splitdorf, 138th street and Walton avenue, New York City, or at any of the branch houses.

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ILLUMINATING THE ROAD AT CURVES.

Device for Swivelling the Headlights with the Road Wheels from the Driver's Seat---Lamps Also May Be Tilted for Reading Signs, Etc.---Simple and Efficient Solution of an Interesting Problem.

(By Joseph P. Fox.)

THE DESIRABILITY of arranging the headlights on an automobile so that they will swivel with the steering, thus illuminating a curve to be taken by the car, instead of first being obliged to turn the vehicle fully into the new path before the road can be lighted up, is well established. It is clear that a long range of brilliant light is absolutely necessary for the safety both of the occupants of the car and the other users of the highway. The road must be illuminated for such distance as to give the driver time to stop his car from high speed after an obstacle has been sighted. When travelling at say, 20 miles an hour, a distance of at least 100 feet is necessary, and this increases with the speed of the machine.

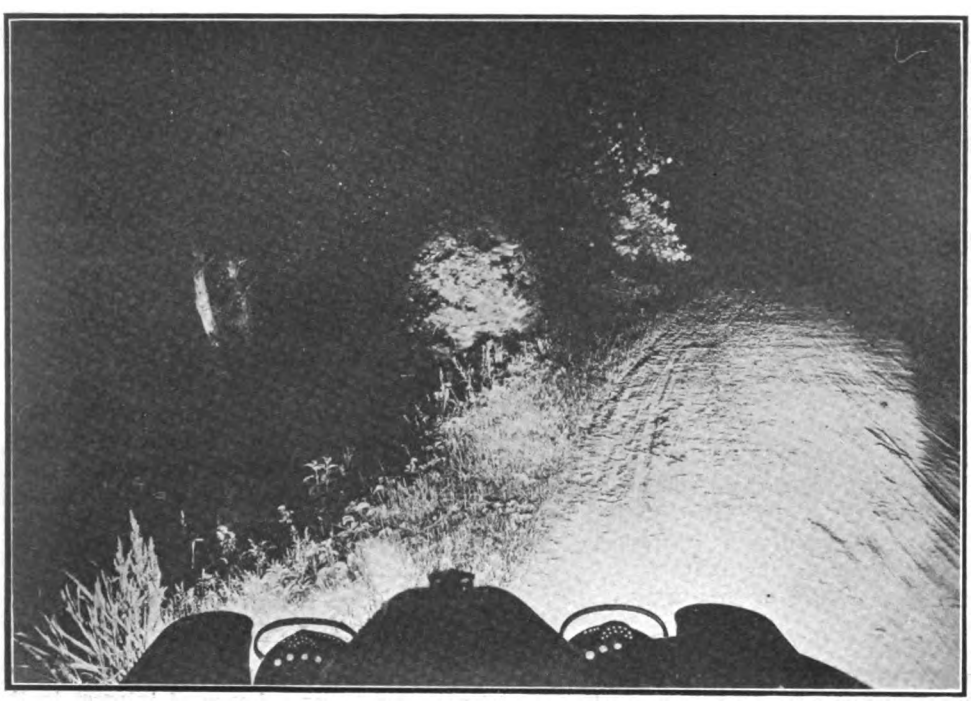


Fig. 1—Illustrating Position of Ordinary Lamps with Reference to Car About to Turn to the Left.

To secure such a light it is necessary to construct the reflector and lens in such manner that the beam of light shall be almost parallel. Of course a lamp of this character does not illuminate the sides of the road immediately in front of the car as well as one which is constructed to give a beam of greater diverging angle. It is because of this that side lights are employed on motor vehicles, in addition to the headlights.

The practical lighting value and length of the light beam decreases very rapidly as the angle of divergence is increased, therefore this angle in the side lamps also must be normal. These lamps, if well constructed, give good service in lighting the sides of the road, and in passing other users of the highway, but they are not sufficient to illuminate the path in turning corners.

It is stated by experts that even should the headlights project beams having an angle of divergence as great as 24 degrees, the light rays still would be insufficient to illuminate the curves, and that such a beam, unless the source of light were of unusual power, would not be able to illuminate the path sufficiently far ahead to be of any practical service on country roads. The lateral rays would be devoid of strength and such a beam would squander great portions of its light value. Furthermore, the blinding dazzle from a beam of such divergence would be dangerous.

It is the side reflected light which is so disagreeable and dangerous to pedestrians. The unreflected, almost parallel beam lights up the road so far ahead that it is possible to drive at full speed over a dark country road, and to people meeting this light, except when they are a long way in front of it and directly in the path of the car, there is no dazzle. As they come out of the parallel beam, they obtain light enough from the side lamps to see the sides of the road up to the mudguards of the vehicle.

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From the driver's point of view, objects not well illuminated by the lamps are less visible than if no lamps were used, and the night around appears to be darker. One illusion about driving on a dark night is that of being on the approach of a blind corner where the road appears to end abruptly, this corner being the furthest point ahead to be seen. Accidents often are the result of having poor lamps or lamps with quick diverging beams, either of which makes it impossible to distinguish between the real and imaginary blind corner, or other danger. As a result, the driver, having become accustomed to the imaginary blind corners, is apt to take chances, which sometimes spells disaster.

Problem of Swivelling Lights.

With due consideration of these conditions, it is evident that lamps projecting almost parallel beams, so constructed as to swivel with the wheels and illuminate the road to be taken, are proper for power vehicles. But there are a number of important constructive features to be considered, as well as many difficulties to be overcome, in the production of a practical lamp device for swivelling the headlights, some of which may be enumerated as follows:

Absolute safety. Stability of the lamps in all positions and absence of vibration. Easy movement, avoiding any noticeable friction or pressure on the steering post. Light weight. Simplicity of construction; of attachment; of adjustment; of take up in case of wear without being obliged to renew the parts. Simplicity of operation. Enclosure of all moving parts. Symmetrical lines to conform with the fastidious requirements of modern motor car construction.

The writer has given this subject careful study and has invented the swivelling lamp device described and illustrated herein. It not only provides for illuminating the road in front of the vehicle at corners, but is so arranged that it is possible to deflect or disconnect the lamps by hand from the driver's seat. Moreover, it combines all of the elements above mentioned.

Advantages of Fox Device.

The danger of driving around curves in the night already has been commented upon. The illustration at Fig. 1 is taken from an actual night photograph and shows the inadequate lighting of a curve even with the best of lamps which are not made to swivel with the steering wheels.

As a matter of fact, there is no side street or curve in the picture, but the forward portion of the car is at the extreme left of the road, with the front wheels turned fully to the left and the remainder of the car partially so. Everything is in exactly the same position as if the machine had been steered toward a road to the left, and were about to be driven around a sharp corner in that direction. It is easy to imagine a road to the left in the photograph, and if such were the case it readily may be seen that it would not be illuminated to the satisfaction of the driver.

Fig. 2 presents a car fitted with the Fox swivelling lamp device, and it will be noted that the headlights are turned so as to project their beams fully in the direction which it is desired to take. Of course, there are other devices upon the market which aim to bring about this condition, but it is not the object of this discussion to enter into the comparative merits of these inventions. Special interest attaches to the methods employed in bringing about the desired results in this construction.

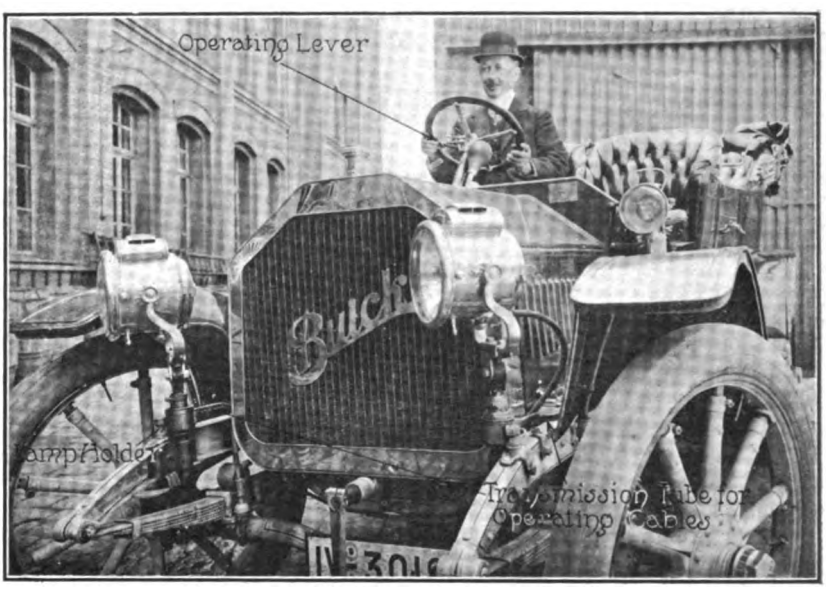


Fig. 2—Car Equipped with Fox Swivelling Lamp Device About to Turn to the Right.

It has been stated that this device is operated from the driver's seat. Fig. 3 shows the operating mechanism at this point, the movement of the lamps in a lateral direction being accomplished by the lever mounted on the steering column as indicated. Fig. 4 brings this out still more clearly.

The lever 1 is pivotally connected to a sleeve 2, or to a bracket-like projection thereof, by which the lamps are driven. It will be seen that the outer end 3 rests against a spoke 4 of the steering wheel 5 in such manner that it can be disconnected instantly. When in the position shown in the drawing, any movement of the wheel will carry the lamp controlling device with it, thereby turning the lamps when the road wheels are turned.

This lever is firmly pressed against the spoke by the spring 6, arranged about a pin 7. This portion

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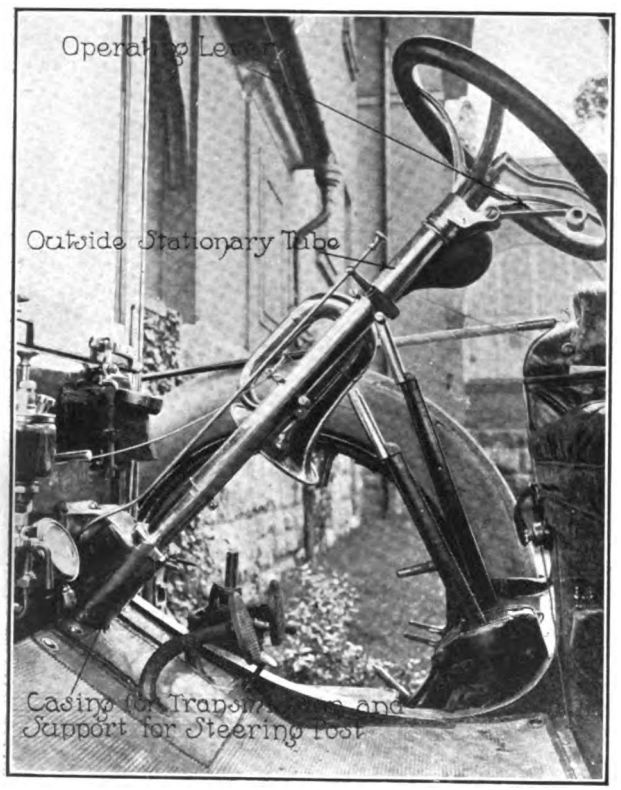


Fig. 3—Steering Column Equipped with Fox Lamp Turning Device.

of the mechanism is of spring steel, so that it is possible to release the clutch, as it is termed, automatically, when excessive resistance occurs in consequence of any part of the mechanism for adjusting the lamps becoming clogged. In this manner all danger to the occupants of the car, due to the possible breakage of the lamp adjusting mechanism, is avoided.

It is preferable, particularly when rounding corners at high speed, to turn the lamps more quickly than the road wheels, and to this end suitable gearing is interposed. In the drawing at Fig. 5 A, the required ratio of transmission is obtained by proportioning the pitch of the threads 12a of the sleeve 12 and the screw wheel 13. Consequently the rotation of the lamps throughout their entire angle of deflection is terminated earlier than the slewing of the wheels. Thus it is that the lamps are ready to throw their beams into the road ahead, before the road wheels are fully steered around the curve or corner.

Disconnecting the Lamps.

When the lever 1 is in the position shown at Fig. 4, it is impossible for it to free itself and jump between the spokes of the steering wheel, because of the set screw 10, abutting against the extension of the sleeve 2. Arrangement is also made for putting the device out of action when it is desired to drive in the daytime or in lighted streets, where the swivelling lamps are not needed.

In this case the end 3a of the lever 1 is rocked downward out of the position shown at Fig. 4, when the adjusting mechanism is disengaged from the steering gear and the lamps remain arrested in their middle position. Obviously, the lever can be actuated by hand in every intermediate position in a convenient manner for turning the lamps. If they are to be arrested after this lever has been disengaged from the steering wheel, this can take place in the lower position of the lever by hooking its outer end into a suitable hole 11a in the fixed steering column 11.

To recapitulate: It will be seen that the lamps may be placed stationary, or instantly connected with the movements of the steering gear to follow automatically the angle of the road wheels in lighting the curves before the car has entered them. In addition, the lamps may be deflected by hand or foot, independently of the steering gear, so as to make it possible to read mile stones, sign posts, street names, house numbers, etc.

How Lamps May Be Tilted.

This is a feature which will be appreciated by all who have travelled by motor car in the night season. It is decidedly disagreeable to be obliged to leave the machine and hunt around in the dark with matches or small lamps to find and read the necessary directions. The convenience of being able to utilize the headlights of the car for this purpose is evident, especially when this may be accomplished by the simple movement of a lever near the driver's seat.

That portion of the device which enables this deflection of the lamps is outlined at Fig. 5C, and comprises a cable 23a connected with the lamps in a manner described later with reference to the lamp holders. This cable is attached to arms 20a of the lever 20, and is guided in the tube 14 to the pulley

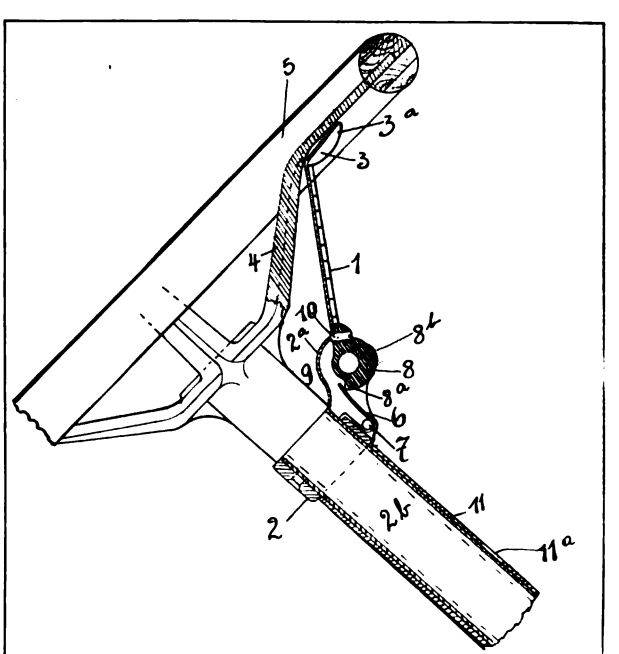


Fig. 4—Operating Lever and Mechanism of Fox Lamp Control.

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35 of the lamp holder, Fig. 5D. The arms 20a are connected with the lever 20 by means of a shaft. This lever is within easy reach of the driver's seat and may be operated either by the hand or foot. When it is operated, a suitable tooth is let into the various holes or recesses 18a of the case 18, corresponding to the different position of the lamps.

The Lamp Holder.

In Fig. 5D is shown the manner in which the motion of the driving mechanism is imparted to the lamps. The holder consists substantially of two parts —the lower outwardly screw threaded casing 24 for screwing into the bracket, and the upper rotating part 30, into which is led one of two flexible shafts 23. An inner tube 32 is connected with the upper part 30 by means of screws, and serves as a guide for the hollow supporting stem 33 of the lamp fork.

upward for reading signs, etc., but downward, so that it is possible to deflect the blinding light from the eyes of other users of the highway, when passing through cities and towns. This is a feature which eliminates the necessity for extinguishing the headlights, or reducing their brilliancy by means of other attachments.

The outside of the rotating part 30 is provided with an annular groove 30a, in which the ropes 23 and 23a are placed before this part is inserted in the casing. The cable 23 is for the purpose of swinging the lamps in a lateral direction, while cable 23a operates the tilting mechanism, as previously explained.

Operation of Swivelling Action.

At A and C may be seen the tubes 14 in which these ropes are conveyed to the lamp holder. It also will be noted in D that the cable 23 is placed in the

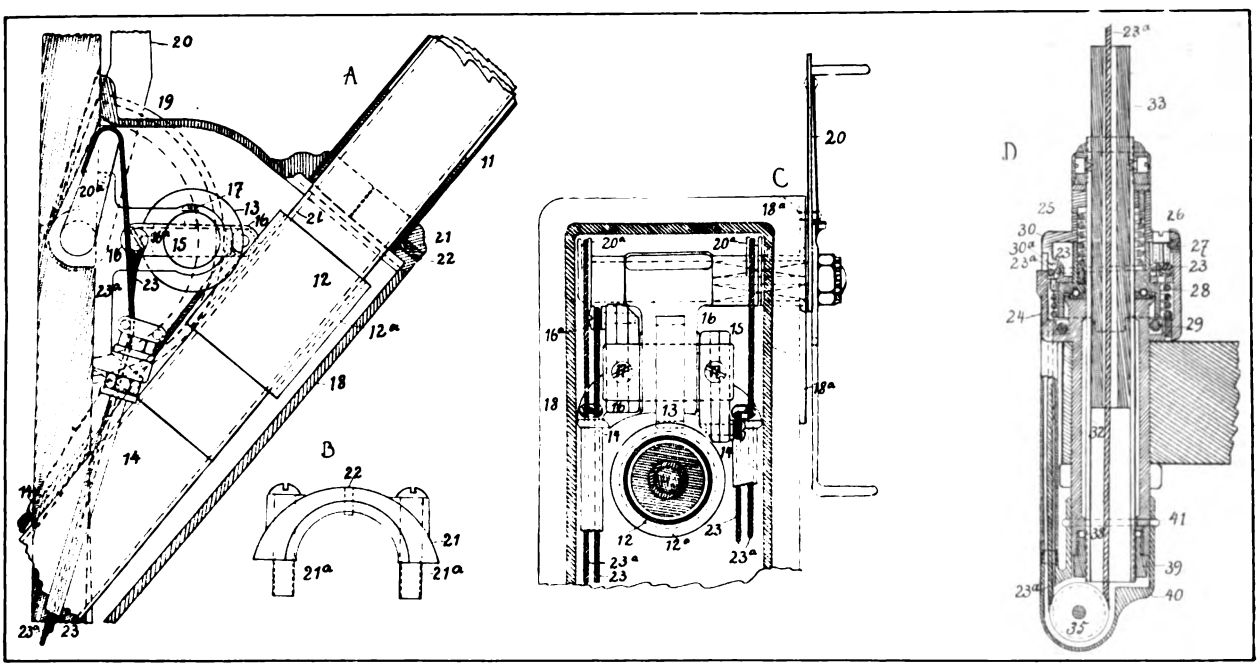


Fig. 5—A, Transmission Mechanism; B, Clamp for Holding Casing; C, Device for Tilting Lamps; D, Lamp Holder.

The rotating part is mounted on ball bearings 38, which serve as an abutment for the nut 39, screwed on the tube 32 and prevent the rotating part from being lifted. Another set of ball bearings is interposed between the intermediate member and an inner lug of the casing 24, this serving to support the lamps and rotary parts. By this arrangement the heaviest lamps may be turned as easily as those of the lightest construction.

The lamp is tilted in the following manner: By moving the lever 20 upward the cable 23a is pulled out of the tube 14. As this cable passes over the pulley 35 in the lamp holder, it pulls the lamp either upward or downward, according to whether it is attached to the rear or front portion of the lamp. Reverse action is accomplished by means of a spring. It will be seen that the lamps not only may be tilted

annular groove 30a and is wound around the screw 26, the purpose of which is to provide tension for the rope. The set screw 27 prevents the screw 26 from turning backward.

In the casing 24 are arranged two set screws 29, which limit the rotation of the intermediate member, by being able to strike against a lug on this member. Obviously, an uneven adjustment of these screws will affect the angle of rotation toward the one or the other side. A spring 28 is arranged in the fixed casing 24, which always tends to rotate the lamps in one direction.

The lamps are turned in the opposite direction by the tension of the rope acting against the spring. The mode of operation is therefore, that the rotating part is first driven by the rope and, through the medium of the intermediate spring 25, drives with it the

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intermediate member under the tension of the spring 28 until the stop lies against one of the set screws. The rotating part continues then to move against the tension of the spring 25. In order to load the steering gear as little as possible, the arrangement is such that the springs 28 of the two lamp holders act in opposite directions, and the ropes 23 are mounted correspondingly.

Transmission Mechanism.

Referring again to Fig. 5A: It will be noted that the screw 12a is rotated by a tube 2b on the steering column, working against a screw wheel 13. The cables 23 are attached to bearings 16a at opposite sides of the so-called screw wheel 13. These bearings are so situated at the ends of the crank arms 16, which turn with the axle 15 in such manner that when one rope is pulled the other is let loose. These bearings are arranged so as to be moved and regulated as required in order to secure the desired rotation of the lamps on different cars. When adjusted by screwing either in or out of axle 15, the position of the crank arms 16 is then secured by the set screw 17.

A case 18, to cover the transmission mechanism, is constructed to serve at the same time as a holder or bearing for the steering post and to hold the outer tube 11 in the latter stationary. This tube 11 serves as a bearing for the outer rotary tube of the steering post and also as a stop or holder for the lever 1 in its lowered position, when the lamps are to be disconnected from the motion of the road wheels and held stationary. This tube may be held tightly to the case by means of a clamp in the form of a half-ring Fig. 5B, which is screwed to the case in such manner by screws 21a that it presses tightly against the tube. A pin 22 on the inside of the half-ring prevents the tube 11 from turning.

This device has received much favorable indorsement, both in America and abroad, and it may be mentioned that the well known lamp firm of Herm, Riemann, Chemnitz, Germany, has undertaken its introduction for the European market.

CHANGE IN TIRE SELLING POLICY.

A radical change in the selling policy of the United States Tire Company, New York City, is announced Formal notice has been posted in all of the company's 26 branches in various cities from New York to San Francisco, stating that in the future no automobile tires will be sold at retail by this concern.

This voluntary retirement from the retail field has been under consideration by the officers of the company for a long time. In finally declaring itself, the concern relinquishes a profitable trade, as all of its branches have done large business in dealing direct with the consumer. However, it was argued that this business rightfully should go to dealers in towns where these branches are located, and the move was determined upon accordingly.

In making this announcement to the trade, the United States Tire Company desires to show in a substantial manner that it appreciates the decidedly friendly attitude which dealers have manifested toward its line.

PITTSBURG CLUB ELECTS OFFICIALS.

At the annual meeting of the Automobile Club of Pittsburg, Penn., the following officers were elected for the ensuing year: President H. L. Mason, Jr.; vice presidents, E. J. Kent, W. N. Murray, W. H. Seif; secretary, P. C. Wolff; treasurer, W. A. Heyl; board of governors, J. C. Bragdon, A. E. Neidman, L. B. Fleming, F. B. Niweeds.

MANY JOIN TIRE SERVICE BUREAU.

That motorists are beginning to realize that a little attention given to tires is a profitable investment is shown by the large number of automobilists who have joined the service bureau of the United States Tire Company, New York City. The purpose of this department is to aid the consumer in obtaining the maximum service from shoes and to date over 17,000 names have been enrolled. Commenting upon this phase of the tire industry, J. M. Gilbert, general manager of the United States Tire Company says: "Adjusting departments of big tire concerns claim that about 50 per cent. of the tires discarded as unfit for service, are not actually worn out but have deteriorated through abuse or neglect, or both. Whether or not we accept this 50 per cent. estimate of tire waste in its entirety the fact remains that in America each year, enough money is thrown away through this channel to finance a couple of nations. The responsibility, in many instances, rests equally upon the tire manufacturer, the selling agency through which the factory product is handled and the consumer, the former because of negligence in acquainting the user with steps he should take to conserve the strength and prolong the life of his tires, the consumer for a tendency to disregard these rules even when they have been pointed out to him. While many purchasers of cars are posted upon their mechanism they give little if any attention to the tires and the result is incessant trouble.

PREMIER TOUR FILMS SHOWN.

The moving pictures of last summer's Ocean-to-Ocean tour of 12 Premier cars, made by the Premier Motor Manufacturing Company, Indianapolis, Ind., were shown in that city recently in the big assembly hall of the Claypool hotel. The pictures were explained by John G. Monihan, secretary of the tour. The hall was crowded and the exhibit proved exceedingly interesting. It will be shown in leading cities.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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In every Glidden Tour they have entered, Ajax Tires have always made the best showing. In the 1911 Glidden Tour all four of the trophy-winning cars had Ajax equipment—and not one of the sixteen casings had to be replaced during the whole rough trip of 1454 miles.

Dealers Bulletin

There was a big business in Ajax Tires last year, and it will be bigger this year, for Ajax Tires are coming to the front on sheer merit. It will pay to form an early dealer connection with the winning tires.

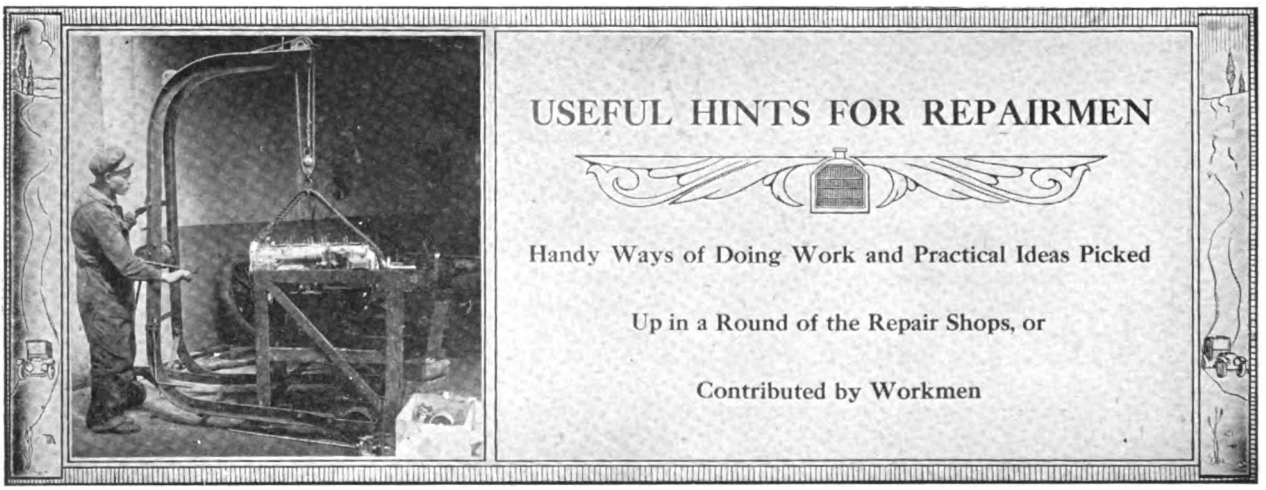
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SELECTING TOOL EQUIPMENT.

The small repair shop, and there are many of these, must always exist. Many owners of motor cars favor these establishments, because of the practical and skillful workmen, and the high class work performed at reasonable charges. This is due in a measure to the fact that the overhead expense is not as great as with the larger and completely equipped plant in the heart of the city.

These small shops usually make it a practise to send the greater portion of the machine work required to some outside firm, the amount of this depending largely upon the character of the work and

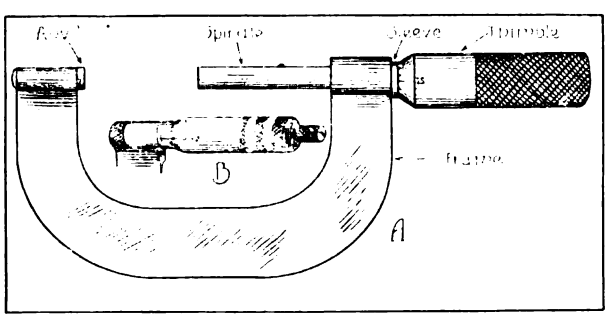


Fig. 1—Measuring Devices: A, Standard Form of Micrometer; B, Ratchet Stop.

the equipment of the garage. Some are fitted with a small foot lathe for light work while others are provided with better facilities for handling different grades.

In a thorough overhauling job there are more or less renewals to be made and some of these cannot be effected with new parts owing to their peculiar relation to one another. When the lathe is utilized to handle the piece, it is essential that the work be turned accurately and to accomplish this it is necessary that the operator be equipped with the proper measuring devices and have a knowledge of their use. It is the intention of the writer to present from time to time a description of the various tools needed to complete the equipment of the small garage, as well as to describe the uses to which they are adapted.

Micrometers.

Considering first the measuring devices: The workman should learn to understand thoroughly the necessity of close or accurate measurements. With the aid of a micrometer he will soon be able to detect differences in measurement down to one-thousandth of an inch. These instruments provide convenient as well as accurate means for fine external measurements and are made in different sizes and styles. They are graduated to read to thousandths of an inch, and one-half and one-quarter as well are estimated readily. Some of these instruments have verniers by which a still finer measurement may be made.

The chief mechanical principle embodied in the construction of a micrometer is that of a screw free to move in a fixed nut. An opening to receive the work to be measured, is provided by the backward movement of the screw and the size of the opening is indicated by graduations. A standard form is shown at Fig. 1 A, this tool enabling measurements up to one inch by thousandths.

Method of Use.

To use the micrometer the article to be measured is placed between the anvil and the spindle. The frame being held stationary, the thimble is revolved by the thumb and finger. The spindle being attached to the thimble revolves with it, and moves through a nut in the frame, approaching or receding from the anvil. The measurement of the opening is indicated by lines and figures on the sleeve and thimble.

The pitch of the screw threads on the concealed part of the spindle is 40 to an inch. One complete revolution of the spindle therefore moves it longitudinally one-fortieth or 25 thousandths of an inch. The sleeve is marked with 40 lines to the inch, corresponding to the number of threads on the spindle.

When the instrument is closed, the beveled edges of the thimble correspond with the line marked 0 on the sleeve, and the 0 line on the thimble coincides with the horizontal line on the former. If the microm-

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eter be opened by rotating the thimble one full turn, or until the 0 line on the thimble coincides with the line of the sleeve, the distance between the anvil and

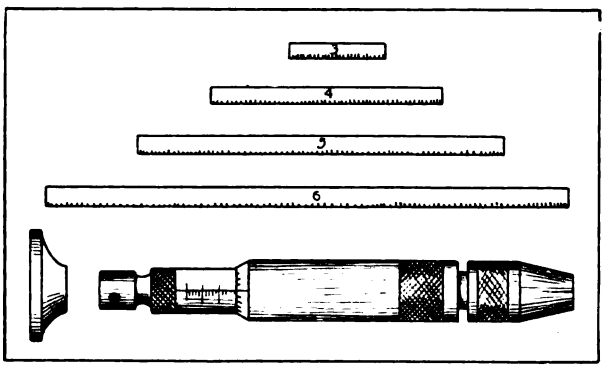


Fig. 2—Inside Micrometer Gauge for Making Internal Measurements, Such as Rings, Cylinders, Etc.

spindle is .025 inch, and the beveled edge of the thimble will coincide with the second vertical line on the sleeve. Each of the latter indicates a distance of .025, and every fourth line is made longer and is numbered 0, 1, 2, 3, etc. Each numbered line denotes a distance of four times .025 inch or .1.

The beveled edge of the thimble is marked in 25 divisions, and every fifth line is numbered, from 0 to 25. Rotating the thimble from one of these marks to the next moves the spindle longitudinally one twenty-fifth of twenty-five thousandths, or one thousandth of an inch. Rotating it two divisions indicates two thousandths, etc. Twenty-five divisions will indicate a complete revolution, .0125 inch.

To read the micrometer: Multiply the number of vertical divisions on the sleeve by 25, and add the number of divisions on the bevel of the thimble, from 0 to the line which coincides with the horizontal line on the sleeve For example: If there are 10 divisions visible on the sleeve, multiply this number by 25, then add the number of divisions shown on the bevel of the thimble, which is 10. The micrometer is therefore opened $10 \times 25 = 250 + 10 = 260$, or 260 thousandths.

Ratchet Stop.

At B is depicted a ratchet stop. When using this device the ratchet slips by the pawl when more than a certain amount of pressure is applied, thereby preventing the measuring spindle from turning farther and perhaps springing the instrument. It is adaptable where a number of measurements must be taken quickly and especially where they are taken by more than one person with the same device, as by its use the same amount of pressure is applied to the article to be measured, in every case.

Inside Micrometer Gauges.

The inside micrometer gauge shown at Fig. 2 is designed for making internal measurements, such as rings, cylinders, setting calipers, comparing gauges, etc. It is also well adapted for measuring parallel surfaces. It consists of a holder provided with a micrometer screw and thimble, and the former has a movement of .3 of an inch. By the use of the extension rods, measurements from three to six inches may be made by thousandths. The extension member varies by inches, and should be readjusted only when the points have become worn.

Depth Gauge.

The gauge depicted at Fig. 3 is utilized for measuring the depth of grooves, holes or irregular parts. It has a one-half inch movement of the screw, reading in thousandths, and with two one-half inch and one one-inch standard collars to slip off or on the spindle 2.5 inches, readings in thousandths may be obtained. The split nut is covered and protected by a graduated sleeve, which not only protects the nut from the dirt, but provides a quick and accurate way of taking up wear and adjusting the device to insure correct reading. The sleeves being held by stiff friction, may be rotated with a spanner wrench, so that the zero lines will always coincide for correct reading. The head carries with it a knurled set screw for locking the spindle to prevent changing after being set.

NOVEL TWO-CYCLE MOTOR.

The two-cycle motor is frequently referred to as the valveless engine which dispenses with a large number of working parts. In some designs, however, simplicity is obtained at the expense of flexibility. This is no doubt due largely to the desire of inventors to avoid the use of valves as much as possible.

Believing that efficiency should not be sacrificed to simplicity, E. H. Micklewood of Plymouth, England, has brought out a novel type of two-cycle motor which is depicted at Fig. 4, and it is claimed that the engine is quite as flexible as the average internal combustion motor of the four-cycle type. In the design the mixture is admitted to the combustion chamber under pressure, and it is interesting to note that the exhaust begins before the completion of the firing stroke, and

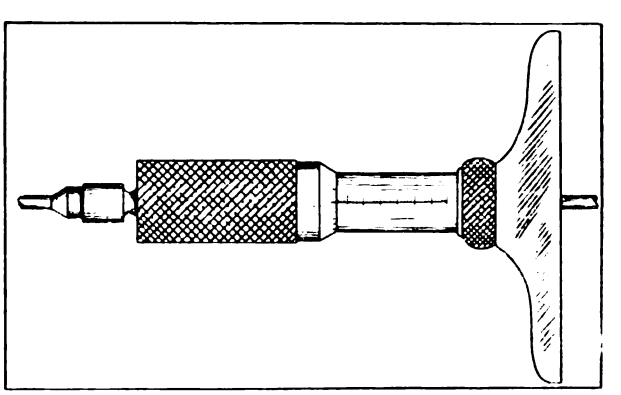


Fig. 3—Depth Gauge, Employed for Measuring Holes, Grooves and Irregular Parts.

that before the exhaust member is closed again a volume of fresh air under pressure is admitted to the cylinder to ensure the thorough scavenging of the

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burnt gases. After this operation fresh mixture is admitted and compressed and exploded in the usual manner by a spark plug.

It will be noted that the piston is considerably longer than the usual type, and that its lower end is larger in diameter than the upper. The lower end is confined between the upper extension of the cylinder walls and the fixed sleeve which is shown in solid section. A reciprocating exhaust valve is fitted, this being operated by eccentric motion from the timing wheel. On the opposite side is located the intake member which consists of an air and mixture distributing valve rotated by a silent chain driven from the crankshaft at the speed of the latter.

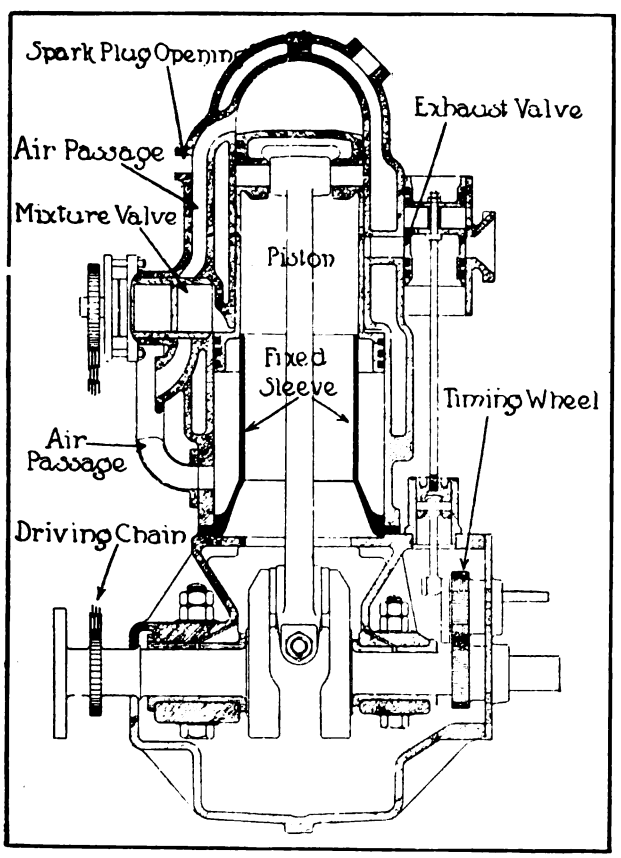


Fig. 4—Novel Two-Cycle Motor Utilizing Rotary Form of Distributing Intake and Exhaust Valves.

In the drawing, the piston is depicted at the top of its stroke, and from this point the cycle of the motor is as follows: Upon the explosion of the charge the piston is driven downward during which movement mixture from the carburetor is drawn into the space above the enlarged portion of the piston, pure air being compressed below it. At the completion of the stroke the rotary distributing valve cuts off communication with the carburetor, and at the same time opens up passages for the compressed air below the piston to reach the combustion chamber.

Just previous to this, however, the piston in its movement uncovers the exhaust port and exhaust begins, this being facilitated by the sudden admission of the compressed air as previously outlined. This intake of air is of very short duration, for as the piston begins to rise the distributing or mixture valve closes the air passage and opens that between the combustion chamber and the mixture space above the enlarged part of the piston by the way of the upper passage, allowing mixture under pressure to find its way to the space above the piston. Compression is completed when the piston attains the top of the stroke, but in the meantime the distributing or mixture valve has opened up the air space below the piston to the open air, and on the upstroke atmosphere is drawn into the space.

This completes the cycle, for as ignition takes place, the piston again descends, compressing below it the air drawn in during the previous upward stroke. The spark plug opening is at the side of the cylinder, located in the upper air passage, and is thoroughly scavenged by the air that rushes past it after each down-stroke, and at the completion of the intake period has fresh mixture surrounding it for ignition.

It would appear that the area of compression space over the cylinder is unusually large, but this is said to be due to the larger volume of mixture forced above the piston than is usually drawn into the combustion chamber of the four-cycle type. It is claimed that for this reason compression is maintained properly. In trials it is stated that the motor ran perfectly on low throttle and even with the latter almost closed. This is attributed to the location of the spark plug.

ANNEALING COPPER OR BRASS.

In fitting brass or copper tubing to the car when the material is not flexible it may split or crack in the operation. This may be prevented by annealing. Heat the piece to a dull red and plunge it in cold water. This will soften the metal so that it can be worked easily. Care should be exercised not to heat the tubing too hot.

VARNISH FOR COPPER.

An excellent varnish for copper and one that will prevent the metal from oxidization may be made by mixing one part of disulphide of carbon, one part benzine, one part oil of turpentine, two parts methyl alcohol and one part hard copal. Several coats of this mixture should be applied to the metal surfaces to be protected.

TO HARDEN SMALL ARTICLES.

To harden small tools or articles that are likely to warp in the process, the following method is recommended: Heat the part very carefully and insert in a raw potato, then draw the temper as usual.

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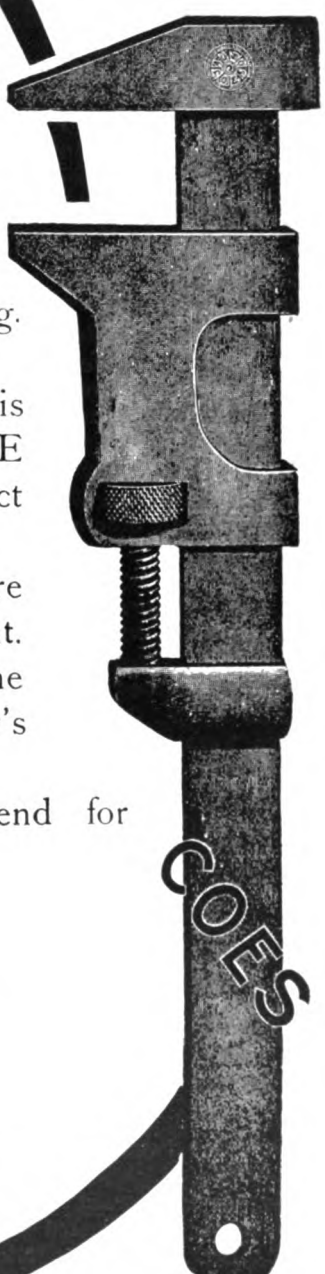
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Unless present signs fail, there will be five nations represented in the fourth international aviation race for the Gordon-Bennett cup. While the date and place have not been selected by the Aero Club of America these must be announced before April 1. The time for filing challenges closed March 1 and on that date challenges had been received from the aero clubs of Great Britain, France, Belgium and Holland.

Chicago is making a determined bid for the honor of holding the meet. The Aero Club of Illinois is attempting to raise a fund of $50,000 with which to finance the undertaking, and it is announced, though this may be a trifle premature, that the meet will be held without admission charge. In addition to the international race it is proposed to hold a grand circuit event, which shall include the cities of St. Louis, Milwaukee, Minneapolis, Dubuque, Cincinnati, Dayton, Indianapolis and others, each to assist in financing the project.

As each country mentioned above is entitled to name three aviators, the prospects of at least 10 machines in the big event seem good. It is remembered, however, that three challenging countries were entered for the second international race held on Long Island in 1910. Of these only France, England and America were represented in the finals. Last year there were five nations listed, but Austria and Switzerland failed to put in an appearance when the race was flown at Eastchurch, England.

The first race for the Gordon-Bennett cup was flown at Rheims, France, in 1909, and was won by Glenn H. Curtiss in a Curtiss biplane for America. The second was held at Belmont Park, L. I., in 1910, and was won by Claude Grahame-White of England in a Bleriot monoplane. The third event was held last year at Eastchurch, England, and was won by Charles Terres Weyman of America with a Nieuport monoplane.

Some effort has been made this year to limit the makes of machines to the countries represented by the aviators flying them, but the Federation Internationale Aeronautique, which has general jurisdiction over such matters, has determined that the manufacture of aeroplanes has not progressed far enough to warrant a rule of this character. It follows that while America may again take the cup it may be won by a machine other than of American manufacture.

It is altogether too early to make suggestions as to who will compete in this year's event. The aviators who will represent the respective countries will be selected by the aero clubs of their countries, and need not be named until 24 hours before the date of the race. Elimination events may be necessary to select the various teams, if sufficient applications are received. Weyman has the right to defend the cup without further trials.

Although several attempts have been made to construct a parachute device which may be considered satisfactory for use by aviators in flight, the first practical test of such apparatus from an aeroplane was made by Albert Berry at St. Louis March 1. The parachute was released when the machine was at an altitude of about 1500 feet and worked perfectly.

Berry is an experienced parachute jumper, having taken many leaps from balloons. He left the Kinloch field with Anthony Jannus in a biplane, the parachute hanging in a specially constructed case under the machine. When a speed of 55 miles an hour had been reached with the aeroplane about 1500 feet above the earth, Berry climbed out of the biplane and swung free on a trapeze bar, at the same time cutting the cord which connected the parachute to the machine.

As Berry shot downward the biplane bobbed upward like a cork, swayed for a moment and soon righted itself. The parachute opened very suddenly, and the remainder of the trip to earth was accomplished without difficulty. Later Berry explained that he really believed the man in the biplane was in greater danger than he.

French aviators have an opportunity to earn a prize of 10,000 francs by flying 10 meters without using mechanical power. Already 79 entrants have filed their intention of competing for this award. Among the names are found those of Colliex, Reyrol, Cayla, Gabriel, Voisin and Dupont. In addition, La Justice, apparently in a spirit of humor has offered a prize of 100,000 francs for a similar flight from Paris to Versailles.

The rules governing the international Michelin prize for 1912 provide that the winner shall be the aviator who covers the greatest number of kilometers over a course made up of three different circuits, at an average speed of 40 kilometers an hour throughout.

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Each national aero club must lay out its own course and submit it to the Aero Club de France.

Each of the three circuits must start from the same point, and the first and third, each of about 500 kilometers, must have three or four obligatory stopping places, while the second, of 255 kilometers, must have one or two. The starting line will be the same for all three.

At each of the intermediate landing places the competitor must alight in a square, of which the sides are not more than 500 meters long. Replenishments may be made only at the starting point, and while covering each circuit the competing machine must average at least 60 kilometers an hour. The circuits will be numbers 1, 2 and 3 and must be covered in their proper order. It will not be permissible to cover the same circuit twice in succession. Should a competitor land at a place otherwise than officially designated, he must start the circuit over again.

Before starting, the machine must have certain parts sealed, and must carry a sealed barograph. For each 75 kilograms of useful load carried beyond the pilot and necessary fuel, etc., a bonus of 25 per cent. will be allowed on the time up to the maximum of 100 per cent. This extra load may be made up of passengers or ballast. If the latter, it will be weighed and sealed at the start, and weighed at each intermediate stopping place.

Pilots of competing machines must possess a certificate under the rules of the Federation Internationale Aeronautique. Each national club must arrange six periods of five days each on which attempts may be made and each date must be announced at least a month in advance. The last period of five days must terminate before Oct. 1, 1912. If a pilot aviator makes several attempts for the prize only the best one shall count. Should there be a tie in the classifications for the cup, the length of each circuit covered will be multiplied by the extra weight carried and the results added together, the cup going to the competitor with the best record.

The parts to be sealed include the cylinders of the motors, the propellers, the wings, rudders, elevators and ailerons. Any supplementary regulations made by the national clubs for attempts to take the prize outside of France, must have the approval of the Aero Club de France. The cup is now held by M. Helen of France, with a Nieuport monoplane.

It begins to look as if the proposed hydro-aeroplane meet at Monte Carlo, Monaco, later this month, would bring out a number of Continental craft. Until recently the only canard, as they are termed in France, made in that country was the Voisin. Lieut. Cayla began trying out a Farman hydro-aeroplane at Buc, France, last month, and now an entirely new canard is announced by Capt. Morel.

This is shown in an accompanying illustration, although it would appear that the hydroplane attachment had not yet been fitted. Apparently, the inventor, who is well known as the constructor of the Morel monoplane, prefers to test his new device on land before venturing on the water. It is understood that the machine is designed to be flown tail foremost.



Morel Biplane Designed to Be Flown as a Canard, the French Term for Hydro-Aeroplane, at the Monte Carlo Meet This Month.

The length is 22.9 feet, spread 30.5 feet, supporting surfaces 215.2 square feet, weight 880 pounds. The motor is a 60 horsepower Anzani, and accommodations are provided for three persons, two beside the pilot. It is expected that the machine will be entered for the Monte Carlo meet.

In order to supply the United States army with an efficient reserve aerial corps in time of need, the War Department has issued an order permitting not only commissioned officers of the regular army but officers of the organized state militia to qualify as military aviators, providing they can pass a rigid physical

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test and operate an aeroplane as stipulated by the department. The officers who qualify will be placed upon the army register as military aviators.

The details of the physical test will prove of interest. The visual acuity without glasses should be normal. Any error of refraction requiring correction by glasses will be cause for rejection. The candidate must be able to estimate distances and color blindness for red, green or violet is cause for rejection. Any diminution of the acuity of hearing below normal will be cause for rejection. The order also reads:

"These tests for equilbrium, to detect otherwise obscure diseased conditions of the internal ear should be made: Have the candidate stand with knees, heels and toes touching. Have the candidate walk forward, backward and in a circle. Have the candidate hop around the room.

"These tests should be made with the eyes open and then closed, the candidate trying to hop or walk in a straight line or in a circle. Any deviation to the right or left from the straight line or from the arc of the circle should be noted. Any persistent deviation either to the right or left is evidence of a diseased condition of the internal ear and nystagnus is also frequently associated with such a condition. These symptoms therefore should be regarded as cause for rejection.

Having passed the physical test, the applicants must make a flight in an aeroplane attaining an altitude of at least 2500 feet, recorded by a suitable barograph. They must make a cross country flight of at least 20 miles, 10 miles going and 10 returning, at a minimum height of 1000 feet. They must make a flight of at least five minutes duration with the wind blowing at least 15 miles an hour. They must carry a passenger to a height of at least 500 feet, and the combined weight of the passenger and pilot must be at least 250 pounds. In addition, applicants must be prepared to execute a volplane from an altitude of at least 500 feet with the engine completely shut off, and cause the aeroplane to come to rest within 300 feet of a previously designated point on the ground. A military reconnaissance flight of at least 20 miles at an average altitude of 1500 feet also is necessary.

The shares of the Eastern Aeroplane Company, Brockton, Mass., held by Alfred F. Gay and J. H. Geary, have been purchased by E. Percy, H. O. and L. L. Miller, three brothers, who have become interested in the construction of monoplanes of the Bleriot type. E. Percy Miller, who becomes president, has made short flights and will undertake the production of practical machines under the guidance of experienced constructors.

Russia appears to be taking considerable interest in the **hydro-aeroplane.** Not long ago the Russian government purchased a Curtiss machine of this type from Glenn H. Curtiss of America, and announcement has been made that certain government officials have been in France for the purpose of investigating the Voisin canard, with a view to purchasing if found satisfactory.

Driving a 140 horsepower Gnome-engined Deperdussin monoplane at Pau, France, March 1, Jules Vendrines created a new world's record for sustained speed by flying 101.6 miles in an hour. This also is a record for an hour's flight. During the second international cup race at Belmont Park, L. I., in October, 1910, Alfred LeBlanc set the first mark at 59 miles, using a Bleriot monoplane. The late Edouard Nieuport, with one of his monoplanes, raised this to 79.5 miles at Mourmelon, France, in June, 1911. Vendrines in a Deperdussin exceeded this Jan. 19, when he flew 88.3 miles.

Twice within a week, while flying at Pau, France, Maurice Tabuteau in a Morane-Saulnier monoplane created new world's records for two hours' flight. Feb. 24 he covered 127.8 miles, and March 2, 141.2 miles. He also set new world's marks for all distances up to and including 250 kilometers. His time for 100 meters was 51:07.8; for 200, 1:42:17, and for 250, 2:07:54.

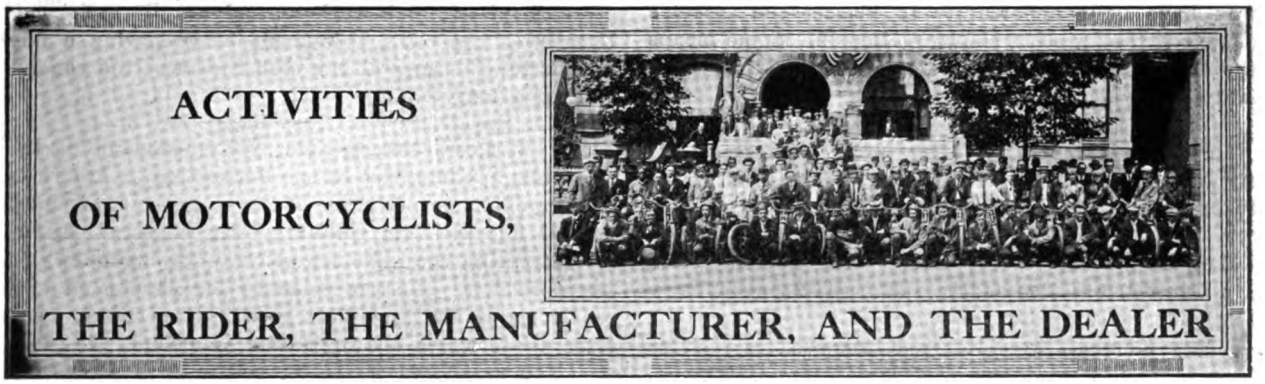
Using a self-starting device constructed at the factory of the Burgess Co. & Curtis, Marblehead, Mass., Walter Brookins made a successful flight unaided in his Burgess-Curtis hydro-aeroplane at Palm Beach, Fla., last month. The device is said to weigh six pounds and is not similar in any way to the self-starters used in automobile work. With it, the aviator simply turns a handle at the seat and this governs a gear attached to the propeller shaft. It will be remembered that an English aviator recently tried out a similar device with satisfactory results.

Plans are progressing favorably for the international exhibition which is to be held by the Aero Club of America in New York City in May. The Italian government is said to have granted permission for the display of at least one of the machines used by its army in the campaign against the Turks in Tripoli. Other foreign machines to be seen will include the Bleriot, Nieuport, Deperdussin, Etrich and Henri Farman. The Wrights have consented to show the first machine they flew with a motor, as well as a number of the 1912 models, and Glenn H. Curtiss will have on exhibit the machine with which he took the first international cup race at Rheims, France, in 1909. Several well known American types will be included in the display.

NEW MARYLAND COMMISSIONER.

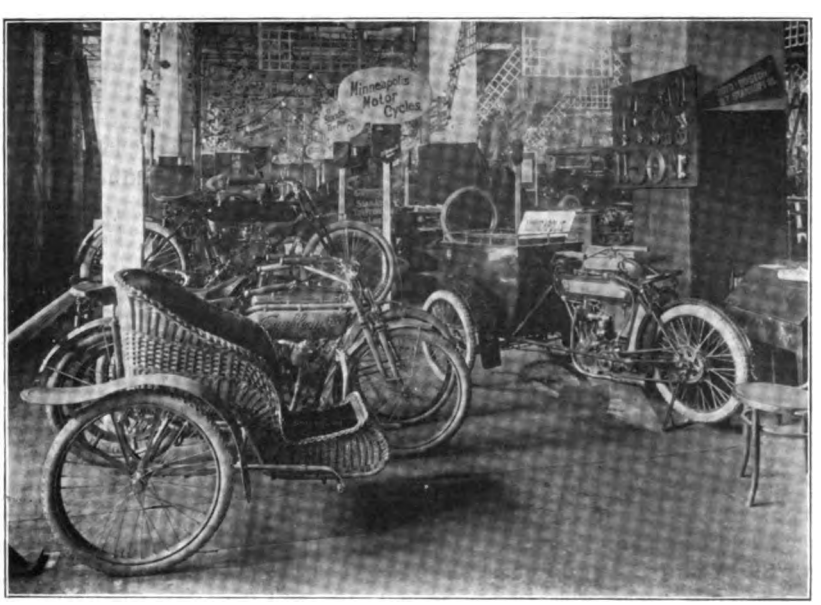
Former Senator Harry A. Roe of Caroline county, Md., has been named as automobile commissioner to succeed John E. George. Mr. Roe had the support of the Automobile Club of Maryland, and it is expected that his administration will prove satisfactory to all parties concerned.

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BOSTON SHOW EXHIBITORS.

Times have changed materially since the days when the members of the Motorcycle Manufacturers' Association considered the Boston show one of the big events of the year and made display at this exhibition in the same manner as at the so-called national shows. It was not until last year that the national organization of makers decided the Boston display was not of sufficient importance to warrant continuing its support as formerly. Undoubtedly this decision was based somewhat upon the fact that Mechanics' Building, as large as it is, does not afford opportunity to place all of the exhibitors in an advantageous position, and the motorcycles were relegated to the basement.



Where the Motorcycles Were Displayed in the Basement at the Boston Show—Emblem in the Foreground.

Last year's announcement came so late in the season that the local dealers were unable to make such provision as they desired in order to be satisfactorily represented. This year the manufacturers assisted the local dealers by supplying exhibition machines, etc., and a better representation resulted, although the motorcycles were to be seen in the basement again, under conditions similar to those which governed previous displays.

Only about half a dozen makes were shown. Emblem models were displayed by the Boyd Motor Company, 27 Stanhope street, which also handles the Minneapolis. Both were to be seen in connection with side cars and tandem equipment. Indian machines were shown by George N. Holden, 141 Massachusetts avenue, and these also were with side car and tandem devices. The Hub Cycle Company, 40 Portland street, exhibited the Yale; the New England Motorcycle Company, 178 Columbus avenue, the Harley-Davidson and Pope, and the M. M. Motorcycle Company, 187 Columbus avenue, the M. M.

In addition to the completed machines on view, several of the accessory exhibitors displayed fittings and supplies particularly adapted for motorcycle use. Specific mention need not be made of the long list of lubricants, lamps, horns, speedometers, etc., which were to be found at these various booths, but it may be pointed out that the Hub Cycle Company showed a full line of Corbin coaster brakes, made by the Corbin Screw Corporation, New Britain, Conn., and Eclipse free engine pulleys, the product of the Eclipse Machine Company, Elmira, N. Y., besides a large number of other standard supplies and fittings carried by this concern.

Naturally, the display was not visited by riders and prospective purchasers in the same numbers as during the years when more attention was paid to the Boston show by the makers. It undoubtedly is true that the interest in automobiles overshadowed the two-wheeled mounts in a marked degree, but there are a large number of riders in the New England states

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who have little opportunity to inspect the season's models if they are not shown at Boston. Some means should be devised for calling more attention to them in 1913.

New Members in February.

Four hundred and forty new members were signed up by Secretary-Treasurer G. B. Gibson of the Federation of American Motorcyclists during February. Classified by districts, the list reads as follows: Lake, 129; Atlantic, 90; Pacific, 79; Southwestern, 31; Central, 30; Peninsular and Gulf, 28 each; New England, 16; Canadian, nine.

New members by states were received as follows. New York, 56; Ohio, 41; Washington, 36; California, 28; Oklahoma, 27; Idaho, 22; New Jersey, 18; Illinois, 18; Montana, 18; Kansas, 17; Pennsylvania, 14; Georgia, 13; Massachusetts, 12; Indiana, nine; Florida, nine; British Columbia, nine; Missouri, seven; Alabama, five; Minnesota, five; Nebraska, three; South Dakota, three; Oregon, three; Maryland, three; Connecticut, two; Rhode Island, two; Wisconsin, two; Iowa, two; Michigan, two; Arizona, two; Tennessee, one; North Carolina, one; Utah, one.



Young Women of the Los Angeles Motorcycle Club Ready for a Day on the Road.

Los Angeles' Fair Enthusiasts.

The East has heard much concerning the young women of the Los Angeles Motorcycle Club, Los Angeles, Cal., of whom there are a large number. It would appear that the young women of California are more largely interested in motorcycling than those in any other section of the country. Many of them own their own machines, and it is not an uncommon occurrence for them to hold their own runs, while they often accompany the male members on strenuous endurance contests.

An accompanying illustration shows a number of these young women ready for a day on the road. They are enthusiastic club workers, and usually assist materially in the day's enjoyment by preparing a fine supper for the boys at the club rooms at the conclusion of a long run.

Repair Shop as Recruiting Station.

E. M. Estabrook, Bangor, Me., chairman of the membership committee of the Federation of American Motorcyclists, spends some of his spare time, of which he has but little, in thinking over ways and means for increasing the influence of the organization which he represents. He has come to the conclusion that repair shops are first class recruiting stations, especially those which are registered as official. He says:

"The registered F. A. M. repair shop already is demonstrating its possibilities and worth as a successful recruiting station for the F. A. M., and more than this, it is contributing largely to the general popularity of the motorcycle and the sport through its ability to create and maintain interest. Instances are at hand daily where local interest is being awakened, clubs promoted or affiliated, entertained or housed by these active spirits.

"According to my information and experience, it is taking a rather narrow view of the matter to say that all of this well meant activity of the dealer or repairer is accounted for only in a mercenary way. First and last, I don't believe it. I have never been able to prove a case of this kind, but on the contrary, I could always disprove it.

"Before a man goes into the trade as a repairer he usually is a genuine enthusiast with respect to the motorcycle and the sport. That is what brings him into it. And it is not a gilt edged vision of 'easy money' that induces him to work his head off year in and year out, without being able to 'dig up' much at that. Think this matter over a little."

Emblems at Toronto Show.

Emblem motorcycles, made by the Emblem Manufacturing Company, Angola, N. Y., were prominently displayed at the big show in Toronto, Ont., last month. Three singles and one twin were exhibited by Hyslop Bros., Ltd., and in addition to this firm's representatives, L. S. Taylor, the well known Emblem racing rider, was on hand to explain the fine points of this make. President W. G. Schack of the factory was in attendance two days.

Lang Takes More Harleys.

It will be remembered that the Harley-Davidson Motor Company, Milwaukee, Wis., maker of Harley-Davidson mounts, announced early in the season that C. H. Lang, the Chicago agent, had contracted for 1000 machines for the 1912 season. During the re-

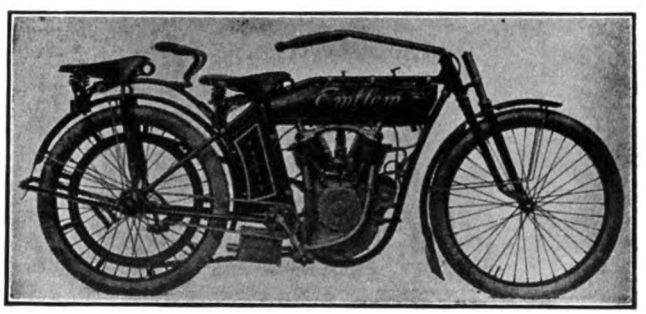
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THAT SPRING FEELING

Will soon seize you with its irresistible grip, and you will long to get out in the glorious sunshine with a firm and a dependable motor under you. There is no use waiting until you feel all out of sorts with yourself, everyone else and the world in general. Place your order for a

STURDY EMBLEM MOTORCYCLE

now and then when the open
to jump on the saddle and
while the other fellow con-
To make it an everlasting
machine that can be depend-
day and every day in the
EMBLEM MOTOR-
all the Speed you crave,
ever use and money in your
You owe it to your pocket-
EVER ECONOMICAL
agent in your town?



road calls you will be ready
go where fancy dictates
tents himself with wishing.
Joy Ride you must have a
ed on every minute of the
month. To ride an
CYCLE means Satisfaction,
more Power than you can
pocket at the end of the year.
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EMBLEM MANUFACTURING COMPANY

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ANGOLA **ERIE COUNTY** **NEW YORK**

cent Chicago show Lang disposed of 300 of these and the demand seemed so insistent he was afraid his thousand wouldn't last the year out. Accordingly, he has increased the order to 1200 machines. This is believed to be one of the largest single orders for motorcycles ever given.

Late Affiliations.

Included in the list of recent affiliations with the Federation of American Motorcyclists are the following clubs: Enid, Oklahoma, No. 222; J. A. Olinger, secretary, 209 West Rand street, 26 members. Boise, Idaho, 223; G. A. Hill, Box 593, 20 members. Butte, Mont., 224; J. E. Seaker, 610 East Platinum street, 17. Flower City, Rochester, N. Y., 225; W. Krieg, Lincoln Park, 14. Aberdeen, Wash., 226; Leon McNeal, Box 542, 15. Batavia, N. Y., 227; S. F. Houseknecht, 46 Main street, 23.

Three New Records for Excelsiors.

Three new world's records were created at the meet on the stadium at Los Angeles, Cal., Feb. 25. Jacob De Rosier on an Excelsior rode six miles in 4:08.6; Joseph Wolters on a machine of the same make, covered three miles in 1:59.6, and Charles Balke, also on an Excelsior, made four miles in 2:40.4. The summary of the meet follows:

Two miles, match—First, De Rosier, Excelsior; second, Wolters, Excelsior; time, 1:21.2.

Four miles, professionals—First, Albright, Indian; second, W. Samuelson, Indian; time, 3:02.2.

Three miles, professionals—First, Wolters, Excelsior; second, Balke, Excelsior; third, Hasha, Indian; time, 1:59.6.

Four miles, professionals—First, T. Samuelson, Indian; second, Humiston, Indian; time, 3:09.6.

Four miles, professionals—First, Balke, Excelsior; second, Wolters, Excelsior; third, Seymour, Indian; time, 2:40.4.

Five miles, professionals—First, W. Samuelson, Indian; second, Albright, Indian; third, Humiston, Indian; time, 3:52.6.

Two miles, match—First, De Rosier, Excelsior; second, Wolters, Excelsior; time, 1:24.4.

Five miles, professionals—First, Ward, Indian;

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists.
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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second, Wolters, Excelsior; third, Balke, Excelsior; time, 3:23.8.

Six miles, free-for-all—First, De Rosier, Excelsior; second, Ward, Indian; third, Seymour, Indian; time, 4:08.6.



Raymond Snyder of Columbus, O., and His Emblem Motor Sled.

Emblem Motor Sled.

That it does not require good roads and warm weather in order to enjoy motorcycling thoroughly has been proven conclusively by Raymond Snyder, the 15-year-old son of W. H. Snyder, proprietor of the American Machine Company, Columbus, O. During the winter months, when the deep snow made it impractical for young Snyder to ride his Emblem in the usual manner, he conceived the idea of constructing a motor sled, and that he succeeded is indicated by the accompanying illustration.

Taking the motor, tank and rear wheel from his four horsepower Emblem young Snyder mounted it on a double sled body of his own design, and the result was an entirely practical vehicle which has attained speeds of between 40 and 45 miles an hour on the roads around Columbus.

Besides being a lad of a practical turn of mind, Snyder is a road rider who has attained some distinction. Last summer, in company with three other Columbus riders of twice his age, he toured the Eastern states, covering some 2400 miles. Considerable bad weather was encountered but Snyder found no difficulty in maintaining the schedule set by the others.

New Official Repair Shops.

The following have been added to the list of official F. A. M. repair shops: Michael Curnow, 205 South Montana street, Butte, Mont.; C. H. Tompkins, 327 North Broad street, Richmond, Va.; Victor R. Stenger, 111 South 10th street, Nebraska City, Neb.; Jacob Petske, 2514 West Jackson boulevard, Chicago, Ill.; F. N. Bailey, 919 Tacoma avenue, Tacoma, Wash.; Progress Auto Company, 1736 Richmond turnpike, West New Brighton, N. Y.; A. C. Shaw, 414 Commercial street, Emporia, Kan.; Gene Johnson, 469 North Beach street, Daytona, Fla.; J. E. Sayre & Co., 331 Ohio street, Terre Haute, Ind.; E. F. Horn, Sixth avenue and Superior street, Antigo, Wis.; John N. Ellsworth, 233 Main street, Watsonville, Cal.; Barnes & Hansen, 404 East Wishkah street, Aberdeen, Wash.; Oakdale Cyclery, West Railroad avenue and G street, Oakdale, Cal.; Clarence O. Sibley, 636 Jefferson street, Joliet, Ill.; Motorcycle Supply Company, 412 East 15th street, Kansas City, Mo.; P. S. Coulter, Homestead, Penn.

Cripple Tours With Minneapolis.

Alfred Leroy of 330 South Spring street, Los Angeles, Cal., met with a severe accident some years ago, as a result of which he was deprived of both legs and one arm. This crippled condition does not preclude his enjoying the motorcycle. An accompanying illustration shows him with his Minneapolis machine, which has been transformed somewhat by the addition of a novel tricar arrangement. With this he has travelled all over southern California without aid and expects to take a trip East in the near future.

New Indian Station in Chicago.

The Edwards-Crist Company, Chicago, Cook county agent for the Indian, made by the Hendee Manufacturing Company, Springfield, Mass., has opened a new retail store and service station on Evanston avenue, on the North side of that city. This branch will be in charge of C. A. Leander, a well known Indian endurance rider and a prominent member of the North Shore Motorcycle Club.

Club Notes, Here and There.

The Attleboro Motorcycle Club has been organized at Attleboro, Mass., with the following officers: President, Herbert James; vice president, Ira Cook; secretary, Charles H. Obrist. The club will affiliate with the national body at once.

The Black Hill Motorcycle Club, Deadwood, S. D., has been organized with the following officers: President, Albert Wolley; secretary, Phil Shoenberger; treasurer, A. E. Bailie; captain, J. De Picaza; lieutenant, C. E. Applegarth. The club will hold a dance



Alfred Leroy of Los Angeles, Cal., and His Converted Minneapolis Mount.

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St. Patrick's night, the purpose being to raise funds for fitting up club rooms.

Ithaca, N. Y., joins the list with a new motorcycle club, in which the following have been chosen as officers: President, John T. Hastings; vice president, Frank Martin; secretary-treasurer, Levi C. Morris.

The Colorado Springs Motorcycle Club, Colorado Springs, Col., has elected the following officers for the ensuing year: President, Orrin G. Lewis; vice president, U. S. Emmick; secretary, U. S. Johnson; treasurer, H. G. Schif; captain, H. W. Clark; lieutenant, F. W. Weatherby.

The recently organized Washington Motorcycle Club, Washington, D. C., has decided to affiliate with the F. A. M. on a 100 per cent. basis. The following officers have been elected: President, George Cockran; vice president, Edward Mangold; secretary, G. C. Billard; treasurer, C. F. French; captain, Edward Mangold.

New clubs are being formed by the following, according to Chairman E. M. Estabrook of the F. A. M. membership committee: George W. Cooper, Grand Forks, B. C.; Alfred C. Hackberth, Murray street, Meriden, Conn.; C. Hanson, 1406 Grand avenue, Kansas City, Mo.; Barter & Co., 55 Public square, Watertown, N. Y.

Twenty riders in Port Arthur, Tex., have formed the Port Arthur Motorcycle Club with W. F. Gerken as president and J. McFarland as secretary-treasurer. F. A. M. affiliation is to take place as soon as possible, and weekly runs to nearby towns are to be regular features throughout the season.

Latest Emblem News.

The Wichita Bicycle Shop, Wichita, Kan., has changed its name to the Dickinson Cycle Company and will represent the Emblem motorcycle in that territory in the future.

The W. A. Doubleday Company, 517 South Salina street, Syracuse, N. Y., has taken the agency for the Emblem, and it is expected that several Syracuse riders will be utilizing the Angola machine during the coming season as a result.

George Evans of Columbus, O., who has been spending the winter months acquiring a mechanical knowledge of the Emblem at the factory in Angola, N. Y., has returned to Columbus to take charge of the motorcycle department of the American Machine Company. L. S. Taylor, who formerly held this position, will remain at the Emblem factory. It will be remembered that Evans created a number of records on Emblem machines last year.

The Emblem will be represented in Racine, Wis., this year by the G. W. Burkert Company of 611 Wisconsin street. This is a large concern which has been identified heretofore with automobile interests but which sees a large future for the two-wheeled mount.

Among the new agencies recently appointed by the Emblem Manufacturing Company are the following: Browning Bros., Ogden, Utah; C. J. Jobe, Canton, O.; Groise Brcs., Holyoke, Mass.; United Cycle Company, Hartford, Conn.; L. R. Elliott, Attleboro, Mass.; R. G. Davis Automobile Company, Providence, R. I.; Taylor Bros., Oklahoma City, Okla.; A. F. Mueller, Evansville, Ind.; Moultrie & Maginni, Yonkers, N. Y.; J. C. Stafford, Fort Wayne, Ind.; Clinton E. Carpenter, Grand Rapids, Mich.; E. E. Fenn, Bloomington, Ill.; Smith & Wolfe, Denver, Col.; H. J. Kingsbury, Kalamazoo, Mich.; William Lintner, South Bend, Ind.

Waverley Changes Its Name.

Announcement is made from Jefferson, Wis., that the name of the Waverley motorcycle has been changed to the P. E. M. The reason for this action is said to be found in the fact that the old name conflicted too much with those of the Waverley automobile and Waverley bicycle.

Rhode Island Club's Smoker.

The annual smoker of the Rhode Island Motorcycle Club will be held in Providence, R. I., early in April. The committee of arrangements is busily engaged working up the programme, which will be even more elaborate than in past years. These annual events of the Rhode Island Club have become a matter of decided interest in that state and they are looked forward to with interest by a large number of riders. Incidentally the club has found them a valuable aid in recruiting new members.

New Club for Evansville.

The Evansville Autocycle Club has been organized in Evansville, Ind., under the leadership of John A. Sink, well known as a promoter of racing events. The following are the charter members: F. Kiechle, J. A. Miller, A. H. Schnell, E. Twietemeyer, W. H. Karges, H. F. Miller, F. H. Mohr, C. T. Davis, E. Nelson, E. Kuehn, C. Mesker, A. Blair, C. D. Beverly,

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head, as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON

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The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

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R. Haag, S. Niehaus, A. Legler, C. E. Bruck, O. Strange, W. Francis, W. Winterhelmer, W. Johann, D. Stewart, E. Inkanbrandt, H. Reisinger, G. A. Beard, F. Droit, J. A. Sink, M. Schaeffer, F. Emig. The following officers have been elected: President, John A. Sink; secretary, M. Schaeffer; treasurer, August Schnell; directors, G. A. Beard, J. A. Sink, F. B. Droit, D. Stewart, C. Mesker, J. A. Miller, W. T. Gregson, C. D. Beverly and F. H. Mohr. Club runs, track events and hill climbs are to be included in the programme of activities. Club rooms will be fitted up as soon as opportunity affords.

Harley Wins Hill Climb.

Max Wilson, riding a 1912 single-cylinder Harley-Davidson, won first place in the big hill climb held by the Wichita Motorcycle Club at Winfield, Kan., last month. The course was up the famous Observation hill and proved a splendid test for the different machines entered. The place winners were: First, Max Wilson, Harley-Davidson; second, Ray Weishar, Indian; third, J. K. Brown, Yale.

Monarch a New Mount.

The Ives Motorcycle Corporation, Owego, N. Y., exhibited its first Monarch motorcycle at the automobile show in Binghamton, N. Y., last month. It was the intention of the company to have this model ready for display at the Chicago show, but was unable to do so. It is a single cylinder machine, the motor having a bore of 3.375 inches and stroke of 3.75, and being rated at five horsepower. Ignition is by Herz magneto. Power is transmitted to the rear wheel by V belt, and an Eclipse free engine pulley is fitted as regular equipment. The lines are graceful, and the rear of the frame has been dropped slightly to permit of a low saddle position. Road shocks are taken care of by a substantial spring fork of the double type. Tires are either Empire or Diamond, and an option of Corbin or Eclipse brake is offered.

Columbus Holds Independent Show.

With all this talk about a separate showing of motorcycles, the Columbus Motorcycle Club, Columbus, O., seems to have taken the initiative in practical results. When it became known that the local dealers were dissatisfied with the plans the management of the Columbus automobile show had made for showing motorcycles, the club took up the matter and arranged a showroom at 39 East Chestnut street. Six dealers helped the club to make the venture a splendid success. These were: American Machine Company, Emblem; L. P. Birkenbach, Thor and Yale; Franklin Cycle & Supply Company, R-S and Excelsior; Barr Motorcycle Company, Indian; P. I. Haynes & Co., Harley-Davidson; A. C. Edwards, Merkel.

New Departure Wins.

Judge John R. Hazel of the United States district court at Buffalo, N. Y., has issued a decree sustaining the coaster brake patents held by the New Departure Manufacturing Company, Bristol, Conn. Nov. 30, 1910, this concern brought action against the Forsyth Manufacturing Company of Buffalo, alleging infringement of patents. The decision holds that the New Department patents are good and valid and that they cover the "original, first and true invention" of the coaster brake.

In this connection it is proper to note that the New Departure Manufacturing Company was one of six companies and 18 individuals indicted by the last federal grand jury at Buffalo on a charge of violating the Sherman anti-trust law, so called. A petition to have the indictments quashed is now pending before Judge Hazel. The federal authorities admit that these indictments grew out of the action against the Forsyth Manufacturing Company.

The companies indicted with the New Departure Manufacturing Company were: Corbin Screw Corporation, New Britain, Conn.; Aurora Automatic Machine Company, Aurora, Ill.; Eclipse Machine Company, Elmira, N. Y.; Miami Cycle & Manufacturing Company, Middletown, O., and the Buffalo Metal Goods Company, Buffalo, N. Y., all of which are licensed to manufacture under the New Departure patents. Obviously, the decision is of importance to these concerns as well.

Chicago Association Short Lived.

Advices from Chicago indicate that the recently organized Chicago Motorcycle Dealers' Association, which was formed for the purpose of conducting an extensive local advertising campaign, will soon pass out of existence. It is announced that the members could not agree upon the proper method of dividing the expense, some representatives feeling that certain makes were to receive rather more for their money than others.

TO MERGE NATIONAL BODIES.

The movement which has been on foot for some time looking toward the merging of the National Association of Automobile Manufacturers and the Automobile Board of Trade into one large organization, has been referred to a committee of conference between the two bodies. A tentative plan was brought forward at the recent meeting of the executive committee of the former association in New York City, and this will be submitted to the Automobile Board of Trade for ratification.

The following committees of the N. A. A. M. have been appointed for the ensuing year: Commercial vehicles, S. D. Waldon, W. C. White, B. A. Gramm, Fred White; show, H. O. Smith, A. L. Pope, W. C. Leland; legislative, A. L. Pope, Benjamin Briscoe, Charles Clifton; good roads, R. D. Chapin, S. D. Waldon; contests and demonstrations, Alfred Reeves, W. T. White, W. C. Leland; auditing, Benjamin Briscoe, S. T. Davis, Jr., Charles Clifton; membership, G. W. Bennett, L. H. Kittredge, S. T. Davis, Jr.; traffic, A. L. Pope, L. H. Kittredge, Hugh Chalmers; conference, Alfred Reeves, A. L. Pope, R. D. Chapin; electric vehicles, H. H. Rice, W. C. Anderson, Fred White.

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

The M. M. Automobile Automatic Safety Signal Company, New York City; capital, $50,000; incorporators, J. C. McGee, W. F. Rawlins, I. M. Black.

Whitmore Auto-Gear Composition Sales Company, Jersey City, N. J.; capital, $100,000; incorporators, B. S. Mantz, J. R. Turner, L. H. Gunther.

Independence Oil Delivery, Burlington, N. J.; capital, $100,000; incorporators, G. S. Neath, R. P. Moore, H. Eastwood.

Standard Automobile & Tire Company, Plainfield, N. J.; capital, $25,000; incorporators, H. P. Vosseller, J. J. Slevin, F. Ivamy.

Amalgamated Motors Corporation, Los Angeles, Cal.; capital, $1,000,000; incorporators, W. M. Varney, C. B. Croner, Robert McKee, Ernest Kouwen-Hoven, E. P. Craig, C. L. Woodbury, R. F. Davis, L. Scheer, C. J. Schroeder, J. A. Craig, T. W. Beddo, J. L. Kirkham, Thomas Carmody, Jr., J. B. Price, N. E. Masson.

National Motor Transportation Company, Washington, D. C.; capital, $1,000,000; incorporators, not given.

Excelsior Specialty Company, Jersey City, N. J.; capital, $30,000; incorporators, F. Thomassin, F. O. Lockwood, A. Higson, G. H. Martens. C. S. Goodfellow.

Empire Automobile Company, Indianapolis, Ind.; capital, $100,000; incorporators, C. E. Gibson, C. B. Sommers, D. Sommers.

Bussing Agency, Inc., New York City; capital, $50,000; incorporators, G. Ozanna, J. V. Knoth, R. Webber.

Cliffside Motor & Supply Company, Cliffside Park, N. J.; capital, $50,000; incorporators, A. E. Neumann, G. F. Walker, G. C. Bottorff.

High Point Motor Company, High Point, N. C.; capital, $50,000; incorporators, George Wilson, S. L. Davis, J. E. Kirkman, Raley Stone.

Ft. Wayne Auburn Auto Company, Fort Wayne, Ind.; capital, $20,000; incorporators, J. M. Carmer, H. C. Hoodelmire, E. C. Walker.

Hudson Motor Car & Garage Company, Stafford, Conn.; increase of capital stock to $2500.

Excelsior Sales Company, Buffalo, N. Y.; capital, $10,000; incorporators, William F. Hanavan, Henry O. Wait, Leo F. Donnelly.

Hansen Automobile Company, Wilmington, Del.; capital, $50,000; incorporators, E. Moore, Jr., P. C. Hansen, F. H. Broman.

United Service Auto Company, Boston; capital, $10,000; incorporators, Rufus B. Skinner, Arthur L. Thomas, Lydia A. Brimmer.

Gray Auto Supply Company, Portland, Me.; capital, $10,000; incorporators, Walter J. Hardy, H. P. Sweetser, M. A. Thurston.

Atlantic Aviation Association, Boston; capital, $100,000; incorporators, Alonzo H. Merritt, James H. Scannell.

L. G. Fisk-Mooers Company, Boston; capital, $20,000; incorporators, Lessie G. Fisk, Edward P. Mooers, Fred Raymond.

Phillips Gasoline & Kerosene Engine Company, Chicago; capital, $6500; incorporators, Louis C. Kunert, Jr., Sidney Adler, Hyman L. Weiss.

Tri-City Auto Supply Company, Rock Island, Ill.; capital, $25,000; incorporators, O. P. Sala, Jr., Frank Sala, E. M. Sala.

Forest City Automobile Company, Forest City, Me.; capital, $25,000; incorporators, W. B. Clarke, J. A. York and others.

Auto Shop Company, Paterson, N. J.; capital, $50,000; incorporators, W. McKee, G. F. Wright, F. Beegs.



Fleet of Mais and Premier Machines in Service with the Central Transfer & Storage Company, Indianapolis, and Utilized by the Newspapers in Replacing Horsedrawn Equipment.

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Oakes Manufacturing Company, Indianapolis, Ind.; capital, $10,000; incorporators, W. D. Oakes, Cora P. Oakes, W. H. Oakes.

Self-Spreading Cotter Pin Company, Wilmington, Del.; capital, $250,000; incorporators, M. L. Rogers, S. E. Roberson, H. W. Davis.

Eyles Auto Wheel Company, Chicago; capital, $2000; incorporators, George A. Chritton, John H. Lee, R. A. Raymond.

Mansfield Tire & Rubber Company, Mansfield, O.; capital, $300,000; incorporators, Walter F. Heene, C. R. Grant, F. M. Bushnell, B. L. Chase.

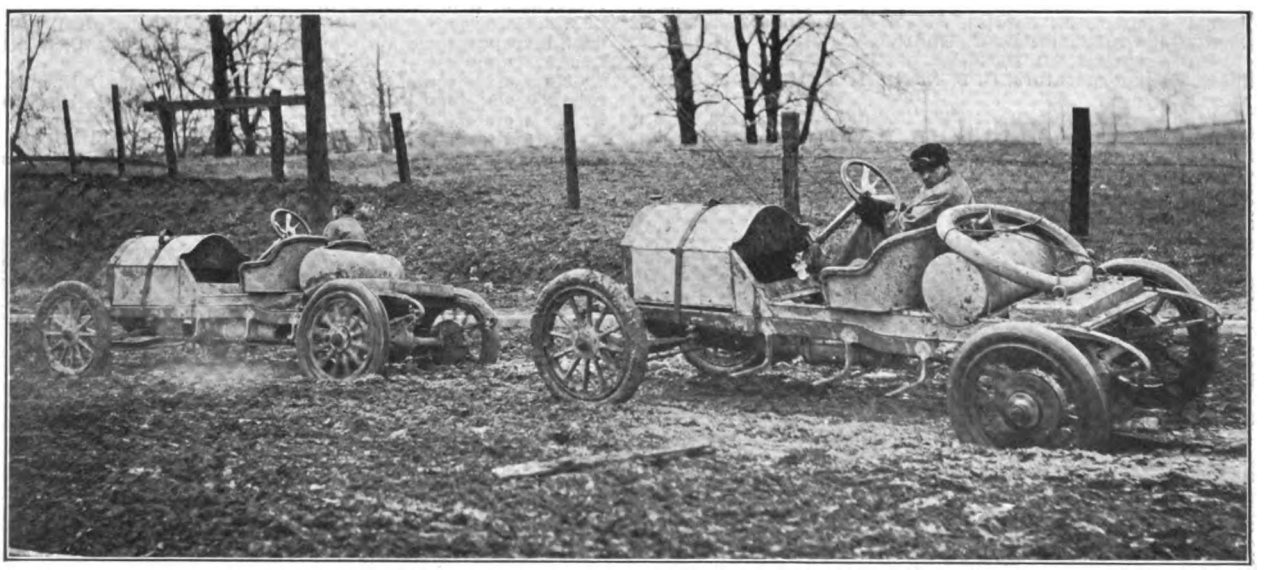
Englewood Motor Car Company, Chicago; capital, $1000; incorporators, Christian Londelius, Jr., A. U. Jackson, John F. Wagner.

Decker Bros. Lock Nut & Bolt Company, Saco, Me.; capital, $300,000; incorporators, M. L. Decker, Maxwell, Neb.; E. E. Bean, Saco, Me.

Taxi Service & Baggage Corporation, Wilmington, Del.; capital, $150,000; incorporators, W. J. C. Delaney, W. L. Lamderdin, A. P. Thom, Jr., Norfolk, Va.

Boulevard Motor Delivery Company, Chicago; capital, $2500; incorporators, C. H. McDonough; C. D. Black, George H. Davis.

Krebs Commercial Car Company, Clyde, O.; capital, $100,000; incorporators, J. C. Krebs, R. A. Becker, F. X. Bachle, Homer Metzger, George Slessman.



Testers of the Cole Motor Car Company, Indianapolis, Ind., Successfully Negotiating a Clay Road Softened by a Severe Rainstorm.

GARAGE AND DEALER.

The Morse-Readio Auto Company, Springfield, Mass., has secured a tract of land between Dwight and Chestnut streets and plans to erect a six-story structure of the latest fire proof design. The foundation will be reinforced concrete, the framework of steel, and floors and roof of fire proof material. The building will have a frontage of 78 feet and be 97 deep.

The Wade & Dunton Motor Car Company, Lewiston, Me., is occupying new quarters. The structure is 50 by 100 feet, four stories in height and of brick. The first floor will be utilized for automobiles, the second as a salesroom and the third for storage, and top floor as the repair shop.

Bishop & Whitney, which operates a garage at Cananseraga, N. Y., has acquired the garage conducted by Roberts & Son, Elmira, N. Y.

The Horst & Strieter Company, Davenport, Ia., is now occupying new quarters in the Horst building, 1417 Second avenue. The concern is headed by Henry W. Horst with Henry T. Horst, vice president, and M. E. Strieter, secretary and treasurer.

Fred E. Folger has purchased the garage department of the Warner Automobile Company, Watertown, N. Y., and will handle all kinds of supplies and conduct a general repair business. He was formerly sales agent for the Ford Motor Company, Detroit, in Alberta, Canada. Mr. Warner will retain the agency for the Ford line.

William Fairchild and Ralph McGraw, Newburgh, N. Y., have purchased the garage on Grant street conducted by Daniel Aber. An adjoining building has been secured and will be utilized as an office with a rear driveway connecting with the other structure.

The Atlanta Automobile Top & Trimming Company, Atlanta, Ga., of which George W. Anderson is president and owner, has secured the agency in Georgia for the Bergdoll, made by the Louis J. Bergdoll Motor Company, Philadelphia.

The A. C. Guy Company, Worcester, Mass., wholesaler of lubricants, has moved from 102 Commercial street to 120 Main street.

The Ohio Motor Sales Company, Des Moines, Ia., has contracted for the agency of the De Tamble line, manufactured by the De Tamble Motors Company, Anderson, Ind.

Edwin R. Stancliff, Elmira, N. Y., has been appointed general manager of the Auto Car Sales Company, Los Angeles, Cal., and will have full charge. He formerly was connected with the New York office of the company.

The J. W. Bowman Company, Boston, has added the Waverley electric, made by the Waverley Company, Indianapolis, Ind., to the line of pleasure and commercial vehicles carried by it.

A. F. Shallberg, Moline, Ia., has given up his agencies for the gasoline vehicle and will devote his attention in the future to promoting the sales of the Rauch & Lang electrics, made by the Rauch & Lang Carriage Company, Cleveland, O. He has disposed of his garage, but it is his intention to open a new one devoted to the interests of electric vehicles.

The Warren Garage, Worcester, Mass., is undergoing extensive alterations. A section near the entrance and adjoining the office is being converted into a show and salesroom.

The Steenrod Auto Supply Company, Wheeling, W. Va., expects to occupy its new four-story fire proof garage at 2106 Main street shortly. It will have a capacity of 200 machines. The first floor will be utilized for storing cars while the second will be employed as the repair shop. As business increases the remaining floors will be used.

The Blue Ribbon Garage, Inc., Meriden, Conn., which was organized about two years ago, by Bridgeport parties, has been sold to Mauritz Mathison, David E. Brown and Arthur Oldroyd. The new company will conduct an

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up-to-date service station and will make a specialty of repairing.

Harry E. Pence, president of the Pence Automobile Company, Minneapolis, Minn., has secured the Hennepin Avenue Methodist Church property and will convert it into an automobile plant having six stories of ample floor space.

J. G. Tennant & Co., 2247 Michigan avenue, Chicago, has taken the agency for the Simplex, made by the Simplex Automobile Company, New York City.

Thomas Bush, Elmira, N. Y., has joined the sales force of the Chemung Motor Company of that city.

L. B. Keeton, Elmira, N. Y., has entered the employ of A. M. Zimbrich as salesman of the various lines which the latter represents.

The Ford Sales Company, Utica, N. Y., has secured property on Pine and Lafayette streets and will tear down the present structure and erect a two-story brick building, which will be 48 by 87 feet. The lower floor will be devoted to a salesroom and garage and the upper utilized as a repair shop. The building will be constructed of fire proof material. Electrical appliances will be employed throughout.

Cecil C. Robinson has been appointed general manager of the Roberts Motor Company, Jacksonville, Fla. Bert Farnum will have charge of the repair shop.

The Osen & Hunter Auto Company, San Jose, Cal., is erecting a new building at the corner of McAllister and Polk streets. Some changes are announced in the firm, O. C. McFarland, the San Francisco manager of the concorn having purchased the interests of A. E. Hunter and the company's name hereafter will appear as the Osen-McFarland Auto Company. Mr. Hunter will continue in the present quarters as agent for the Garford and Firestone-Columbus.

William Klockau, Rock Island, Ill., is planning to erect a three-story brick garage at Fourth avenue and 16th street.

The G. W. Blake Auto Company, Inc., Colorado Springs, Col., will erect a new garage and salesroom on North Nevada avenue. The new structure will be of fire proof material and equipped with modern conveniences for the repair and maintenance of automobiles.

WITH THE MANUFACTURER.

The Connecticut Shock Absorber Company, Meriden, Conn., announces the opening of an office, show and stock room at 231 West 54th street, New York City, where a complete line of Connecticut shock absorbers and fittings will be carried as well as installed.

The Cole Motor Car Company, Indianapolis, Ind., gives its product a thorough testing before the body is fitted and car equipped. In the accompanying illustration is presented two machines negotiating a road of soft clay and it will be noted that the wheels are sunk in the mud nearly to their hubs.

"The Great Western Tattler," a publication devoted to the interests of the Great Western Automobile Company, Peru, Ind., contains several interesting as well as instructive articles pertinent to the motor car.

The Central Transfer & Storage Company, Indianapolis, Ind., maintains a fleet of automobiles and in the accompanying illustration is depicted four Mais trucks, made by the Mais Motor Truck Company, and six Premier delivery vehicles, manufactured by the Premier Motor Manufacturing Company of the same city. These machines are utilized by the newspapers of Indianapolis and one publication, the News, has 36 sub-stations which are supplied by 10 machines, these doing the work in about one-third the time formerly required by 18 horse drawn vehicles.

The Abbott Motor Company, Detroit, announces a sales agency at South Edmonton, Alberta. O. J. Edinger, an experienced automobilist, is the proprietor, and the agency will be known as the S'Cona garage.

Edward Wells of Boston has been re-engaged by the E. R. Thomas Motor Car Company of Buffalo, N. Y., as assistant sales manager of the factory.

A. C. Stebbins, secretary and general manager of the Lansing Company, Lansing, Mich., is making a trip through Guatemala and Panama.

The Stewart & Clark Manufacturing Company, Chicago, has moved its Minneapolis, Minn., branch from 45 South 10th street to 1202 Hennepin avenue, where larger and more convenient quarters will be had for the handling of the Stewart speedometer as well as its installation. The new office will be in charge of T. J. Snelling, who has been with the company for some time. A. H. Champlin, who has had charge of the office, will call upon the trade in Minnesota, outside of Minneapolis and St. Paul, and Iowa.

Charles F. Kellom & Co, the New England branch of which is located at 284 Columbus avenue, Boston, announces that the Darling Automobile Company of Portland and Auburn, Me., has secured the exclusive right for the sale of Invader oil in the entire State of Maine.

The Remy Electric Company, Anderson, Ind., maker of ignition specialties, has appointed the following concerns to act as Remy service stations in their respective cities: Child, Day & Churchill, Inc., Spokane, Wash.; Washington Auto Supply Company, Seattle, Wash.; Archer & Wiggins Company, Portland, Ore.

J. K. McKeough has accepted a position with the Chicago branch of the Velie Motor Vehicle Company, Moline, Ill. He will be connected with the commercial car department.

Edgar E. Muller has been appointed manager of the recently established service department of the Ohio Motor Car Company, Cincinnati, O.

The Abbott Motor Company, Detroit, announces that arrangements have been made whereby the White Automobile Company of Baltimore, Md., will have the exclusive sale of Abbott-Detroit cars for the States of Maryland and Virginia. Another contract is that with the Eastern Motor Company of Atlantic City, N. J.

The Stewart & Clark Manufacturing Company, Chicago, has leased the store and basement at 174 Columbus avenue, Boston.

Manager Westerdale of the Chicago branch of the R-C-H Corporation, Detroit, has appointed W. J. Williams manager of the local retail sales.

The Greenville Metal Products Company, Greenville, Penn., will engage in the manufacture of motor cars, having closed a contract, it is stated, for the delivery of 13,500 cars to a western concern. The officers of the Greenville concern consist of: President, S. H. Penfield; vice president, Fletcher Goodwill; secretary and treasurer, F. L. Fay.

The Omaha Motor Company, Omaha, Neb., which was incorporated recently, is to erect a factory on the site adjoining that of the Stroud Machine Works. The company is to build a five-passenger car of moderate price.

Hamilton Cowley, Elwood E. DeHart, Edward G. Richardson and Walcott V. Smith are recent additions to the sales force of the New York branch of the R-C-H Corporation of Detroit.

The Fishback Motor Company of Newark, N. J., is negotiating with the Bristol Business Men's Association of Bristol, R. I., relative to removing its plant to that town.

Lucius Wilson has resigned as secretary of the Chamber of Commerce, Detroit, to become associated with the Warren Motor Car Company of that city, maker of Warren cars, in the capacity of vice president and general manager.

The De Tamble Motors Company, Anderson, Ind., has been reorganized, and James W. Sansberry, president of the National Exchange Bank, has been appointed general manager. Charles H. Walters, who has been secretary and general manager, is to become general superintendent. The capital stock has been increased to $200,000.

The King Motor Car Company, Detroit, maker of the King car, is occupying its new plant formerly utilized by the Hupp Motor Car Company. The factory will provide a floor space of about 70,000 square feet, and comprises practically a group of four buildings.

The Steenrod Dual Ignition Spark Company has been organized and will locate in Wheeling, W. Va. The company will manufacture a dual ignition device which distributes two sparks to one cylinder at the same time by the use of a single distributor. The ignition system is the invention of George W. Steenrod. It is applicable to both new and old motors.

The Bridgeport Brass Company, Bridgeport, Conn., is issuing a neat postal folder calling attention to the Atlas pump and other products made by it.

The Remy Electric Company, Anderson, Ind., announces the establishment of a new service station with the Lamb Electric Company of Grand Rapids, Mich.

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STUTZ WINS BAKERSFIELD RACE.

The first really big road race of the year was held over the Bakersfield-Maricopa-McKittrick course at Bakersfield, Cal., Washington's Birthday, the distance being 212 miles. Fourteen cars started but only 10 completed the first lap. The event was won by John Bayse in a Stutz car, made by the Ideal Motor Car Company, Indianapolis, Ind. G. J. Packer in a National led the field for the first 150 miles.

In winning the Lakeview-Gusher cup and $1000 in cash, the Stutz thus occupies the most prominent position in the racing end of the industry at the beginning of the 1912 season. It will be remembered that the first car of this make took part in the 500-mile race on the Indianapolis speedway, Memorial Day of last year, and completed the entire distance without stop. The Stutz finished second in its class in the Fairmount Park race at Philadelphia in October, and third for the Shettler cup at Santa Monica, Cal., the same month.

The place cars in the Bakersfield race were as follows: First, Bayse, Stutz, 5:44:59; second, Klipstein, Mitchell, 7:05:25; third, Goochenauer, Buick, 7:08:49.

MERCER LOWERS ROAD RECORD.

One of the cars on display at the Boston show was a Mercer raceabout, made by the Mercer Automobile Company, Trenton, N. J., in which Hugh Hughes, head of the Mercer's racing team, covered the distance between New York and Boston in 7:45:00 of night driving just previous to the opening of the show. This is held to be a new record for the distance between these two cities, and was undertaken for the purpose of giving a convincing demonstration of the Mercer as an all-around car.

Hughes left Columbus Circle in New York City at midnight, Saturday, March 5, and arrived in Boston the next morning at 7:45. The distance by road between the two cities is approximately 260 miles, and the Mercer lowered the best previous record by 36:00.

MATHESON ADOPTS NOVEL PLAN.

A unique selling plan has been adopted by the Matheson Automobile Co., Wilkesbarre, Penn., maker of the Matheson six. Utilizing its New York office as a nucleus field, crews of its employees will cover the bulk of its selling territory east of the Alleghenies. Each crew is composed of two salesmen and a service expert, and three different types of cars will be driven sufficient to make a travelling display of the company's standardized designs. The crew will call on all Matheson owners, inspect their cars, overhaul any little defects that may need attention, give general advice and otherwise see that every machine is giving perfect satisfaction. The salesmen will interest dealers in the establishment of agencies and follow up prospective buyers. This co-operating with the owners is a striking development of the manufacturer's willingness to stand back of his product and is of particular interest to the trade, inasmuch as it constitutes an aggressive policy of going after business. The first crew is touring New Jersey, Delaware and Pennsylvania, and others will visit New England.

REMY REPRESENTED IN CANADA.

Announcement is made by the Remy Electric Company, Anderson, Ind., that Taylor & Arnold, Ltd., the largest railway supply house in Canada, has been appointed sole representative of the American Electric Headlight equipment for locomotives, a product of the Anderson concern. The branches maintained by Taylor & Arnold at Winnipeg and Montreal will be used as service stations as well as distributing and selling points. Each station will employ a corps of skilled mechanics.

TIRE MEN IN EFFICIENCY MEETING.

In keeping with its policy to bring about a closer spirit of co-operation between the manufacturer, selling agent and consumer those connected with the service branches of the United States Tire Company, New York City, are brought together at certain central points, and under the direction of R. R. Drake of New York City, manager of the service department, schooled along lines calculated to improve the service of the company to each individual motorist. One of these "efficiency" meetings was held recently at San Francisco, Cal., where Thomas Wilkinson, manager of the branch, entertained a large number of the employees of the company. In addition to the business meetings there were theatre parties and dinners.

NEW DIXON LUBRICANT.

The Joseph Dixon Crucible Company, Jersey City, N. J., is placing upon the market a new chain graphite, especially intended for lubricating chains of pleasure and commercial vehicles. The preparation is put up in sticks, cylindrical in shape, about two by eight inches, encased in a neat cardboard carton, weighing about one pound each. It provides a convenient article as it may be carried upon the machine and the chain lubricated by rubbing the bar against it.

CRONE VAPORIZER.

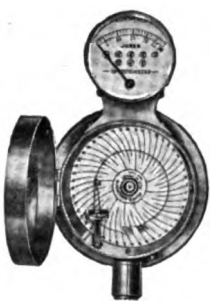
A device for facilitating vaporization of gasoline has been brought out by F. G. Crone, Buffalo, N. Y. It is fitted easily in the intake manifold of a gasoline motor and by it any raw fuel drawn from the carburetor is converted into a mixture. It provides a considerable vaporing surface and not only gives increased mileage but prevents danger of fire in the event of backfiring.

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JONES RECORDER

Gives time, speed and distance. Number of stops and the length of each stop. A complete record of every movement or stop of your truck or delivery wagon, is marked on a chart. This enables you to know just what your driver does—it is really a watchman's clock guarding your big investment.

Your delivery service IS NOT efficient without the JONES RECORDER. Write us today. Let us explain in detail just how much we can save you in the operation of YOUR delivery department.



THE JONES RECORDER

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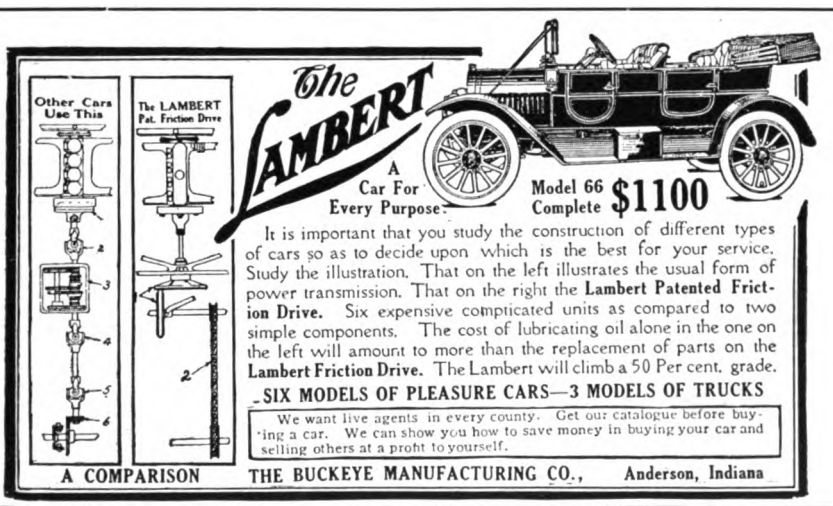
The Car Owner is asking for MULTIBESTOS

because it is the safest, surest and best wearing Brake Lining and enables him to motor in confidence.

DEALERS—Your delay in getting MULTIBESTOS in stock means a loss to you.

Write to-day for book and prices.

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The **LAMBERT**

A Car For Every Purpose

Model 66 Complete **$1100**

It is important that you study the construction of different types of cars so as to decide upon which is the best for your service. Study the illustration. That on the left illustrates the usual form of power transmission. That on the right the **Lambert Patented Friction Drive.** Six expensive compticated units as compared to two simple components. The cost of lubricating oil alone in the one on the left will amount to more than the replacement of parts on the **Lambert Friction Drive.** The Lambert will climb a 50 Per cent. grade.

SIX MODELS OF PLEASURE CARS—3 MODELS OF TRUCKS

We want live agents in every county. Get our catalogue before buying a car. We can show you how to save money in buying your car and selling others at a profit to yourself.

A COMPARISON

THE BUCKEYE MANUFACTURING CO., Anderson, Indiana

Why Not Let Us Tell You?

How to reach 11,500 active purchasing heads in the Automobile Industry each month. The only guaranteed service of its kind.

We can save you from $150 to $500 a month on your mailing list and give you the benefit of the best list obtainable. ***A postal will bring full information.***

THE ACCESSORY & GARAGE JOURNAL

Times Building **Pawtucket, R. I.**

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¶ We protect the trade by referring inquiries and orders received from owners to our dealers.

¶ We protect the consumer by strictly maintaining the quality of our products.

¶ We protect ourselves, the consumer and the dealer by prosecuting those who substitute inferior oils for MONOGRAM.

MONOGRAM OILS AND GREASES ARE

"Best for YOUR Engine"

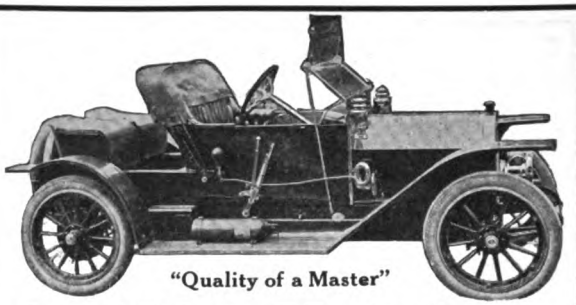
¶ Give them a trial and be convinced that there is real truth in our advertising slogan.

NEW YORK LUBRICATING OIL CO.
Consolidated with
COLUMBIA LUBRICANTS CO. of N. Y.
116 Broad Street, New York City
New England Headquarters: 126 MASS. AVE., BOSTON, MASS.
Branches at Newark, Boston, Chicago, Cleveland, Philadelphia, Seattle, San Francisco, Los Angeles, London, England; Johannesburg, South Africa.

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"The Car That Gets There and Back"
High Class Touring Cars and Roadsters
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STORAGE BATTERIES
CLASS A FOR ELECTRIC LIGHTING
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UNITED STATES TIRES
Continental *Hartford*
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The Strength of Four at the Price of One



"Quality of a Master"

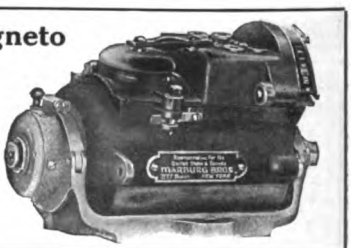
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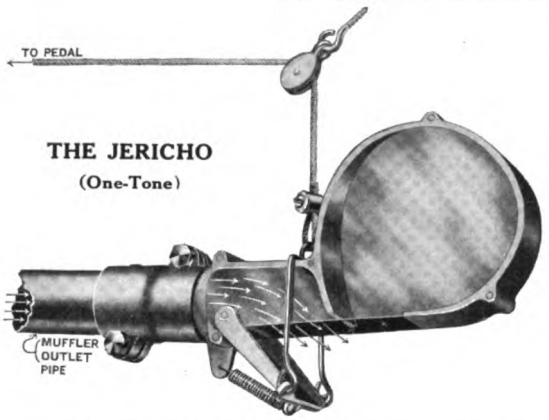
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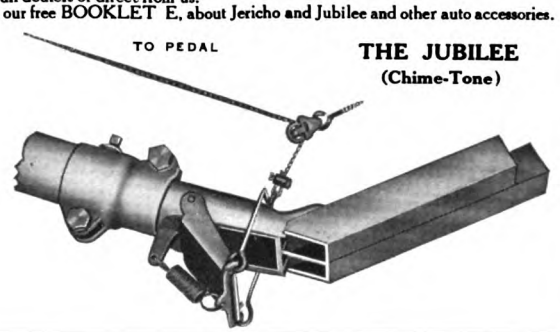
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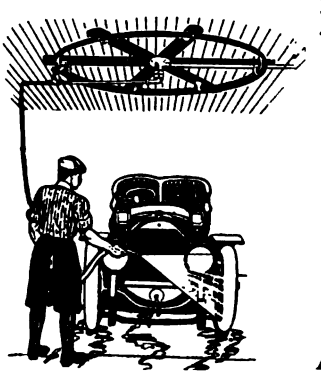
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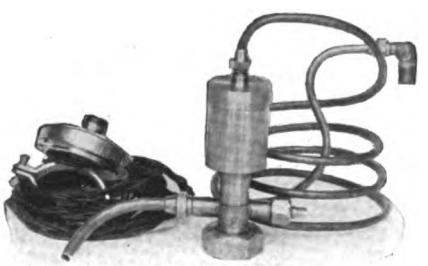
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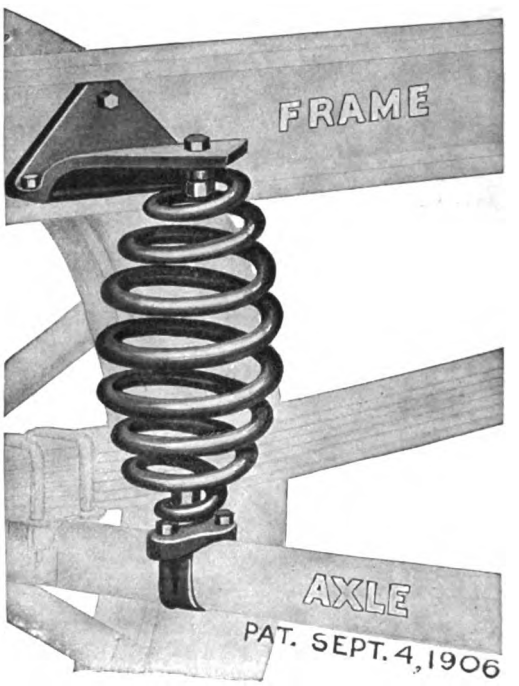
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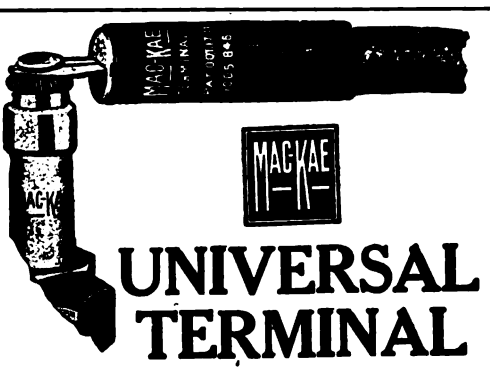
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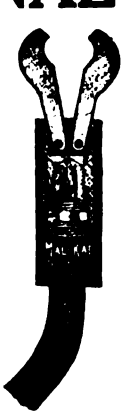
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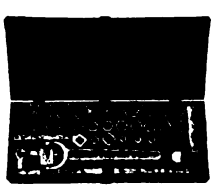
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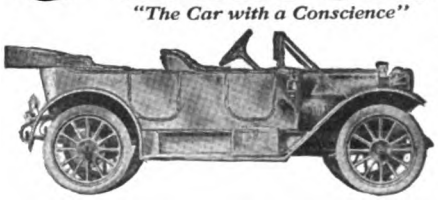
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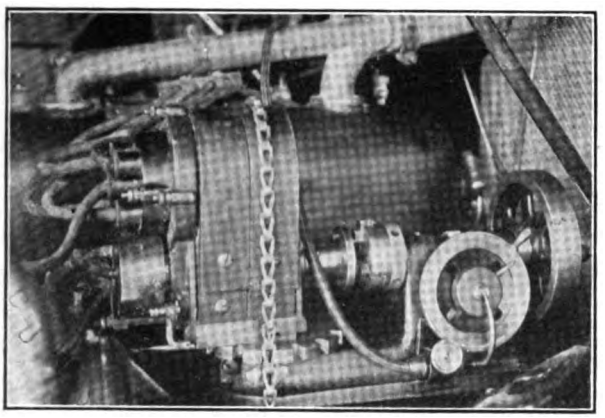
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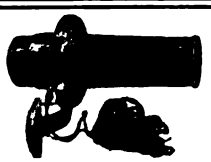
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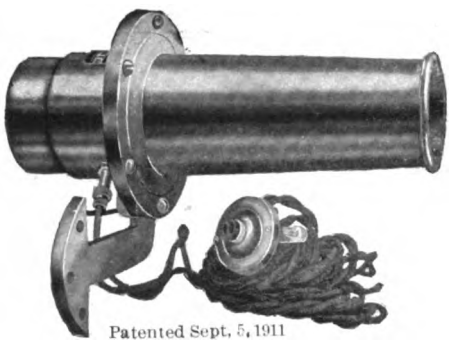


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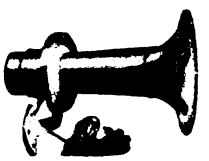
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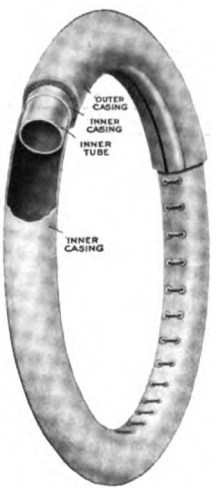
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Havoline Oil Co., 133 William St., New York City (Havoline.)
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Branch: 899 Boylston St., Boston, Mass.
Kellom & Co., Chas. F., 113 Arch St., Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.
Kincaid Oil Co., 219-221 West Exchange St., Providence, R. I. (Kincaid.)
Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York Lubricating Oil Co., 116 Broad St., New York City. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 423 Passaic Ave., East Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.
New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York City (Polarine.)
Branches: In all cities.
Texas Company, The, 7 West St., New York City.

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Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston, Mass.; 605 Brown Bros. Bldg., Philadelphia, Penn.; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

Wolverine Lubricants Co., 30 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

OIL AND GREASE PUMPS, GUNS, ETC.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Randall-Faichney Co., Boston, Mass. (B-Line.)

POLISHES.

Harris Oil Co., Munice, Ind. (Metal, Wood, Leather.)

Auburn Specialty Co., 122 Green St., Auburn, N. Y. (Blitz Cloth.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

RIMS — REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston, St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittelsey Demontachable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash., London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Harris Oil Co., Muncie, Ind.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Hess & Co., 295 Lafayette St., New York City (Bougie Mercedes.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York City. (Rex.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPEEDOMETERS AND RECORDING DEVICES.

Casgrain Speedometer Co., 172 Columbus Ave., Boston, Mass.
Branches: 1919 Broadway, New York City; 2031 Euclid Ave., Cleveland, O.

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1618 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York City.

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park square, Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St., Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1776 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

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Empire Tire Co., Trenton, N. J.
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Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17½ Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

Western Automobile Supply Co., 3900 Sheridan road, Chicago, Ill. (Auto Inner Casings.)

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator). See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

New Tyr Manufacturing Co., 771 Lexington Ave., New York City. (New Tyr.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)

Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TIRE TOOLS AND REMOVING EQUIPMENT.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Butler Mfg. Co., The, Carthage, Ind.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TRUCK BODIES.

Lynch Manufacturing Co., East Side Station, Chicago, Ill.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing, Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Pitless Auto Turntable Co., Kansas City, Mo.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VALVE STEM ADJUSTORS.

Auto Parts Co., Motor Ave., Providence, R. I. (Apco.)

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O., (Garage and Individual.)
Branches: In all principal cities.

WASHING DEVICES FOR GARAGES.

Perfect Mfg. Co., Albany, N. Y.

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Conover & Robinson, 244-252 W. 54th St., Motor Hall, New York City (Boreas.)

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

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Cutter, Geo. A., Taunton, Mass.

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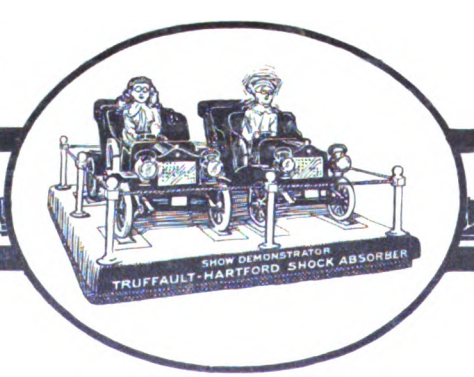
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VOL. XXXIII No. 4

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PAWTUCKET. R. I.

March 25, 1912

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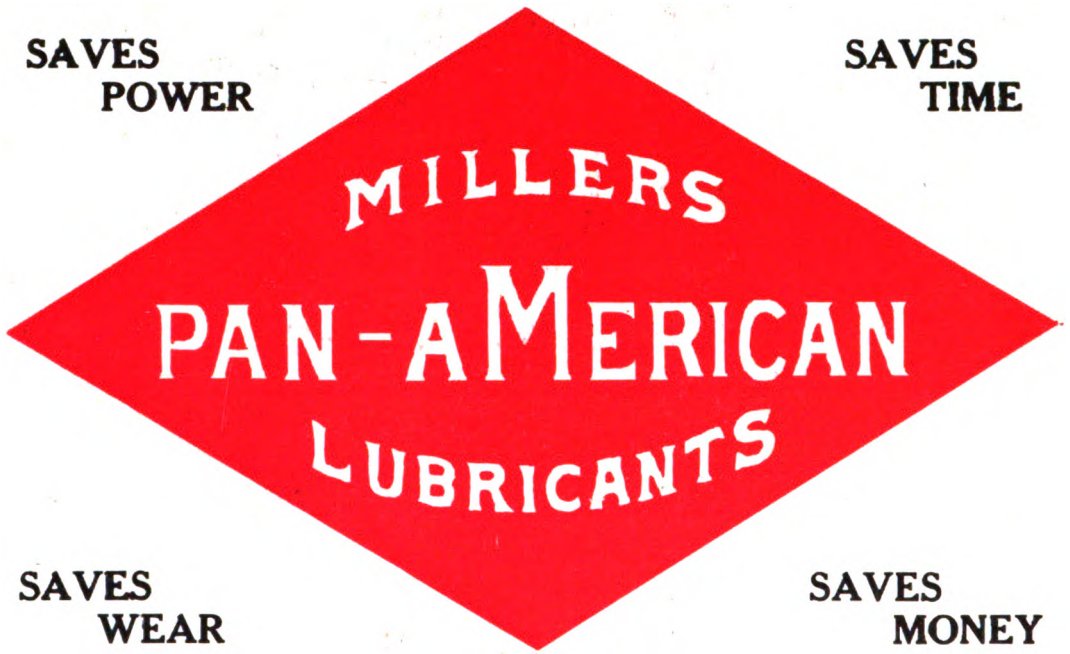
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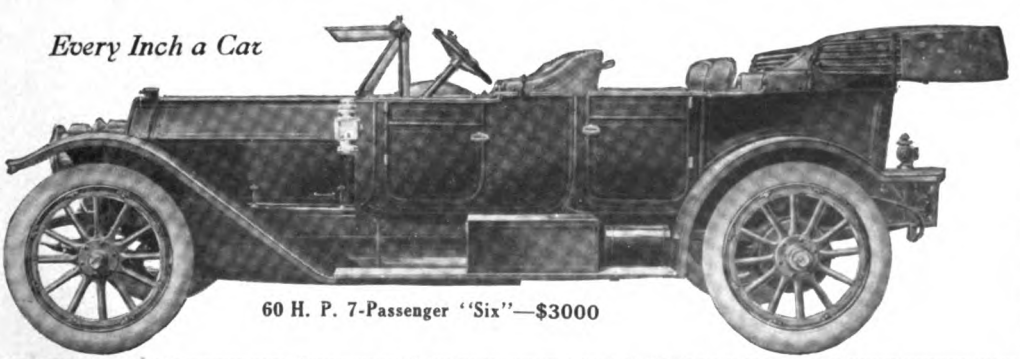
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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 4 MARCH 25, 1912 Price $1.00 the Year

WORLD'S LARGEST TRUCK SHOW AT BOSTON.

Exhibit Included Nine Makes Not Seen Elsewhere and Three New Vehicles of Home Production---Record Number of Machines Under One Roof---Enormous Business Prospects in Market of Unlimited Possibilities.

THE largest exhibition of power wagons ever held in America, and probably in the world, was that conducted by the Boston Commercial Motor Vehicle Association at Mechanics' Building, Boston, which was was concluded the evening of March 20. It was held under one roof, in direct contrast with those of other cities, and the visitors saw 182 complete vehicles and 42 chassis, this making a total of 224, representing 61 different makes. Had it not been for the delays that prevented the arrival of the purposed exhibits of several concerns the show would have been somewhat larger, the inability to make display being bitterly disappointing to concerns that had to ship from distant points and were victims of railroad transportation failure.



Looking Across Grand Hall from the Balcony, Showing the Power Wagon Display in Decorations Representing a Spanish Mission Scene.

But all in all it was a grand exposition of the mechanical transport. The success of the exhibitors in exploiting their productions was complete from every point of view, and the volume of business transacted—that is, actual sales—was very surprising, even to those who made careful estimate of the possibilities. The show was the first separate display of power wagons ever made in Boston, but there is no reason to doubt that every exhibitor was gratified with the interest manifested and the really remarkable desire for industrial machines made evident.

Regarded from any viewpoint the Boston show was far superior for those who were desirous of purchasing. It afforded opportunity for those who wished to make close examination and careful comparison of

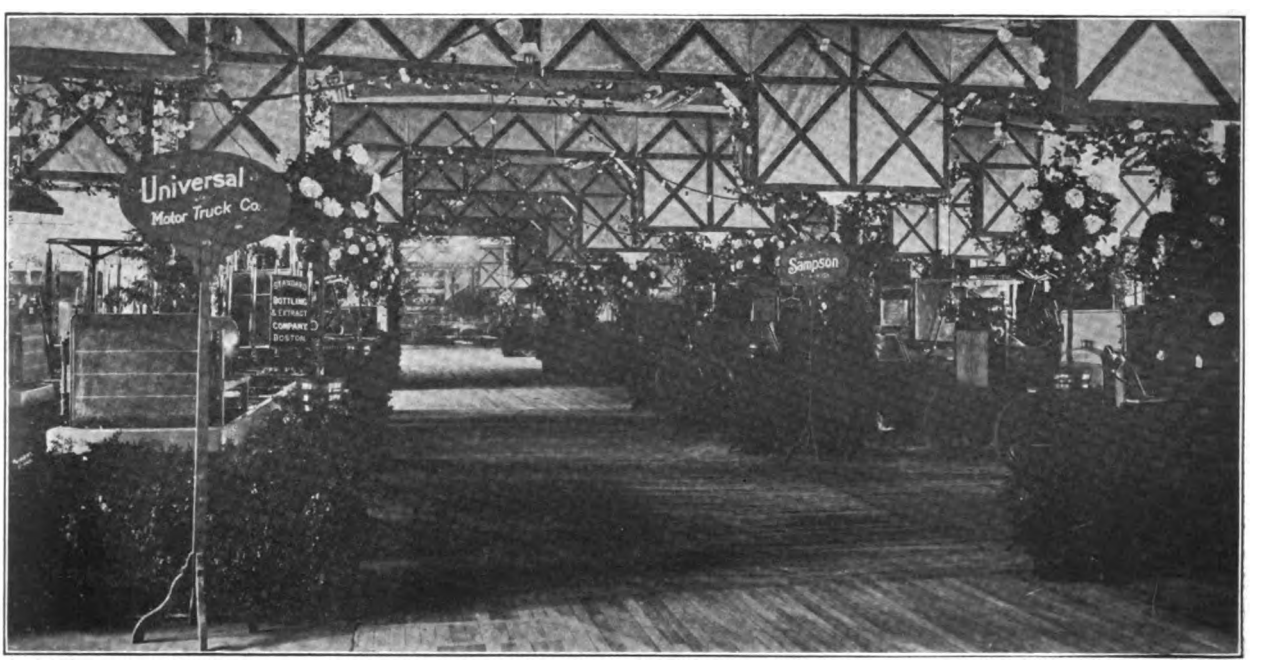
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the machines. There was practically double the number seen at either New York exhibition, and it may be said that the exhibits were what might be regarded as standard productions. Spacious as is the building it did not permit the full lines of any maker to be shown. The best that could be hoped for was a display of the different chassis, and while some made an admirable showing of bodies it is evident that it was impossible for any one to exhibit what might be regarded as more than a suggestion of service equipment.

The show was the greatest education ever organized among business men of the Eastern market as it illustrated practically the possibilities of the development of transportation facilities. There was a noticeable absence of freak constructions. The purpose of every designer was to create what would yield service continuously and under all conditions, and there was a universality of opinion as to what will make for endurance, impelled by the better knowledge of requirements and materials and engineering experience. It is unquestioned that there is no willingness to deal with constructions that have not been thoroughly experimented and tested. The market has been studied carefully as to demands and the majority of the makers are disposed to standardize and develop types that are favored in the market.

The Boston shows have always been productive from a selling point of view, but the results so far as the exhibitors of vehicles were concerned was surprising in that many of them were unable to cope with the demands, at least so far as immediate deliveries were concerned. In fact, the sales exceeded all expectations and with the manufacturers the applications for agencies were exceedingly gratifying.

The attention given to the show by organizations of business men was such as to justify the belief that there will be remarkable impetus to the adoption of the power wagon for every service. The New England Coal Dealers' Association members visited the exhibition and systematically examined the vehicles adapted for their purpose. Then incidentally, they listened to addresses before them as a body by experts concerning the subject of haulage. The addresses and their own investigations placed at their disposal information that would not under ordinary circumstances have been available. It is hardly necessary to indicate the value of such detail, or the influence that it must have so far as the market in this particular field of activity is concerned.

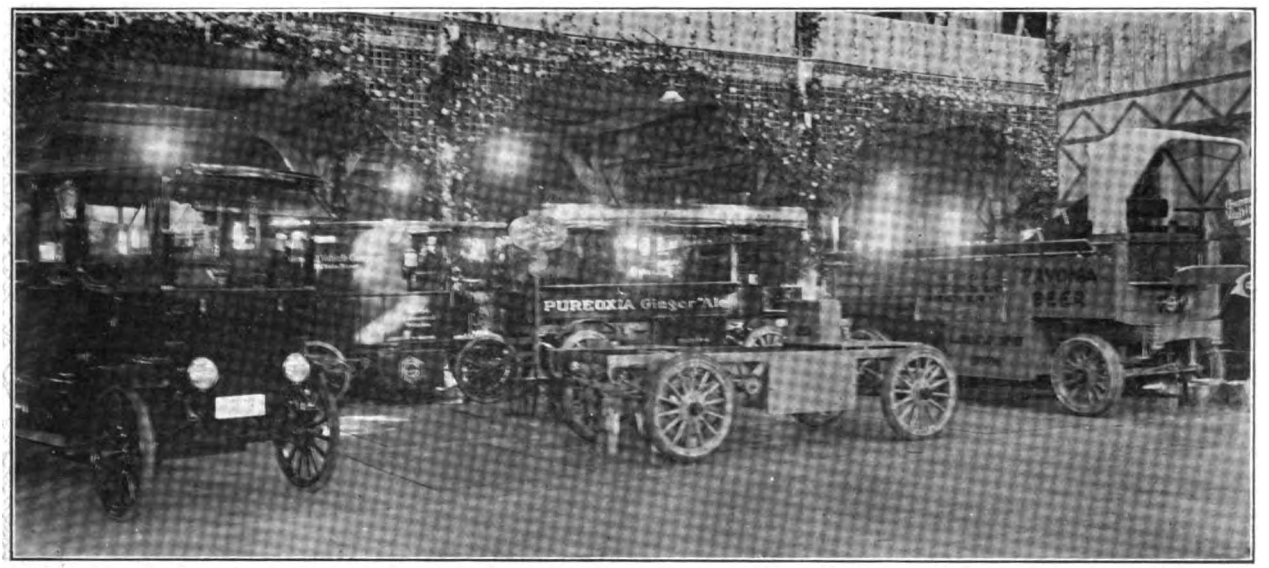


Looking Down a Long Aisle in Machinery Hall with Its Decorations Suggesting an Old English Rose Garden in the Early Spring.

It is evident that the business men are carefully studying the haulage problems with a view of adapting their own systems to the use of motor vehicles, and with the assurance of the economy of power wagons from a mechanical viewpoint, and their unquestioned superiority to any other available service, there can be but one conclusion—that the market is not only remarkably active, but the demand will be steadily increased. While the condition stated will obtain generally, it will be unusually manifested in the East, where the commercial centres are numerous and close together, linked by admirable thoroughfares, and where the keen business competition and the suburban patronage will compel wider range of activity and delivery.

The attention given to the eastern market by the

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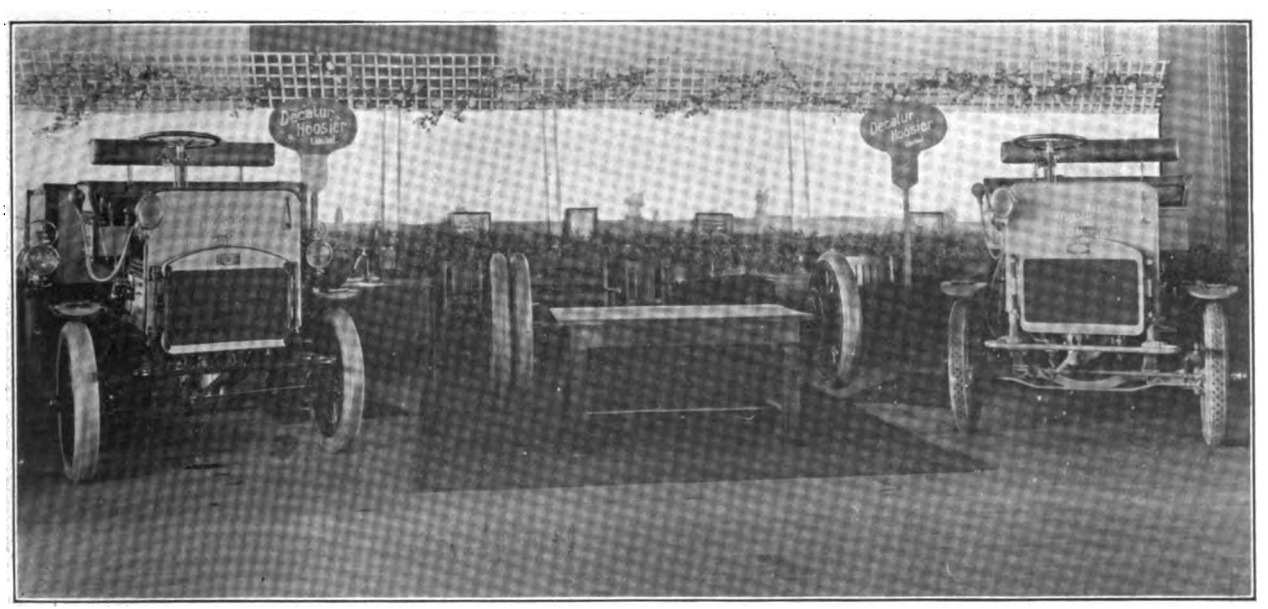
A Glance Into the Stand of the General Vehicle Company, Showing a Special Ambulance, Delivery Wagons, a Brewery Truck and a Chassis.

manufacturers of power wagons was evidenced at the Boston show by the presence of the executives of practically every concern of prominence. With the knowledge of the motor experience of the people and the business requirements the patronage and interest of the visitors was regarded as the best measure by which to gauge the prospective business for the year, and while there was not the curiosity ordinarily manifested at the shows the deep concern and the information sought was sufficient to satisfy any observer that the show was in every sense a repetition of the Boston pleasure car shows in direct purchasing quality.

There were many conditions that made clear that, despite the promise of the market there was not the capacity of manufacturing to produce anything like the number of machines desired within the period set for delivery, so that many buyers will be compelled to wait for vehicles—some of them for what may appear to be discouraging lengths of time.

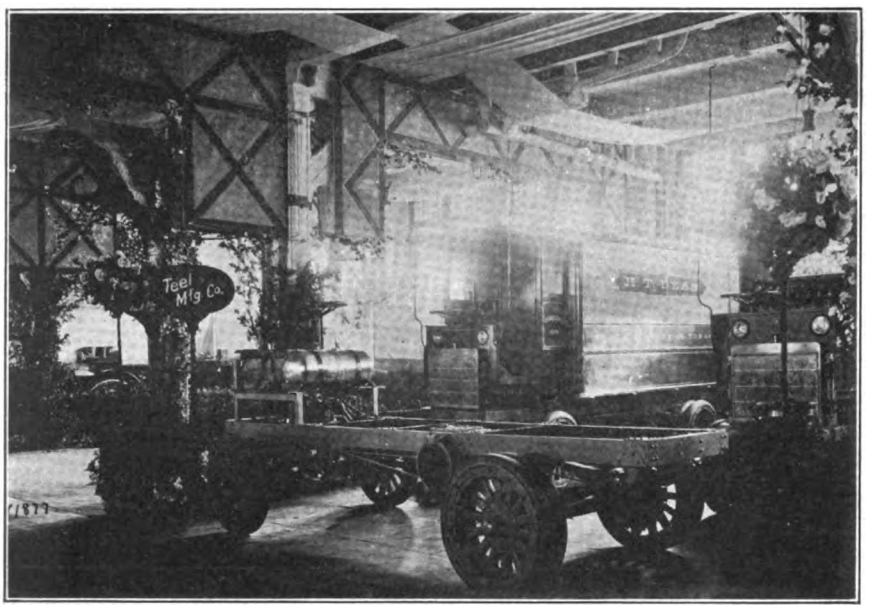
Taking the exhibition as a whole it may be said that it was in every sense satisfactory, but brief considerations show that five concerns showed practically 25 per cent. of the exhibits, and that 14 makers displayed 119 machines and chassis, or more than 50 per cent. of the entire exhibition. The remaining 47 exhibitors showed 105 wagons and chassis, or about 48 per cent.

The distinction of showing the largest number of



Where the Decatur "Hoosier Limited" Was Displayed, the Exhibit Consisting of a Complete Vehicle and a Chassis.

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The Teel-Woodworth Three-Ton Chassis with Its Surroundings of Power Wagons and Hedges.

chassis was shared by the makers of White and Kelly trucks, each with 14, but of these the latter had 13 bodies installed and the former but eight. Next in point of numbers was the Packard with 13 chassis, all but one with bodies. The General Motors Truck Company was third with 12 chassis, nine of these with body equipment, and the Autocar Company was fourth with 10 chassis, eight of them with bodies. The International Motor Company divided its exhibit into nine Mack trucks and seven Saurer chassis, four of the latter being body equipped, one exhibit being an imported fire pump and the other two chassis. Six Sampson wagons and trucks and one chassis made up the display of the United States Motor Company, while the Atterbury with six trucks, the General Vehicle Company with six chassis, four body equipped, and the Knox display of six chassis, including two fitted for fire service and an ambulance, made up the list of the makers showing more than five cars.

In contrast with the previous shows there was better opportunity for buyers to examine the machines. There was as a whole sufficient room for those interested to see every part, and in no case was there such congestion that the visitors could not have access to every constructional detail. Of the 42 exhibitors in the industrial department of 1911, 26 made display at the show of 1912, and of these two made change of exhibit, so that 16 did not care to or could not secure representation. But there were 37 new exhibitors, including the two referred to. Of the 61 makers represented nine did not make display at either New York or Chicago, so that these may be considered to be practically new machines.

These were the Chalmers, Clark, Couple-Gear, Eckhard, Ford, Mais, Mora, Teel-Woodworth and Stanley, the last mentioned being the first showing of a steam vehicle adapted for industrial purposes by the pioneer builders. The other 51 machines were seen at some of the preceding exhibitions. Of the 1911 exhibitors those to return were the Alco, Atterbury, Autocar, Buick, Chase, Commerce, Dayton, Decatur, Garford, Grabowsky, General Vehicle, International Harvester, Kelly, Knox, Morgan, McIntyre, Overland, Packard, Peerless, Pierce-Arrow, Sampson, Speedwell, Victor and White, while the Ford taxicab and the Clark two-cycle motor truck were also shown. Those shown in 1911 that made no exhibit were: Atlas, Beyster-Detroit, Brush, Cass, Detroit electric, Franklin, Harder, Harrison, Hupmobile, Johnson, Rapid, Reliance, Randolph, Stoddard-Dayton, Warren-Detroit and Wilcox. The Rapid and Reliance are now marketed as G-M-C gasoline vehicles.

The exhibitors who made no display in 1911 were: Bessemer, Baker electric, Chalmers, Clark, Commerce,

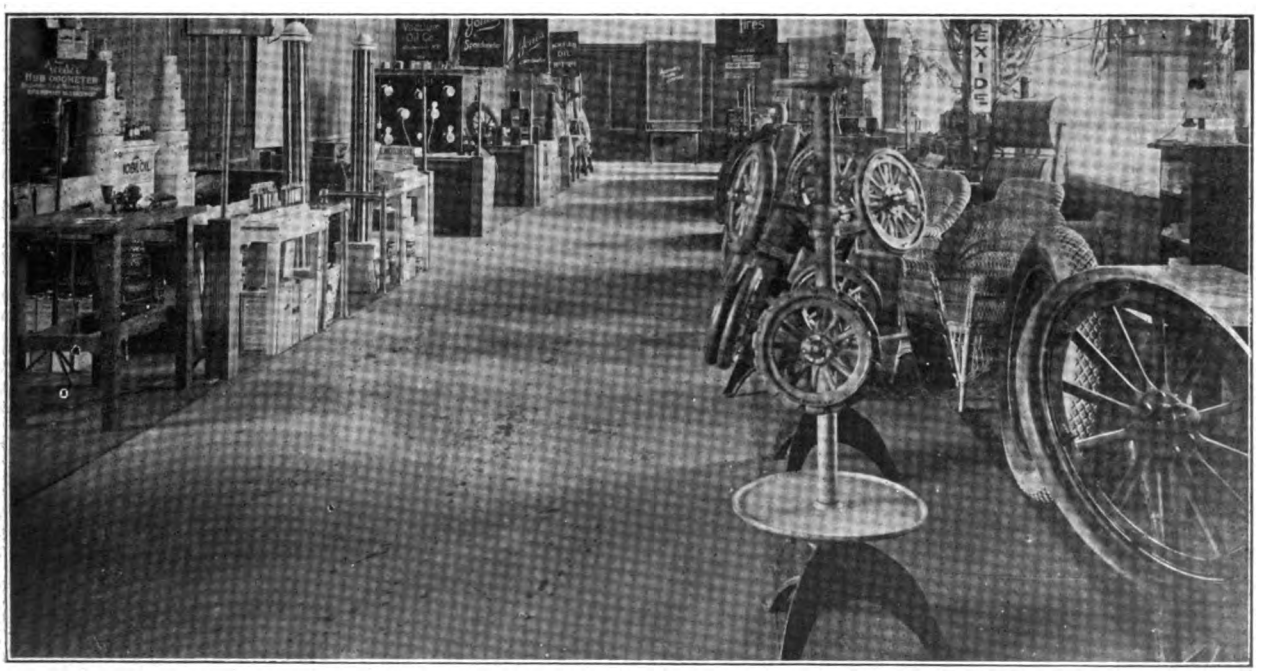


Democratic Vehicles, Couple-Gear Gravel Cart and a General Vehicle Brewery Wagon, Shown Amid the Hedges and Climbing Roses.

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Couple-Gear, Eckhard, Federal, Ford, Gramm, G-M-C, KisselKar, Koehler, Lansden, Lauth-Juergens, Locomobile, Lozier, Mack, Mais, Mercury, Modern, Mora, Motor Wagon, Martin tractor, Pope-Hartford, Poss, Reo, Sandusky, Sanford, Saurer, Stanley, Stearns, Sternberg, Teel-Woodworth, Velie, Walker and Waverley.

Of the 1912 exhibitors the Baker, Couple-Gear, G-M-C, General Vehicle, Lansden, Walker and Waverley are electric, the Stanley is steam driven, and the Chase, International Harvester, Kelly, Mercury and Sanford are air-cooled. The number of machines shown rated as water-cooled was 48. Of the air-cooled power plants the International Harvester, Mercury and Sanford are light wagons, the latest Chase machine has capacity of 4000 pounds, while the Kelly is cooled by a blower system and the trucks



The East Aisle of the Main Accessory Department Looking Toward Paul Revere Hall, with the Kelly-Springfield Tire Company's Display in the Foreground.

are built up to five tons rating. The Stanley is a comparatively light duty machine. The electric wagons and trucks, however, have load capacities ranging from 1000 to 10,000 pounds.

If there is any reason for comment concerning the standard lines of vehicles, both in electric and gas engine drive, it is desirable to emphasize the attention given to the construction to secure uniformity of strength and endurance. Without exception there has been abundant margin of safety of components, but the designers have directed their endeavors toward increasing weight of metal wherever rigidity has been found desirable, stiffening the chassis frames and affording protection against the stresses resultant from constant service. The purpose has been largely to protect wearing parts from effects of abrasive accumulations and to provide means of lubrication where metal faces may be subject to friction. There has been keen realization of the destructive effects of extreme vibration and so far as this may be done the members have been created with a view of long resistance to every influence that may cause deterioration.

With the makers of chassis there is generally a desire to sell without body installations because of the widely differing requirements and demands of the purchasers. This does not mean that the desires cannot be met, but to provide every probable form of body means the addition of a body-building plant to the works producing the chassis, a practically separate industry in which many manufacturers have no inclination to engage. This has brought about activity by body makers who are specialists in their work and who are prepared to furnish whatever may be required within the limitations of the chassis.

The show was not so much of bodies as might be assumed because the majority of the makers preferred to make display of what could consistently be regarded as standard equipment, but in numerous instances there was exhibition of special bodies which demonstrated possibilities for varied delivery service. One of the uses for which a number of bodies were especially designed was coal haulage, for which end, side and chute discharge are used very generally. Another class of service developed varying types of quick discharging equipment, there being some demonstration of hand and powered hoists by which the machines may be unloaded in very brief space of time. Some of these were utilizations of body elevators used

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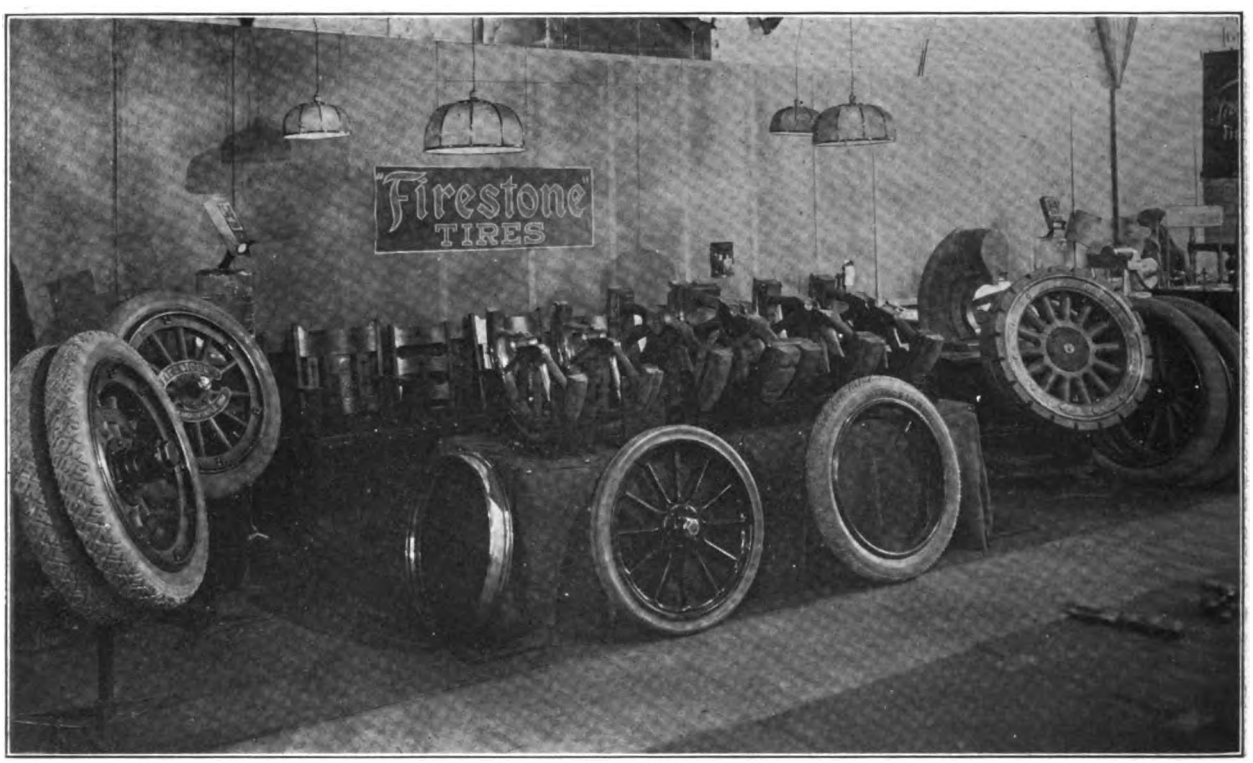
on animal carts, while others were more recent constructions designed to eliminate any effort by the drivers and to economize the time of the machines.

Of unusual interest to all visitors was the Eckhart truck, built by the Hercules Motor Truck Company, Boston, this being a five-ton vehicle in which was installed a six-cylinder motor, the only one exhibited at the show. This machine is an admirable creation from a mechanical viewpoint and the workmanship was unusually well executed throughout. Designed for heavy duty this engine is remarkably accessible. With minimized effort work may be performed upon every part of the motor. To illustrate, either side of the engine case may be opened quickly for work on the crankshaft, camshafts, connecting rods, and bearings. The valves are located in the head, and the valve pushrods and the roller tappets may be released and lifted out by removing a nut holding one yoke on each cylinder unit, the cylinders being in pairs. The valve cages may be similarly released and removed by turning off a nut holding a series of yokes.

The motor has bore of 4.5 inches and stroke of 5.5 inches and while rated at 48.6 by the S. A. E. standard it has produced 54 horsepower by brake test at 800 revolutions a minute. The governor is limited to 900 revolutions, which will yield approximately 60 horsepower. The engine is cooled by a radiator with heavy bronze bottom and top cells, into which copper tubes with spiral radiating flanges are swaged as are the tubes in a steam boiler, the construction being unusually heavy and capable of resisting a considerable steam pressure. A grating protects the front of the radiator.

Both motor and gearbox are carried in sub-frames and the rear of the motor sub-frame and the front of the gearbox sub-frame are suspended from a frame cross member by wide yokes that are pivoted at the frame member, and each sub-frame is mounted at the other end on the chassis frame by strong arms. It is claimed for this construction that no matter what the twist in the chassis frame from load or road shock there can be no strain upon the transmission.

One of the most unique features of the driving system is the enormous gearset, which is carried in a sub-frame and is coupled with the pinion shaft of the jackshaft differential through a second clutch. Both clutches are of the reversed cone type and they are interlocked so that when the gear ratio is changed the gearset is instantly stopped by a brake and the gears may be meshed without possibility of damage. Instead of the torsion rods of conventional design the driving effort from the rear axle is carried to the front axle by a long rod extending between the axle centres. There is a heavy chain attached to the centre of the rear chassis frame member and carried on a hook on a vertical arm rising on the axle housing that resists any twisting movement of the axle.



The Exhibit of the Firestone Tire & Rubber Company, Which Consisted Wholly of Shoes Designed for Heavy Vehicle Service.

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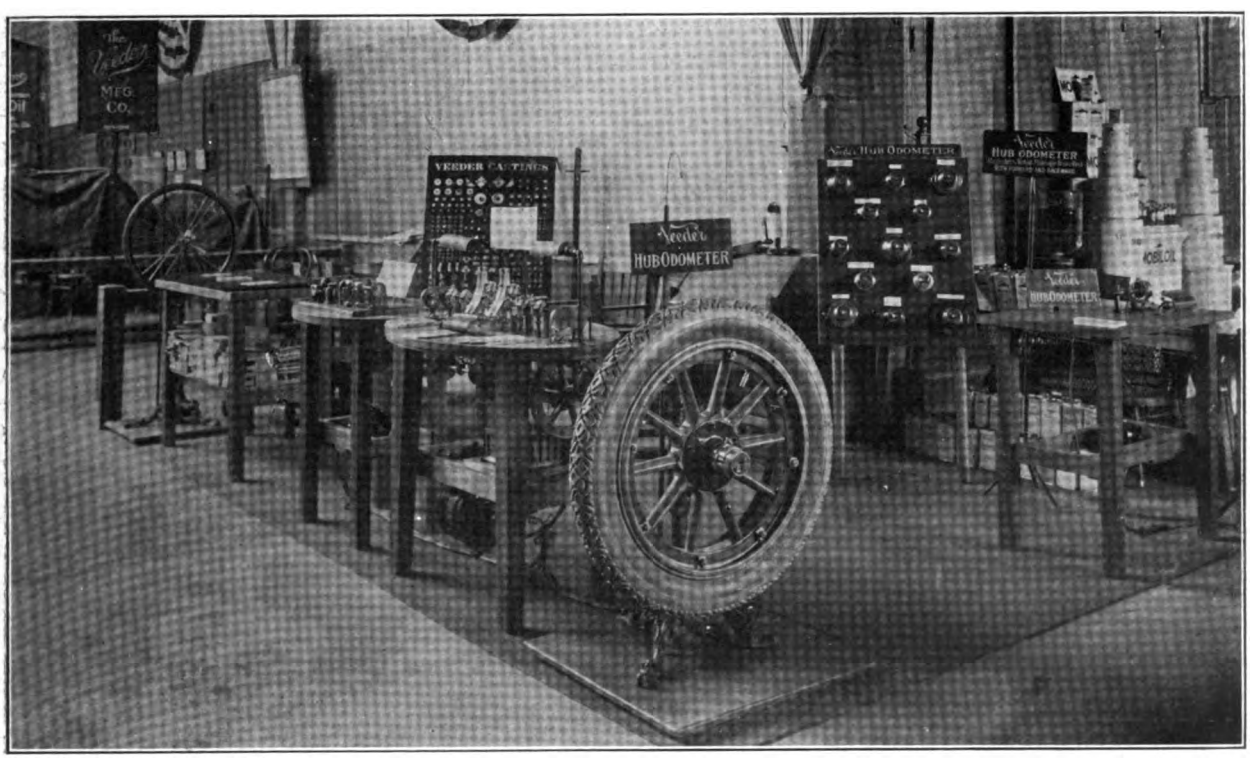
The second Boston-built truck is the Clark, produced by Edward S. Clark, for years a builder of steam pleasure cars, who a year since showed a two-cycle engine power plant in a power wagon. He is now building trucks of conventional type of three and five-ton capacities, one of the smaller being shown. The Clark design is noticeable for the fact that there is a careful adherence to sound engineering and established mechanical principles. It has been worked out with clear knowledge of the requirements of varying service and large factors of safety have been provided. The motor is four-cylinder, 4.125-inch bore and 5.25-inch stroke, giving 35 horsepower. The ignition is the Bosch high-tension dual system, the lubrication is by mechanical force feed from two plunger pumps through a dash sight gauge, the cooling is by gear-driven water pump and tubular radiator, the carburetion is by a float-feed automatic water jacketed carburetor, and the driving system is through a leather faced cone clutch and gearset, giving three forward speeds and reverse, attached to the jackshaft.

The frame and other chassis construction details are according to standard practise, there being a wheelbase of 120 or 130 inches. The springs are semi-elliptic with a cross or jack spring to carry the load. The service brake operates by bands contracting on the jackshaft drums and the emergency brake shoes expand in the rear wheel drums. The driver's seat is at the left side with centre control levers, steering being by an irreversible worm gear.

The Stanley steam machines follow the design developed in Stanley pleasure cars with somewhat heavier construction. One model shown was a 2000-pound delivery wagon and the other was a 12-passenger depot or observation wagon.

The Chalmers delivery wagon has capacity of 1000 pounds and it has either open or closed body fitted on a model M chassis with longer and straighter frame, heavier springs and lower drive gear. The wheels are fitted with 34 by 5.5 pneumatic tires.

The Ford delivery wagon has a special enclosed body installed upon the regular Ford chassis. The wagon has a capacity of 750 pounds and the contents may be protected effectually from the elements or individuals, and the driver is shielded by an extension that covers him completely, yet affords full sight at either side.



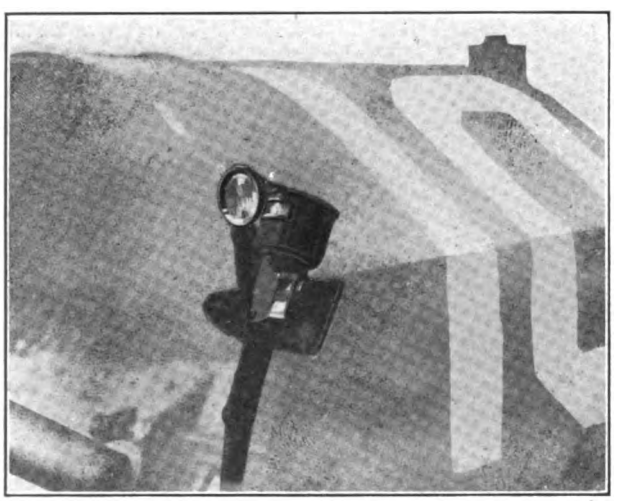
A Corner of the Accessories Display, with the Stand of the Veeder Manufacturing Company Where the Hub Odometer Was Demonstrated.

The Teel-Woodworth truck is three tons capacity, and is built by the Teel Manufacturing Company at Medford, Mass. The designer has included in his machine standard components, such as a four-cylinder 30 horsepower Continental engine, Bosch high-tension ignition, Hele-Shaw clutch, Cotta transmission, Timken front and rear axles, Ross steering gear, and nickel and vanadium steel for every construction. The components are of liberal proportions throughout, provision is made for thorough lubrication of all wearing parts, and adjustment can be made where there shall be wear. The motor is driven with fixed spark and accelerator.

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The Couple-Gear machines shown were a Philadelphia dump cart and a wagon with bottom discharge, these having the regulation Couple-Gear equipment of front wheels with the battery placed under the driver's seat. The platform is carried forward on the Couple-Gear driving wheels and the rear on the usual large wooden cart wheels both being designed for heavy haulage such as is desired by contractors, with 90 per cent. of the load carried on the steel tires. The machine is driven and steered by the front wheels and is especially adapted for work in traffic or narrow streets. The speed is comparatively slow but the machines are in every way economical.

The Mora wagon is a light delivery vehicle driven by an opposed-cylinder water-cooled engine of 16.8 horsepower S. A. E. rating. It is designed for comparatively fast service work and is equipped with either platform or express body. The drive is by planetary transmission and through double side chains.



Magnifying Glass Attached to Speedometer on Stutz Racing Cars.

It is conventionally built and has a simplicity that commends it to those who desire practical service.

The accessories exhibited during the show were in considerably reduced number as compared with the pleasure car display, but there was a very fine and comprehensive showing of tires, which received much attention.

MAGNIFYING GLASS ON STUTZ.

An accompanying illustration presents a novel and useful feature which is fitted as standard equipment on all Stutz racing cars. It is a magnifying glass in focus with the driver's position, by which he can see the entire dial of the speedometer enlarged several diameters. The idea originated with H. C. Stutz, chief engineer of the Ideal Motor Car Company, Indianapolis, Ind., maker of Stutz cars. Gilbert Anderson, who used it first in the Fairmount Park road race at Philadelphia, Oct. 9, says that when a man is driving more than 80 miles an hour there isn't time to take a speedometer reading under the usual conditions, while with this magnifying arrangement it is possible to note the exact speed at a single glance. It will be remembered that Anderson, driving the Stutz No. 10, finished second in the class and the car was the only competing machine which completed the entire distance without a stop of any nature.

PUBLIC TAKES RUSSELL STOCK.

Recently, the Russell Motor Car Company of Montreal, Can., the licensee under the Knight patents in Canada, offered $400,000 of new preferred stock to the public, and announcement is made that all has been subscribed. Although the terms of issue called for an initial payment of $80,000, over $285,000 has been paid in, many of the subscribers taking advantage of the opportunity to take up their entire allotment.

TOURING CLUB TESTS CUT-OUT.

On order to determine the necessity for the use of the cut-out, the Touring Club of America recently conducted a demonstration in the laboratory of Joseph Tracey, a consulting engineer in New York City. A Packard 30 horsepower motor was utilized in the trials, and the result of operation with the cut-out closed and open is shown clearly by the following table:

R. P. M.	H. P. Closed	Car Speed, M. P. H.	H. P. Open
300	13.5	10	13.625
1000	43.0	33	41.750
1800	47.5	60	48.000
900	38.5	30	38.500

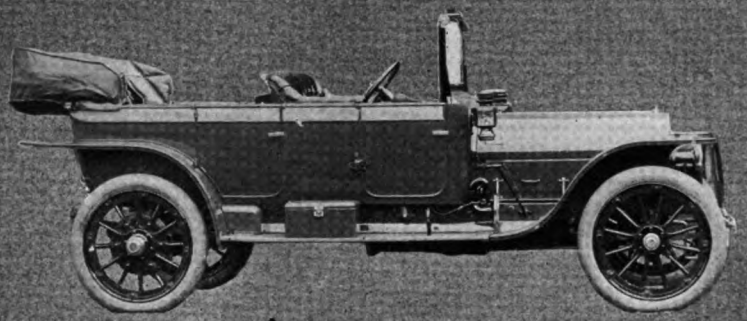
SHAWMUT TIRES AT THE SHOW.

One of the features of the recent Boston automobile show was the exhibit of the Shawmut Tire Company of that city, in which the manufacture of Shawmut tires from the tree to the completed shoe was presented in a thoroughly educational manner. First, there was the rubber tree and the method of sapping it. Solid biscuits of pure rubber in the form in which this component is shipped to this country also were shown. Lastly, Shawmut tires were presented in all the various stages of production. The exhibition also including a device for determining the elasticity and toughness of the Shawmut tubes. Another innovation was the full line of repair material, this being put up in screw top, air tight cartons with full instructions for using.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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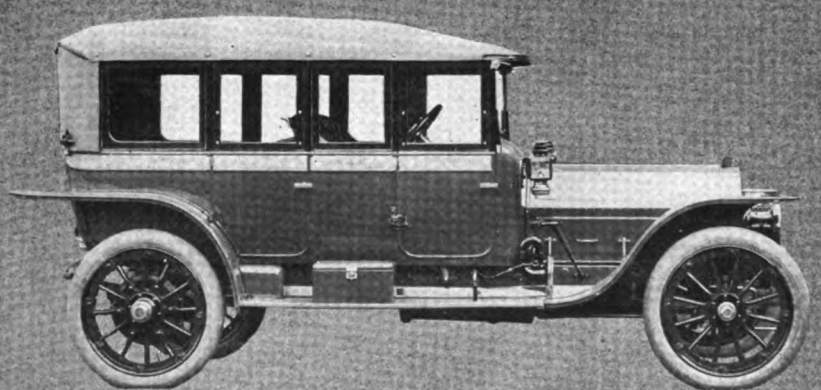
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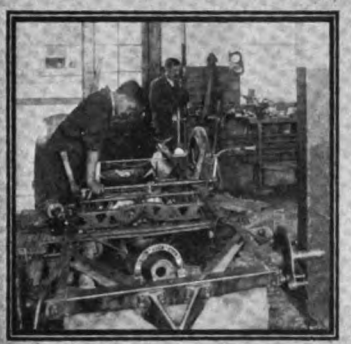
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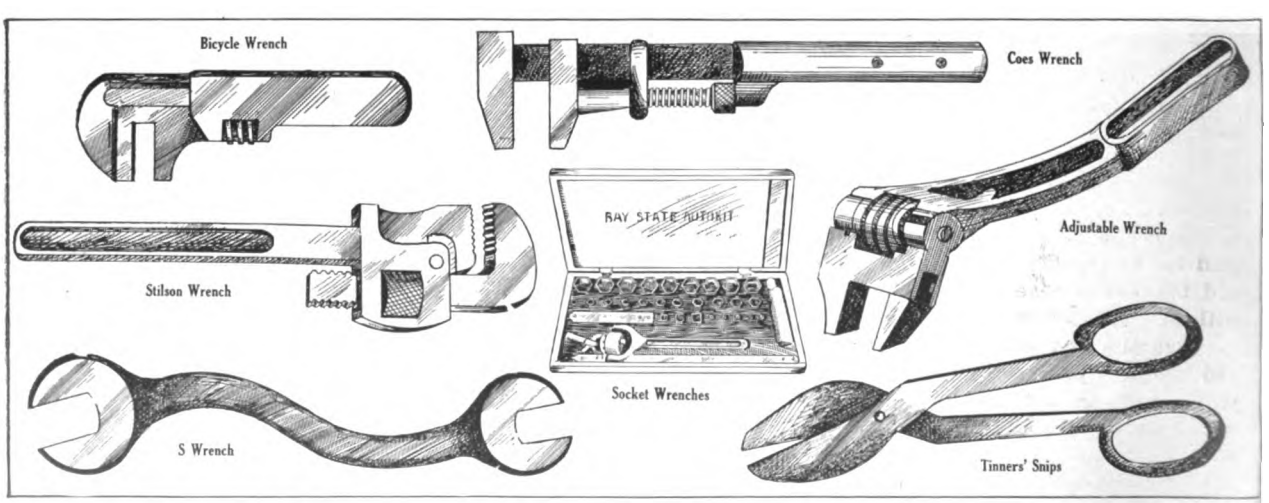
Preparing the Equipment for the Spring Overhaul

by C. P. Shattuck

PROGRESSIVE motorists are beginning to plan the necessary equipment for the spring or annual overhaul of the car, and it is interesting to note that the number of owners who engage in this work is increasing each year, this being the result of the educational campaign conducted by the manufacturer and the motoring magazines. While many undertake their own repairs because of a desire to effect economy in upkeep, there are others who though fully able to have this work done outside, don the overalls and dissect the mechanism of the automobile to become fully acquainted with its components and their relation to each other. In both classes will be found skilled workmen, possessing considerable knowledge of mechanics, and it is from such operators that the manufacturer has received valuable suggestions in the past. Numerous clever devices have been invented by the owner of the pleasure vehicle, and a large percentage of the practical accessories owe their origin to the owner and driver.

Many have model garages in which provision is made for a workshop and some of these are fully equipped, containing as they do, modern appliances for the care and maintenance of the motor car. Those possessing a knowledge of machinery have installed lathes, drills, etc., operating these by electricity or by a small gasoline motor, and during the long winter evenings have turned out the new parts needed in the overhaul. Others have a less complete equipment, confining themselves to a set of practical tools and apparatus, and having the necessary machine work done outside.

There is still another class, the comparatively new owner, who although possessing an elementary knowledge of the automobile, desires to make his own repairs, and it is for his benefit that the suggestions herein are made. While to those who have gone over the ground before the equipment outlined will be familiar, it will serve as an aid in checking the list of tools and material essential to the work. Regarding these, the reader should not take it for granted that every article named must be purchased. The majority will be found in the average private garage and it is probable that those required may be secured at a very little outlay of money. The greater part of the material may be secured for a few cents, such as valve grinding compound, wire, small tools, etc. When the latter are picked up one at a time, and cared for properly, a most complete equipment is secured very rapidly. Special sales provide excellent opportunities for securing first class instruments and in selecting these, quality should receive first consideration.



The Wrench Equipment Is Important in the Overhaul and Should Include S, Coes, Socket and Stillson.

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The extent of the equipment will depend upon the nature of the overhaul; that is, the age of the car and its condition. It is obvious that a machine which has been in service but a short time will require less adjustment than one which has been operated several thousand miles. If the work consist of removing the cylinders, scraping out carbon and grinding valves only, the average tool kit will answer all requirements, with the addition of the grinding compound. If the chassis is to be stripped to the frame and a thorough overhaul required, the use of a more complete equipment will be essential to accomplish the work properly.

Stands and Clothing.

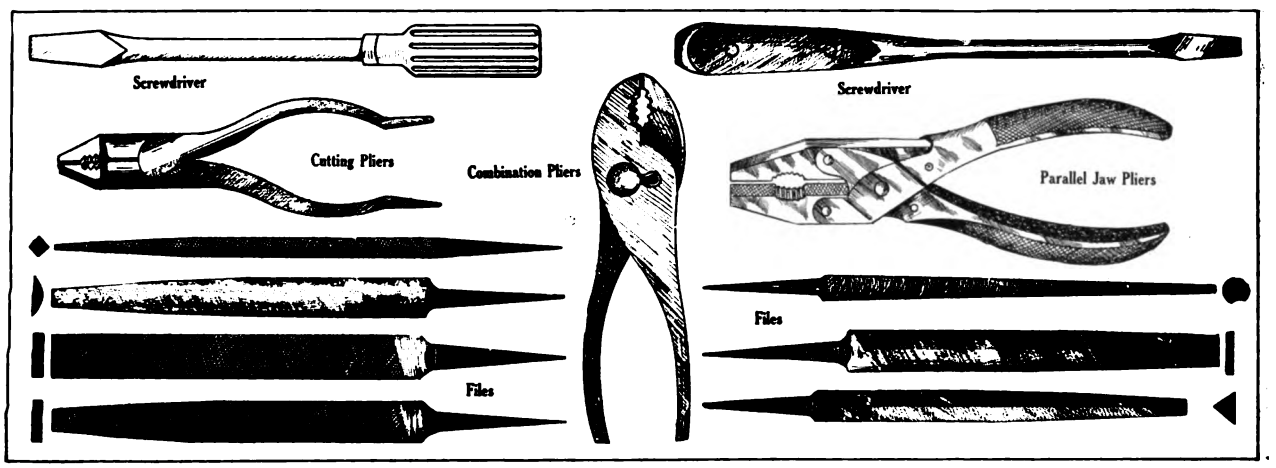
Assume that the automobile has seen considerable service and its condition is such that the owner is warranted in stripping it to the frame, disassembling each of the components, and that these need attention. This work will require the services of a motor stand and frame supports which were described in the last issue of The Automobile Journal. If the garage be *not* equipped with a work bench some form should be constructed, and elsewhere herein is described and illustrated a practical, inexpensive bench which may be built by the motorist.

While a pit is desirable, saving as it does crawling under the chassis, and facilitating the work, it may be dispensed with if the garage be not thus equipped. A creeper may be constructed or purchased, this being optional. In the overhaul, as well as in reassembling, the operator will be obliged to work under the car, and in the absence of a pit or creeper may employ an old blanket or robe with one end rolled up to form a pillow. The latter will be appreciated.

Overalls and jumpers are usually employed over old clothes, as these may be washed from time to time, but an old suit may be utilized. Bruised knuckles and damaged hands may be prevented by the use of an old pair of gloves with the finger tips cut off. As the gloves become saturated with grease they may be cleaned with gasoline. A cake of hard soap should be included for filling the finger nails before starting work as it will not only prevent griming of the fingers, but will facilitate washing. An old cap with a visor is handy as in working underneath the car particles of dirt are apt to drop into the eyes. A pair of old goggles may be used as it is extremely awkward trying to remove foreign elements from the eye when the hands are covered with grease. Regarding soap, there are several excellent preparations. Powerful compounds should be avoided as the skin will be roughened and inflamed by their use.

Tool Equipment—Wrenches.

In selecting a vise for the work bench one having at least three-inch jaws is favored, and a larger one is even more desirable. It should open at least four or five inches to take large work. The wrench outfit is perhaps the most important, and a set of standard S members should be included. These have openings ranging from .125 to 1.25 inches graduated by sixteenths. Special sets are obtainable at any supply house, these including five members the openings of which vary from .375 to 1.25 inches, and are not expensive. Some owners have a complete set while others get along with the ordinary outfit.



Pliers, Screw Drivers and Various Types of Files Useful in the Overhaul.

A Coes all metal monkey wrench is recommended as it is very durable and will withstand hard usage. One about eight inches long will answer for ordinary purposes, but a larger member will be useful for heavy work. A Stillson is essential and at least two will be required. A small one for light work is usually found in the average road kit and to this should be added an all metal member 14 or 16 inches long. When a piece of piping about three feet or more is slipped over the handle, the most stubborn part will yield to the leverage exerted. A small bicycle wrench will be handy for light work such as for small nuts and bolts. A set of box or socket wrenches should form a part of the equipment, as with the universal joint and ratchet device considerable time will be saved in unloosening nuts difficult to reach with the ordinary wrench. The socket type is particu-

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larly adaptable to the overhaul of the motor.

Hammers and Screw Drivers.

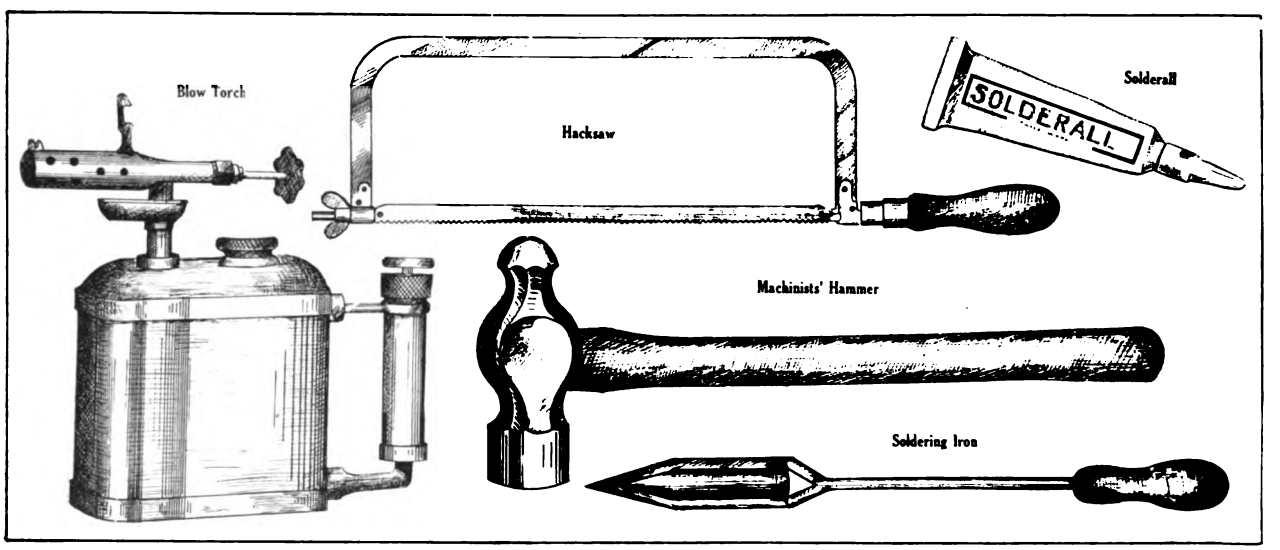
At least two hammers will be required, a machinist's for heavy work and another and lighter member for riveting, etc. A rawhide and lead hammer may be included, but in the absence of these a block of lead or hard wood may be substituted when driving out parts which preclude the use of the regular members.

Screw drivers are not expensive and three of different sizes will prove useful. A very small member for making fine adjustments, another with a wooden handle for light work and a heavier design for removing the stubborn screws, are needed. The last of metal and having a riveted wooden handle.

Two pairs of pliers will answer ordinary requirements, a pair of combination and those having side cutting jaws for cutting wire, cotter pins, etc. For heavier work the hacksaw will be necessary and adjustable frame members are not expensive and permit .625 and .75 inch, will answer ordinary requirements. A diamond pointed cape and round nosed chisel may be included, all of which will prove useful. A couple of solid punches will be none too many as these tools are necessary in driving out pins, bolts, etc. A centre punch is required for marking gears and other parts, and may be plain or knurled as desired.

A breast drill having two speeds is invaluable in the garage. The smaller size is adaptable for light work and its wooden handle is utilized for holding the drills, these ranging from 0 to .15625 inch. The larger drill is preferable as jaws of the chuck will grip drills ranging from the smallest to .5 inch in diameter. Straight shank drills may be purchased in sets or singly in sizes from .03125 to .5 inch by sixty-fourths. In connection with these tools should be mentioned a countersink which is indispensable when fitting new brake linings, riveting, etc.

Regarding taps and dies, these are optional. Some motorists have a set adapted for standard work about



The List Should Include Blow Torch, Soldering Iron, Hacksaw and a Good Machinists' Hammer.

of the use of different sized blades. The latter should have coarse teeth for heavy work and fine for cutting tubing, etc.

In selecting the files those of good quality should be given preference. The set should include: Round or rat tail for filing out holes, square for finishing key ways or cleaning burred splines, half round for finishing surfaces to which their form is adapted such as the inside of bearing boxes, connecting rod and main bearing caps, etc. The three-cornered file will prove useful while the flat member can be utilized on all plane surfaces. Wooden handles should be fitted to the files and these members kept in the bench rack when not in use.

Cold Chisels, Punches, Etc.

Cold chisels in their various forms are not expensive and the motorist is warranted in having several of these handy tools. Three of the plain type, .25,

the car, while others purchase as required. The same may apply to reamers, but if the machine work is to be done outside these members will not be needed. A tempered steel rule will prove valuable for making fine measurements and these members are inexpensive. A pair of calipers for making inside and outside measurements should be included, and if the garage be equipped with a lathe and fine work is to be done, a micrometer will be required.

Chisels and tools become dulled with use and a grinder operated by hand is useful for resharpening as well as performing many little jobs. With a complete equipment a differential pulley block will save lifting heavy parts such as the motor, etc. A falls and tackle may be substituted, however. With some types of machines a wheel puller is necessary. These may be made or purchased and in addition to removing a wheel may be employed in disassembling the chas-

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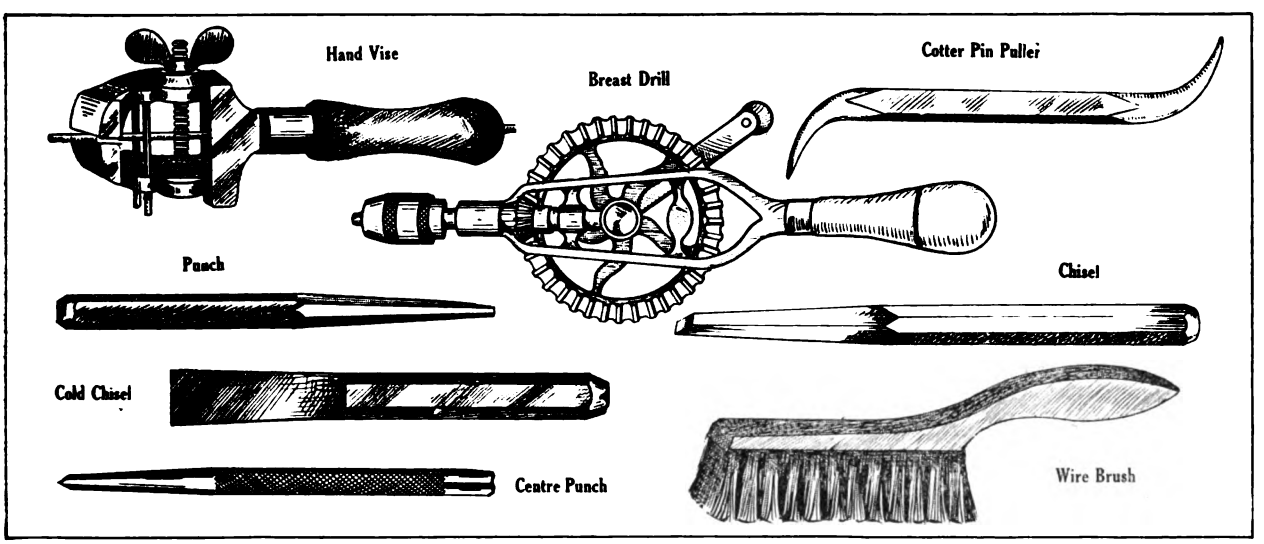
sis. Regarding valve lifters, there are many makes upon the market, and in selecting one of these care should be taken to note if they fit the motor, else the fingers are liable to become jammed in the removal of the keys retaining the valve springs.

Scrapers, Brushes and Soldering Outfit.

If new bearings are to be fitted or old members adjusted, a set of scrapers will be essential. These come in sets of three, adapted for different work, although some repairmen utilize a three-cornered tool. In connection with these instruments a small quantity of Prussian blue is required in scraping a bearing or part accurately. A torch, soldering iron and flux should be included in the equipment, although if there be but little soldering to be done, a tube of Solderall will suffice.

Some motorists add a machinists' hand vise to the list of tools, but this can be dispensed with, although it is a handy device. A pair of tinners' snips are not keeping the nuts, bolts and small parts separate and from being lost, and if the motorist is not experienced in the work it is suggested that each component and its parts be placed in one receptacle which arrangement will make the reassembly easy. A can and a brush with stiff bristles are required for cleaning, as well as waste or old cloths. Three small oil cans, one each for lubricant, gasoline and kerosene are essential, and a squirt gun will facilitate cleaning places not reached easily with the brush or waste.

A small quantity of soft iron and brass wire of different sizes will be of service in securing the water connections where a hose clamp is not used, and for other work. Several sheets of emery cloth, fine and coarse, should be listed, also a small bottle of shellac with a wooden stopper, and a small brush. If the garage be not equipped with cotter pins, lock washers, taper pins, cap screws, nuts and bolts, these should be procured. These come in assorted lots, although the



Punches and Cold Chisels Will Be Required as well as a Two Speed Breast Drill.

expensive and are very useful in working sheet metal and in making repairs. A coarse wire brush will facilitate the removal of carbon after the greater part of the deposit has been loosened. While there are special tools for this work, an old jackknife or chisel will serve. An oil stone for stoning new piston rings and touching up the edges of some tools will be a valuable acquisition to the equipment. A cotter pin puller may be purchased for a few cents and will save much time in removing obstinate pins. The list may be augmented by the addition of special tools adapted to the automobile to be overhauled and the equipment may be made as complete as the motorist desires. The tools mentioned will suffice, however, for general overhaul and the writer has managed successfully with only a part of those mentioned.

Small Material.

There are numerous small articles and material essential for the overhaul, and the sum total of cost is slight. Several wooden boxes should be secured for cost of a box of each is slight and will prove useful from time to time.

Graphite Has Many Uses.

A can of flake or fine graphite can be utilized for many purposes. It is used as an anti-rusting compound for rims, between the leaves of the springs, on the valve caps, and numerous other places where heat will burn up grease or oil. It is an excellent lubricant, resisting as it does the action of water and heat, and in addition fills the pores of the surfaces of contacting metal.

Although there are many excellent valve grinding compounds upon the market the motorist may prepare his own, either with emery and powdered glass or carborundum. The writer favors the finest grade of the latter and when used properly it provides superior abrasive qualities. A few cents will secure enough to last several seasons. It should be mixed with plenty of oil when grinding in a valve.

A bundle of candle wicking provides an ex-

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packing for some types of water pumps and connections, and a small can of white lead should be procured at the same time. A package of assorted machine and wood screws will prove of service, as some of the members removed from the car may be damaged or rusted. Sheet asbestos is not expensive and is employed for gaskets where the parts are exposed to considerable heat. A form of asbestos copper gaskets is manufactured in different sizes and these may be employed when possible for making gas tight connections for the valve caps, intake and exhaust manifolds.

Mobiline is favored by many repairmen as it may be used several times if not damaged in the removal from the motor. Several sheets of cardboard of different thicknesses as well as heavy wrapping paper will be serviceable in the overhaul. If the felt washers utilized on the bearings are worn new members may be made from the same material which may be secured at a mill supply house. As the usual tool kit includes friction tape this may be eliminated from this list of material.

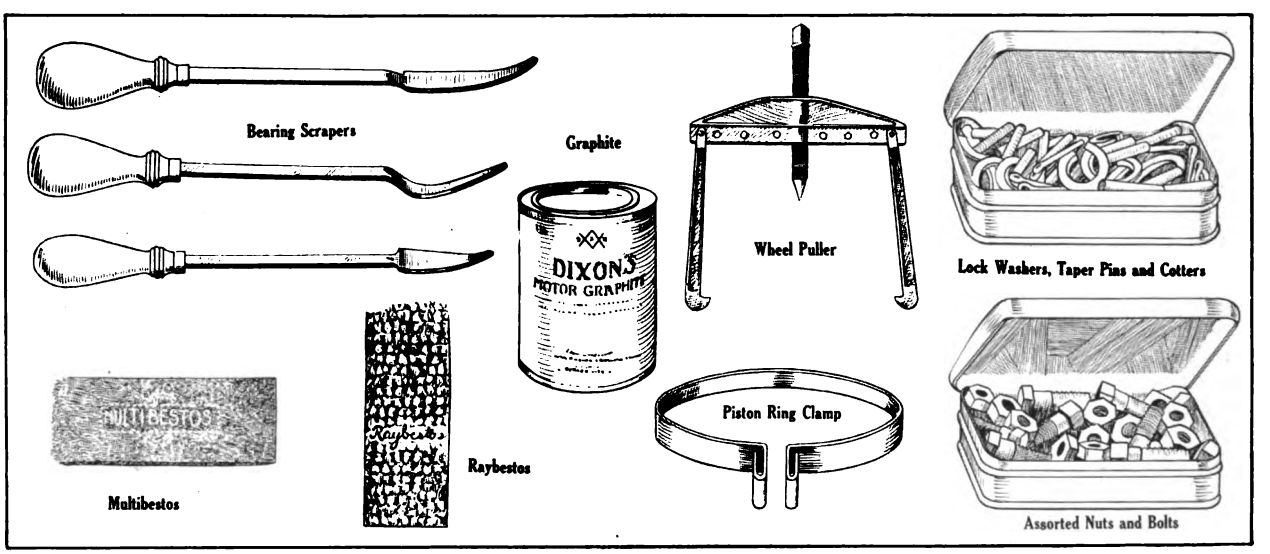
In connection with the preparations for the overhaul the brakes should be inspected and if the friction material be worn new should be purchased. Raybestos or Multibestos is recommended and this material may be purchased at any supply house or agent of the maker. Fibre comes in sheets of varying thicknesses. This is utilized for many purposes among which may be mentioned that of shims for bearings. If a small quantity be needed it may be secured for a few cents from some repair shop.

Piston Ring Holder.

In pulling down and assembling a motor the removal and replacing of the piston rings is not only difficult for the motorist without assistance, but the spring-like circles are broken easily. A simple method is to utilize strips of thin metal or old hacksaw blades, slipping these between the rings and the piston and sliding the former over the strips, three or four of which should be used for successful operation.

In replacing the cylinder the amateur is apt to break the rings and to nip his fingers. A handy clamp may be constructed from a piece of band iron, .125-inch thick and .5 inch wide. Assuming that piston is 4.5 inches diameter, a strip of metal 16 inches long will be necessary. This is bent into a circle and after measuring off 1.5 inches on each end, is placed in the vise and bent as shown in an accompanying illustration. The diameter of the circle when closed should be less than 4.25 inches to enable the clamp to hold firmly the piston ring in its seat.

The cylinder is replaced by sliding it over the piston and holding while the clamp is placed slightly above the top of the ring. With a pair of pliers the ends of the clamp are squeezed together and held. As the cylinder is lowered, the clamp will be forced downward, the ring sliding into place. The next ring is then held and the operation repeated. The device can be so constructed that pliers will not be necessary. The ends of the clamp can be drilled and tapped and a setscrew utilized to bring and hold these together.



In a Thorough Overhaul Bearing Scrapers Will Be Needed, Also a Wheel Puller and Small Material.

DISBROW AND HERRICK WITH CASE.

Louis Disbrow, who is scheduled to drive a Case car, made by the J. I. Case Threshing Machine Company, Racine, Wis., in the 500-mile race on the Indianapolis speedway, Memorial Day, has gone to California, where he will take part in beach and road races until some time in May. It is understood that Disbrow will be seen at the wheel of a Case in the Santa Monica road race of May 4, and that Harvey Herrick, who holds the world's road race record in a National car, also will drive a Case in that event.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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UNITED STATES MOTOR NEWS.

Having completely recovered from his recent illness, covering several months, J. D. Maxwell, president of the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., and vice president of the United States Motor Company, New York City, has returned to the latter city, where he will make his headquarters in the future.

The United States Motor Company, which markets Maxwell, Columbia, Stoddard-Dayton, Courier and Brush pleasure cars, and Sampson trucks, has added three new supervisors, whose duties involve the supervision of the branch houses and dealers in different parts of the country.

Ernest H. Brandt will have charge of what is known as the New York district, including the branches and dealers under them, operated in New York, Albany, Syracuse and Buffalo, with headquarters in New York City. Fred A. Harris will care for the middle district, embracing the branches in Chicago, South Bend, Newcastle, Indianapolis and St. Louis, with headquarters in Chicago. S. D. Porter is appointed for the western district, including the branches in Minneapolis, Kansas City, Des Moines, Omaha and Dallas, with his headquarters in Kansas City.

The New England territory is supervised by F. J. Tyler at Boston. W. F. Smith of Philadelphia has charge of the branches in Philadelphia, Wilmington, Trenton, Baltimore, Washington, Pittsburg, Charlotte and Atlanta. A. I. McLeod of Detroit looks after the interests of the branches at Detroit, Cleveland, Toledo and Columbus. A. M. Barkman is in charge of the Pacific Coast branches at San Francisco and Los Angeles.

BOSCH WINS ANOTHER RECORD.

It transpires that the Deperdussin monoplane, utilized by Jules Vendrines in creating his remarkable record of 124.2 miles in 1:15:20, was equipped with a Bosch magneto. This is particularly gratifying to the Bosch Magneto Company, New York City, as it adds another aeroplane record to the long list of automobile, motor boat, motorcycle and aviation marks won by machines equipped with this make of ignition.

SELF-STARTER BOOKLET.

The interest which has been awakened in self-starting systems during the past few months has been such as to indicate a desirability on the part of the public for information concerning the various types in the market. Obviously, the best information is that compiled as the result of a thoroughly unprejudiced analysis. The Luverne Automobile Company, Luverne, Minn., claims to have secured a treatise of this nature, which it is distributing gratis to all who make application therefor.

AN EFFECTIVE SPEED GOVERNOR.

A speed governor, so constructed that when a truck reaches a certain speed it will automatically cause a shrill, piercing whistle, is claimed to be a practical and exclusive feature of the new light delivery wagon to be produced by the General Industrial & Manufacturing Company, Indianapolis, Ind. This timely warning is designed not only to safeguard the public against reckless drivers but to protect the vehicle itself by informing the operator that he is exceeding a safe and reasonable speed.

DICKSON BELIEVES IN QUALITY.

George M. Dickson, general manager of the National Motor Vehicle Company, Indianapolis, Ind., whose likeness is shown herewith, believes in Quality with a capital Q. Mr. Dickson is a graduate from the bicycle industry, and even his competitors were compelled to admit that he understood the selling end of that business. Despite the fact that he is still young in years, he is a veteran in the manufacture of motor vehicles, having been connected with the production of National cars for a number of years and general manager of the company for some time. Like most successful men he has some very well defined ideas as to how the automobile business should be conducted. After 12 years of experience he is justified in feeling that he can offer a few suggestions, and among these is that of Quality. Mr. Dickson says that no matter how large the factory may be, and no matter anything else, a motor car must be measured by but one standard—Quality. He adds that even if the builder wanted to unload an inferior product upon the people he would be unable to do so, because the public is now motor-intelligent. He also takes comfort in the fact that every day sees the sum total of motor-intelligence increased, and holds that this is the salvation of the industry.



George M. Dickson, General Manager, National Motor Vehicle Company.

Advocate the use of lights on all vehicles using public ways during the hours of darkness.

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MARTIN WINS PROMOTION.

C. W. Martin, Jr., who has been associated with the Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires and other rubber goods, for some time as manager of the company's southern district with headquarters at Atlanta, Ga., has been promoted to become manager of the motor truck department. He has been transferred from Atlanta to the general offices at Akron, where he will be located in the future.

JOINS ABBOTT MOTOR COMPANY.

At a recent meeting of the directors of the Abbott Motor Company, Detroit, maker of the Abbott-Detroit line, Clayton E. Bailey of Jamestown, N. Y., was elected first vice president of the company and chairman of the board. For several months past C. W. Jamieson, president of the company, has been seriously ill and his condition is regarded such as to compel the selection of a man capable of assuming direct charge of the business.



Clayton E. Bailey, Vice President, Abbott Motor Company.

Mr. Bailey has been associated in other business enterprizes with several of the principal stockholders in the Abbott company for a number of years, and recently acquired a heavy financial interest in this concern. He is well known in New York City as a financier and manufacturer and brings to the Abbott company a wide knowledge of business methods.

For several years he has been president and the moving spirit in the Bailey Table Company at Jamestown, one of the largest and most successful furniture manufacturing establishments in that section. He also has been closely allied with the management of numerous other manufacturing and financial institutions in that city. In addition he has large financial interests in the Southwest and has shown a very considerable amount of strength in handling transactions involving large capital with business interests in New York City.

It is anticipated that Mr. Bailey's policies, which are conservative and at the same time progressive, will continue to develop the business of the Abbott Motor Company and cause it to become one of the best manufacturing concerns in the industry. It is Mr. Bailey's intention to remove his family to Detroit and take up his permanent residence there in the immediate future.

SIMPLICITY IN AUTOMOBILE DESIGN.

That automobile engineers and designers are striving to obtain the best results with as few parts as is consistent with absolute safety, is the opinion of Charles B. King, president of the King Motor Car Company, Detroit. Inasmuch as he was the first man to drive a motor vehicle through the streets of Detroit in 1894, he is permitted to make some comparison between that machine and the product of the present. He says:

"In those days the thing most sought after was to make a car that actually would run. As naturally might be assumed, the result was a complicated piece of mechanism, in many instances. Engineers and designers had not time to pay much attention to simplicity.

"As time went on, the buying public declined to accept the more or less crude construction that was hardly any better than could be expected, and some attempt was made to eliminate troubles by standardizing methods. Refinements in construction and manufacture followed, and then the search for simplication.

"With all this progress, there are today only a few cars which can make any claim that they have reduced their number of parts to an appreciable degree. The great difficulty to be overcome is to make this reduction without weakening the car and the average automobile of today has between 2600 and 4000 parts.

"One designer of a well known car made in Detroit has had greater success, reducing the number of parts in his car to less than 1000, and this is actual, not theoretical. How this has been accomplished will be understood readily when it is stated that the frame front cross member, for instance, does seven duties."

CANADA MAY INCREASE DUTY.

An attempt is being made in Canada to pass an act of Parliament increasing the duty on finished automobiles to over 50 per cent. and to decrease the duties on parts not assembled. Apparently, the object is to force American manufacturers to establish factories in the Dominion. Several have done so already, but there are many makers who continue to pay the present duty and produce the finished cars on this side of the line.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

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RECENT DEVELOPMENTS IN SELF-STARTERS.

A Resume of the Situation as Revealed During the Show Season Just Closed--Brief Description of Some of the Devices Presented.

MOTORISTS are beginning to study the self-starting problem with renewed interest. While a large number of these systems have been on the market for some time, several of these were not brought

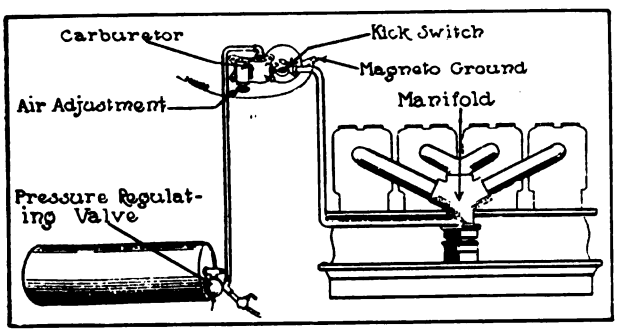


Fig. 1—Eureka Device Utilizes Specially Designed Acetylene Carburetor.

to the attention of the public generally until at the recent shows. It may be added that still others have been undergoing extensive experimentation and are only just making their appearance.

The Automobile Journal, in a series of articles on this subject, recently described briefly many self-starting systems which had been brought to its attention. This treatment will be continued herein, presenting some of the offerings seen at the New York, Chicago and Boston shows, as well as others which have come to light since the publication of the articles mentioned.

Among those who have given the subject careful study, including many engineers of note, the problem cannot be regarded as wholly solved. By this is meant, that while most if not all of the systems offered can be relied upon to do their work in a satisfactory manner under practically every condition, there is still the question as to which system is the best, taking into consideration all of the elements which enter into the proposition.

The situation has reached a point where it may be held that all self-starters are divided perhaps into four classes; i. e., mechanical, compressed air, explosive mixture and electrical. No attempt is made here to give these according to merit, but rather in the order in which they have made their appearance.

Some engineers have published interesting discussions in which they have assigned an order of merit to the various productions, but in most instances it will be found upon careful analysis that such classification has been largely a matter of personal opinion, and there is by no means that unanimity of opinion which carries complete conviction. While engineers continue to disagree it hardly can be expected that the mere layman will be able to follow them to a definite conclusion.

It must be remembered in this connection that there still remains considerable difference of opinion among engineers as to the relative merits of certain other features of motor car construction and equipment. Inasmuch as it is not to be expected, apparently, that engineers will agree on the subject of the long or short stroke motor, for instance, and as each type seems to be able to produce satisfactory results, it is perhaps, unnecessary that there should be any unanimity of opinion regarding self-starters.

It follows, therefore, that the layman motorist must be guided largely by his own inclination, based upon such information as he is able to glean from the discussion of engineers, feeling reasonably certain that even the poorest form of self-starter is better than the older method of cranking by hand. And this should not be taken to infer that the self-starters on the market have not been subjected to thorough experimentation.

There is a mistaken impression among many that none but the cars of medium or low price are being equipped with self-starters this year. Inquiry at all of the three large shows, New York, Chicago and Boston, elicited the information that practically any machine can be purchased with this latest fitting. There are several reasons why some of the older and better known makers have delayed the adoption of a self-starter as standard equipment.

Those who employ chauffeurs and do very little

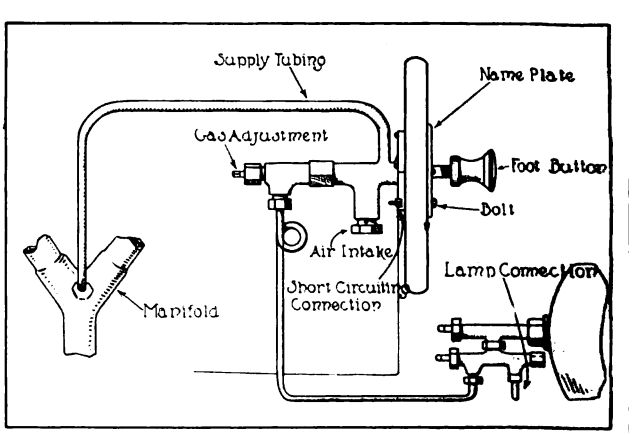


Fig. 2—Crankless Acetylene Starter Also Introduces Mixture Through Intake Manifold.

driving themselves are not so deeply interested in the self-starter problem. There will be little question that certain manufacturers make their appeal more directly to this class of purchasers, but even with these

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there is opportunity to secure the new equipment if desired. And so far as it can be learned all of these are experimenting with self-starters, either of their own design or of some make now on the market. The

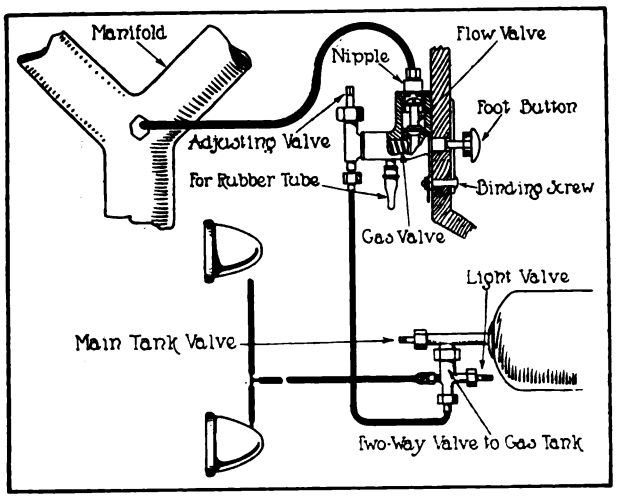


Fig. 3—Illustrating Method of Operating the Empire Acetylene Self-Starter.

man who does his own driving demands the self-starter now, while those who in the very nature of things, have given little thought to the matter are content to wait until it shall have reached an even better state of perfection.

Although the so-called mechanical device made its appearance first, it is worthy of comment that by far the larger majority of those which are now being projected are of the explosion type, and most of these utilize acetylene gas. The underlying principle is much the same in each instance; that of introducing acetylene and air in the proper proportions to the cylinder about to fire and exploding this by means of a spark. In some, however, this mixture is introduced when it is desired to start the motor, and with others it is drawn into the cylinders when the engine is brought to rest, there to be retained until needed.

A starter of the latter type is illustrated by the drawing Fig. 1. This is the Eureka, made by the Automobile Equipment Company, Detroit, and comprises a pressure regulating valve, acetylene carburetor, and combined kick switch and valve. The pressure regulator is attached to the acetylene tank; the carburetor, on the dash under the hood, and the kick switch on the front of the dash adjacent thereto.

When gas lamps are to be supplied from the same tank, a two-way valve is located at this point, the pressure regulator being attached to the .25-inch tubing leading to the acetylene carburetor. A .125-inch gas connection is fitted to the intake pipe above the carburetor and leads to the manifold of the engine. Obviously, the carburetor is for the purpose of mixing the air and acetylene in proper proportions, and the charge is claimed to be only of sufficient power to turn the engine over at a slow speed.

The Eureka is operated entirely by the kick switch and the starting button on the coil switch. Throwing the lever to the "on" position cuts off the spark from the magneto side and opens the valve from the acetylene carburetor to the intake, giving the engine a charge of mixed air and gas as it stops, and is then ready to start again. To start: The switch is turned to the battery side and the starting button is touched. The gasoline throttle is closed and the spark retarded, until the motor has begun to operate on acetylene, when the gasoline throttle is opened slowly, and after the engine picks up speed, the starter switch is cut off and the electric switch is thrown to the magneto.

The Crankless is made by the Cox Brass Manufacturing Company, Albany, N. Y., and is another acetylene starter which charges the motor as it is about to come to rest. The principal parts are outlined in the drawing Fig. 2.

Located at a convenient place on the dash is a push button. Pushing this forward cuts out the ignition and opens two small valves in the starter proper and allows the motor to draw into the cylinders by way of the inlet manifold a mixture of acetylene and air. This is retained until it is desired to start the engine, which may be done by operating the starting button on the coil, or if the car be not equipped with a coil, the company recommends the use of a mechanical vibrator produced by it.

In attaching the Crankless starter, the regular union is removed from the gas tank, and the twin connection is applied. This is equipped with two needle valves, one of which regulates the supply of gas to the lights and the other to the starter. One end of an insulated wire is connected to the special short circuiting connection and the other to the ground terminal and magneto. The drawing makes plain the other features of construction in this type.

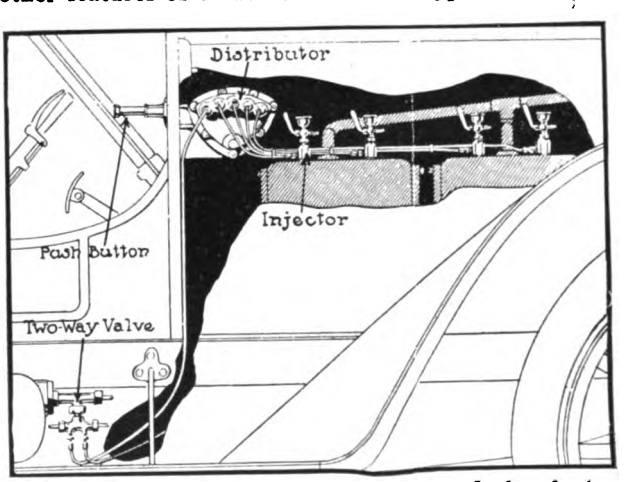


Fig. 4—Panwood Design Arranged for Introducing Acetylene Mixture at Time of Starting.

Still another acetylene device of the same nature is the Empire, made by the Empire Self-Starter Company, 1731 Broadway, New York City, and illustrated at Fig. 3. By the same nature is meant that the mix-

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ture is introduced into the motor when it is about to come to rest, as in the other two mentioned. Obviously, the arrangement is different.

With this, as with the others, a special two-way

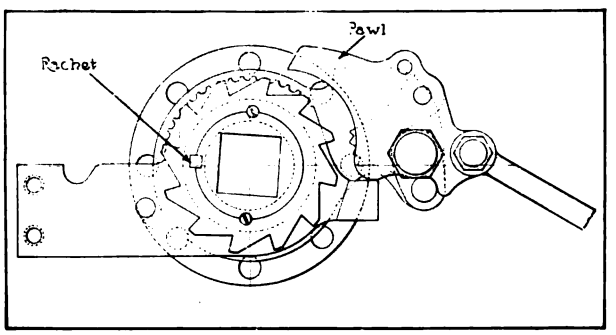


Fig. 5—Simplex Mechanical Device Is Utilized in Combination with Priming Pump.

valve is utilized at the gas tank. This regulates the flow of acetylene either to the lamps or the starter. The latter is installed on the dash in a convenient position to be operated by the foot, and it is of particular moment to see that the flow valve leading to the intake manifold is in a vertical position.

Just before the motor is brought to a stop, the starter button is pressed by the foot and held in position until the engine is at rest. The switch is then placed in the neutral or "off" position. To start: The spark lever is retarded, and the switch is placed on the battery position. Pressing the button on the coil completes the operation.

The Panwood, made by the Panwood Manufacturing Company, Grand Rapids, Mich., is illustrated at Fig. 4. This is designed to introduce the mixture to the cylinder when it is desired to start the motor. The device consists of a special distributor, injectors and two-way valve.

The distributor is located on the dash under the hood, opposite the push button. Pressing the latter causes a measured amount of acetylene to be conveyed along the piping to the injectors and introduced to the cylinders, where it is mixed with air. The two-way valve is attached to the gas tank, and regulates the flow of gas to the lamps and starter.

The operation of the Panwood is decidedly simple. By a slight pressure of the foot, the gas is instantly distributed in equal and sufficient amounts to each cylinder. Upon removing the foot, the gas is shut off automatically, outside the distributor. All that remains to be done is to turn on the ignition switch and explode the mixture in the cylinders.

The first action of the foot pressure causes the main check valve to open automatically and allow the gas to enter the distributor. As this action is continued the valves to the cylinders are opened in rotation. The injector consists of a threaded fitting which is screwed into the cylinder in place of the priming cup.

With reference to the mechanical starter, mention may be made of the Simplex, produced by the Simplex Manufacturing Company, Anderson, Ind., and shown at Fig. 5. This differs materially from other devices of this type, in that it has in connection a priming pump, located in front of the seat, for introducing gasoline into the cylinders so that the motor may be started without the necessity for spinning.

The drawing is a sectional view through the starter proper. The parts are assembled on a bushing, which is mounted on the main shaft between the clutch and the transmission, or on the crankshaft in front of the motor. The operation is by pedal, which can be furnished in a style to match the brake or clutch pedal if desired, and can be located in any convenient place on the toeboard.

This pedal is connected by suitable cranks to a pawl, so that a forward movement causes the pawl to engage a ratchet and rotate the motor. Should the operator press the pedal with the spark in the advance position, another pawl will engage in notches on the stationary disc and allow the motor to rotate in the reverse direction, thereby eliminating any chance for injury either to the operator or mechanism.

The priming pump draws gasoline from the main supply line, bringing it in through the bottom and up into cylindrical chambers, ready to be forced into the cylinders of the motor. With the down-stroke of the pump, four pistons working in the cylindrical chambers spray gasoline in equal proportions to each cylinder. After the motor has been primed in this manner, it is rotated by the pedal, as above described.

Figs. 6 and 7 illustrate the Paris electric system, made by the Paris Electric Starter Company, Chicago. The principle is the same as with all electric starters. The equipment consists of a complete motor-

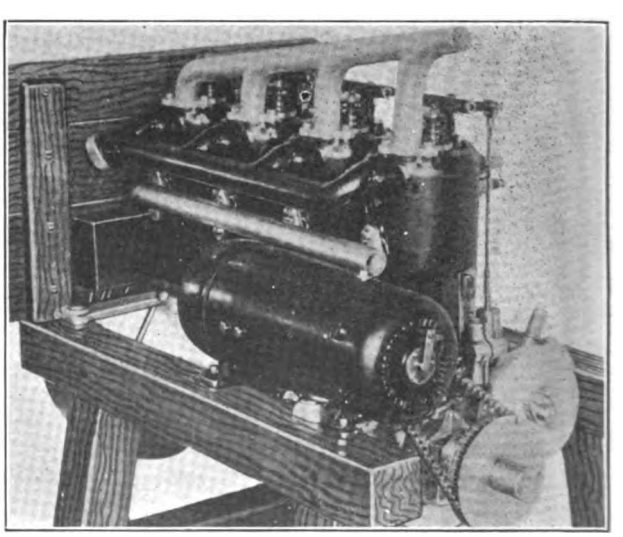


Fig. 6—End View of Paris Electric Starter, Showing Transmission Connected with Engine.

generator and storage battery, the latter energizing the former and turning over the engine by means of suitable transmission mechanism.

The motor-generator and transmission are assem-

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bled as a unit, being about 6.5 inches in diameter and 16 inches long. This is fitted with a regulator for controlling the output of the generator to a predetermined value, regardless of engine speed. A multiple-contact push button completes the outfit.

Pressing the push button energizes the motor from the storage battery through the transmission which gives the motor the advantage of a 30-to-one ratio. As soon as the engine runs on its own power, the operator releases the push button and the motor is automatically thrown into engagement through a three-to-one ratio to run as a generator at three times the engine speed. The automatic change of ratios is accomplished by the action of a magnetic clutch, which also locks the gears of the transmission from rotating with respect to each other so that the entire mechanism revolves with the generator as a unit. The transmission gears are therefore only in operation when cranking the engine. There are no clutches or levers to operate, the pressing and releasing of the push button automatically performing the proper functions in proper sequence.

The regulator is a simple but ingenious device for automatically holding the output of the generator to a predetermined value regardless of the engine speed, effecting a "taper charge" for the batteries. It also performs the functions of automatically opening the circuit between the generator and batteries, when the speed of the former falls too low, thus preventing the generator from "floating" on the batteries.

The storage batteries are of special design, long lived, and of ample capacity for cranking the engine 30 times, continuously, if required. The over-all dimensions of the battery unit complete are: Length, 16.25 inches; width, eight inches; height, eight inches; four cells of six-volt 40 ampere-hours capacity, being connected in multiple when generating, thus giving a combined capacity of 160 ampere-hours for lighting and ignition purposes, and 24 volts at 40 ampere-hours capacity when cranking.

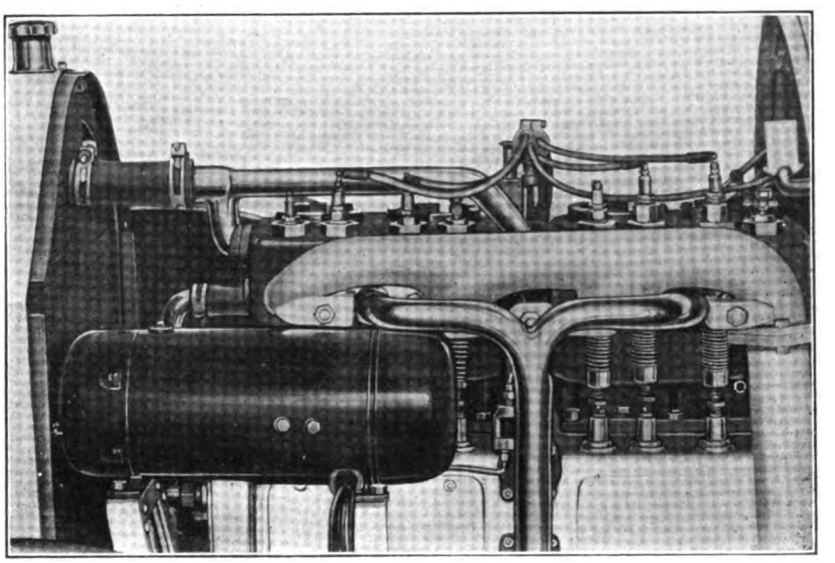


Fig. 7—Illustrating Location of Paris Electric Motor-Generator Relative to That of the Automobile Engine to Which It Is Applied.

(To Be Continued.)

FISK TIRES FOR TAXICABS.

Taxicab service is exceptionally hard on tire equipment, and it will prove of interest to note that the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk bolted-on tires, has closed a contract for the equipment of the cabs operated by the Detroit Taxicab & Transfer Company of Detroit. Fisk tires are used on over 1000 taxicabs in New York City alone, and are prominent in Chicago and other larger western cities.

MARMON BELIEVES IN SHOWS.

"One of the big questions now before the automobile industry," says H. H. Rice, sales manager for the Nordyke & Marmon Company, Indianapolis, Ind., maker of Marmon cars, "is the exact importance of the large shows. The whole business of selling motor cars is in the process of evolution, and what was considered a good sales proposition two years ago may no longer be worth the time and trouble.

"The value of the automobile show lies not in its direct sales, but in the fact that it intensifies interest in the entire business. If all shows were abandoned it would mean merely the dropping of one form of advertising, and no serious results would follow, but so long as the national shows are held each year the local shows will be a matter of interest.

"The Marmon has been exhibited this year in the greater shows in New York, Chicago and Boston. In addition, the cars have been displayed by our dealers in almost 25 other cities. We do not consider the cost out of proportion with the results obtained by individual exhibitors and the industry as a whole.

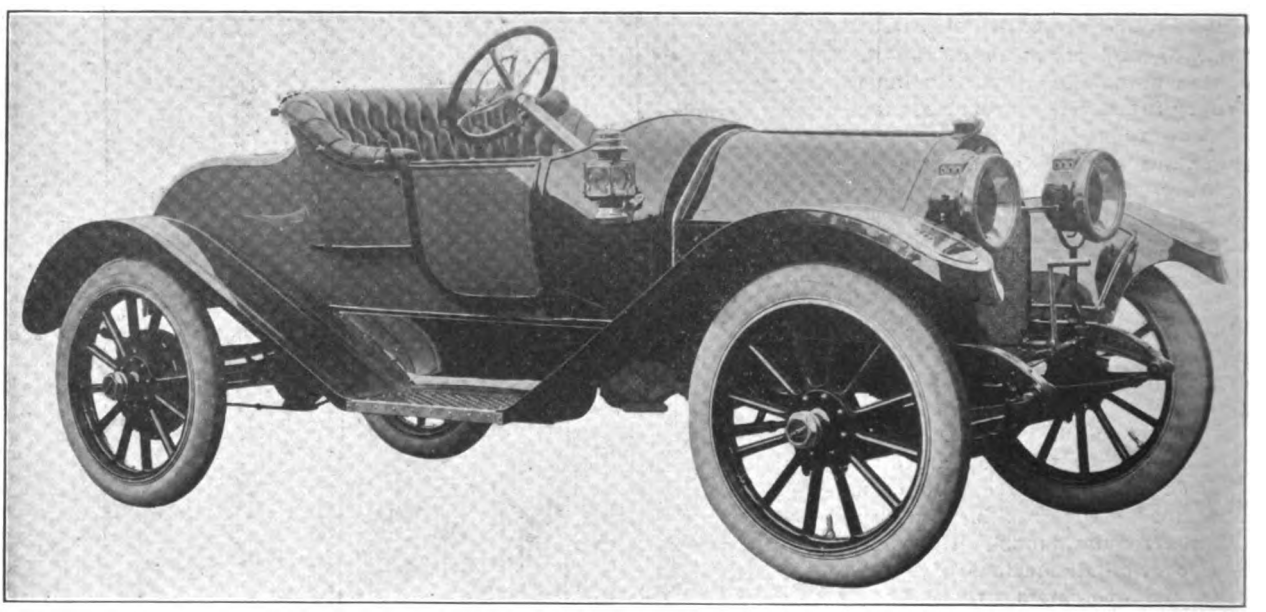
"In one of these shows, an automobile club delegated engineering experts to investigate various mechanical features of all cars inspected and make a report. The Marmon was pronounced as the most nearly approaching the ideal and more nearly able to fulfill its maker's claims in the features inspected.

"Could some action of this sort be taken and reports made on various cars, the show would reach a greater point of efficiency. If this idea were followed out and critical inspection be made by unbiased experts, the interested visitors would find that one of these shows comprised education in mechanical construction, efficiency and the comparative value of the cars exhibited."

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FOUR MODELS IN OAKLAND LINE.

THE Oakland Motor Car Company, Pontiac, Mich., maker of Oakland pleasure automobiles, is building four sizes of chassis, which are known as models 45, 40, 30 and 33 in order of size. Of these the larger is fitted with seven-passenger touring or berline limousine bodies; model 40 is equipped with five-passenger touring, three-passenger sociable roadster or Colonial coupe bodies; model 30 has a five-passenger touring body, and model 33 is known as the "Oriole" roadster, having capacity for two passengers. These machines in proportions, accommodations, finish, appearance, power and price afford an unusual range of choice, each vehicle being produced to carefully developed design by complete and efficient facilities, from thoroughly tested materials by experienced men, long associated with the manufacture of this line.



Model 40 Oakland "Sociable" Roadster, with Sightly Torpedo Body and Comfortable Seat for Three.

The maker of Oakland cars maintains that in every sense they represent development along engineering principles well established by sound experience. There is nothing experimental and nothing uncertain. The machines are regarded as finished from every point of view and the equipment of the chassis is in keeping with the mechanical refinements that have been characteristic of the name. Consistency in very detail has been sought and it is claimed that nothing could be desired in a car that has not been considered and provided for.

While the chassis installations appeal to motorists it is believed that this is secondary to the mechanical construction on which depends the service and life of the car, and in the development of this there has been constant endeavor to create what will embody every quality of protection and accessibility, and eliminate all weaknesses and possibilities for failure. In keeping with this policy attention has been directed toward the power plant, which, as adopted for models 45, 40 and 30 is of the unit type, including in a single assembly the motor, clutch and transmission, every operating part being enclosed and protected from every influence that might cause deterioration or loss of efficiency.

With this construction the entire mechanism is supported on three points and is safeguarded against the effects of frame distortion from driving stresses and road shocks, and the life of the assembly is decidedly prolonged as well as insuring an economy of maintenance and upkeep that cannot but appeal to the man who can choose, with other equally potent qualities, as will be brought out herein.

Features of Power Plant.

In considering the Oakland unit power plant it is well to emphasize that this form of construction has been approved by many designers, and while certain details may have been developed somewhat differently the main purpose has been to yield greater strength with no more, or even less, weight, secure maximum power and efficiency and increased flexibility, minimize lost power, decrease the number of parts and afford the height of accessibility for examination or work upon the components.

The assemblies for each model, save for 33, are identical in every respect aside from proportions, and for the purpose of description that utilized for model 45 has been chosen. Reference to the illustrations will demonstrate the compactness of the mechanism and the smooth and sightly finish of the case, the enclosing

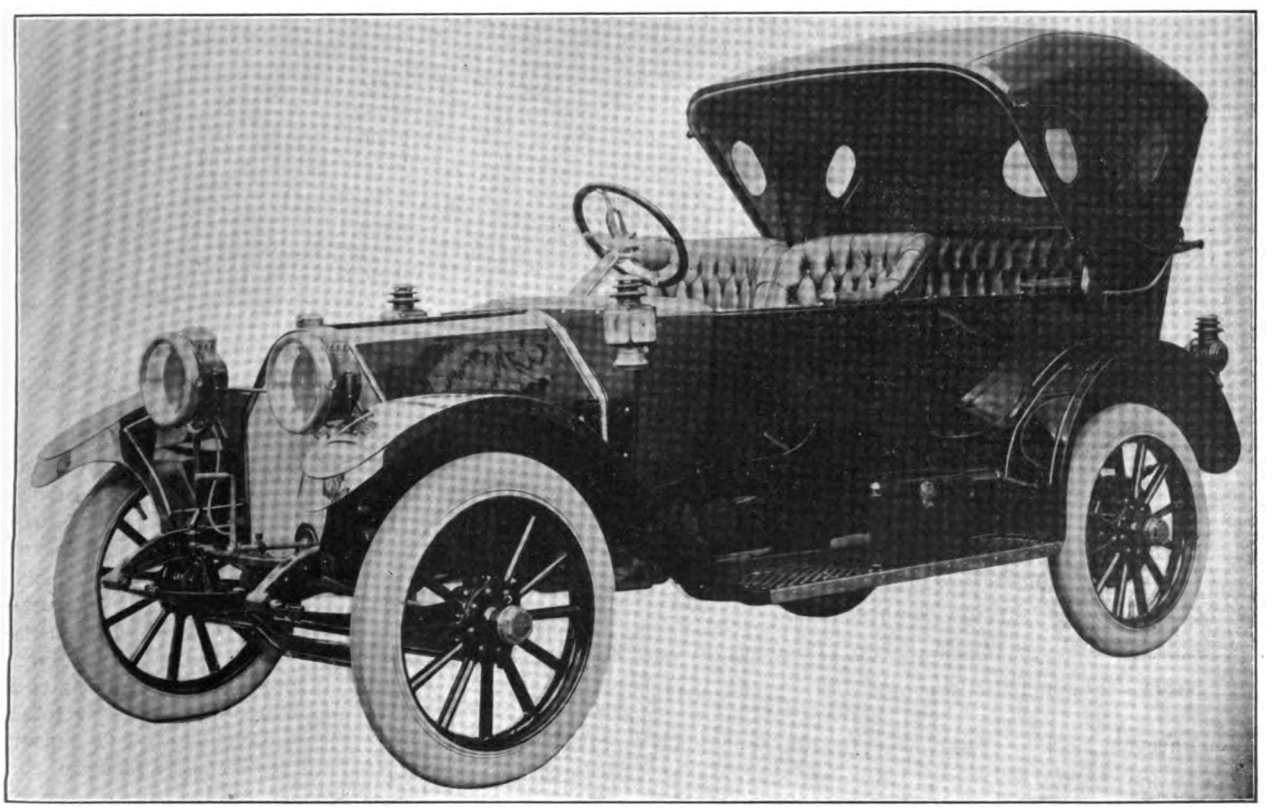
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of the moving parts and the insurance of shaft alignment under all conditions of operation. There is an accessibility not possible were the groups separated and it is apparent that the saving of time in the care of the machine is a factor of large importance to the man who operates his own car.

The cylinders are cast from a superior quality of gray iron in pairs with the water jackets and valve pockets integral. The head is of the L type with the valves at the left side. The water spaces are generous, practically surrounding the head and the valves and affording certain cooling of the motor under all conditions of operation. The bore is 4.5 inches and the stroke 5.25, this giving a stroke ratio to bore of 1.166

Clutch and Transmission.

The engine case and the clutch and flywheel housing are cast integral, of aluminum, there being a web and bridge construction that insures lightness and maximum strength of the case. The transmission case is a separate casting, while there are end plates that enclose both the timing gears at the engine case and the rear of the transmission casing. There is a large handhole at the left side of the engine case so that the forward bearings and the crankshaft and camshaft may be examined, another directly in the top of the case above it, and there is a handhole for examination of the flywheel. Back of this are cover plates which will permit work on the clutch and



Model 40 Oakland Five-Passenger Touring Car, with Straight Line Body and Victoria Top.

to one, the horsepower rating by the S. A. E. standard being 32.4 at 1000 revolutions a minute. The motor will deliver an energy largely in excess of this.

The water inlet to the motor is at the right side at the base of the water jackets and the outlet is at the left side above the exhaust valves. The cylinders are carefully bored, reamed, aged and ground accurately to exact size. The pistons are of the same material as the cylinders and after they are turned they are ground and lapped to precise fit, and channelled for the rings. The rings are ground on the edges and face and are then split, being pinned in the channels to prevent turning. Great care is taken to insure the maximum compression in the cylinders.

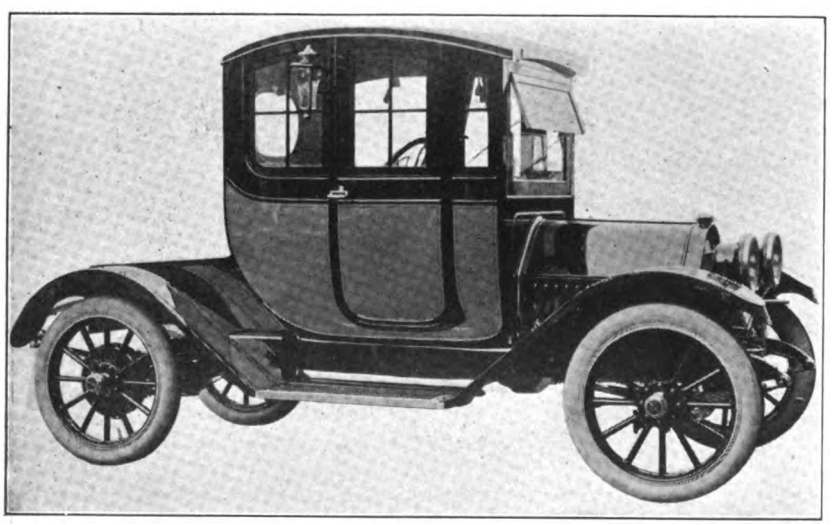
the transmission. It would be unnecessary to remove the power plant from the chassis to do practically any work. Large supporting arms are at either side of the flywheel housing, these being cast integral with the case.

The crankshaft is mounted in three main bearings, that in the centre being carried on a heavy cross web in the engine case. The journals are plain and are of a fine quality of babbitt metal, the front bearing being 3.5 inches length, the centre 2.875 inches length, and the rear bearing 4.5 inches length, this giving a total bearing length of 10.875 inches. The crankshaft has a diameter of 2.125 inches at the centre and 1.875 inches at the rear, two inches at the front.

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The crankshaft is a drop forging of special alloy steel and it is carefully ground and balanced. The camshaft is of special alloy steel of liberal size and it is made with three large bearings, being mounted in journals lined with babbitt metal, carefully fitted. There is an outside camshaft at the right side that is driven by the timing gears that operate the water pump, and an extension from this shaft actuates the magneto.

The connecting rods are drop forged of a special alloy steel, I section, of large size and are heat-treated to secure special strength. The wristpins are of a special steel, hardened and ground to size, having liberal bearing surface. The wristpins are retained in the piston bosses by set screws that are locked to prevent slackening. The bearings are of a high grade babbitt metal, die cast, the big ends being capped and retained by bolts and nuts. By the removal of 11 nuts in the lower half of the crankcase the connecting rods and bearings may be reached and examined or adjusted.



Model 40 Oakland Colonial Coupe, a Winter Car Easily Convertible for Summer Use.

Intake and Exhaust.

The valves are of large size, which insures an ample intake of fuel and thorough exhaust of the products of combustion, and these are effectually cooled by the circulation of the water. The valves have heads of 3.5 per cent. nickel steel, electrically welded to steel stems. The valve guides are unusually long and have corresponding endurance. The valve springs are of large size and retain their resiliency under all conditions of operation. The tappets are carefully ground to fit with ample bearing surface on the cams and are adjustable to any desired clearance. The operation of the valves is practically without noise. The tappets, tappet guides, valve stems, springs and retaining members are fully enclosed by specially designed plates that are retained by studs and winged nuts. The valve mechanism is abundantly lubricated and there is assurance of very long life of every part, this minimizing one of the greatest causes of engine deterioration and loss of efficiency and power.

The timing gears are nested at the forward end of the crankcase assembly, they being covered by a casing, an extension of the crankcase, cast integral, shielding the gear that drives the water pump and magneto drive shaft. The gears are spiral cut and with wide faces, operating without noise and being lubricated by a bath of oil. By the removal of the cover the gears may be exposed for examination or work.

Cooling and Lubrication.

The cooling is by a circulation of water by a large centrifugal pump driven by gears from the camshaft, which passes through the cylinder jackets and into the generous radiator of the cellular type, supplemented by an air draft from a three-bladed aluminum fan that is mounted on a bracket carried on the engine case. The fan shaft is supported by a ball bearing and the drive is by an endless flat belt off a pulley on the water pump shaft. This bearing is adjustable to maintain the belt tension. It is claimed that no matter what the conditions of operation the correct temperature of the engine is maintained.

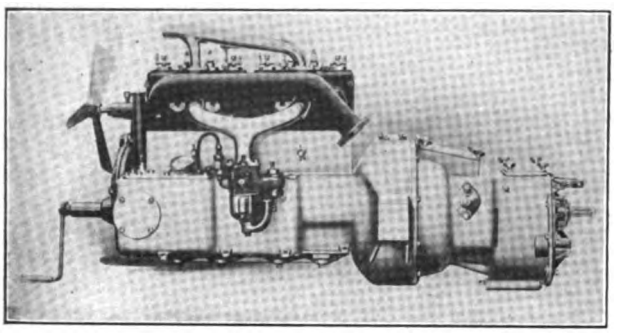
The lubrication is by a combination of the mechanical force feed and splash, a uniform supply of oil being given the engine at all times. In the base of the engine case is an oil reservoir with a capacity of six quarts, that is covered with a transverse horizontal web, and into this reservoir is installed a gear driven pump. A filter screen surrounds the pump intake to arrest all particles of foreign matter in the lubricant. The oil is drawn from the well and forced through a sight feed on the dash in front of the driver, and thence to the centre bearing of the engine, the drainage from the bearing being distributed to the four oil compartments in the base of the engine case. The regulation of the flow of oil is by a screw set into the cover of the oil case. The oil pockets are so formed as to always have a level of lubricant under the big ends of the connecting rods and the rod ends are fitted with specially designed dippers that take up and distribute the oil to the connecting rod bearings. The splash of the oil lubricates the entire interior of the engine, the cylinder and piston walls, the wristpin bearings, crankshaft, camshaft and all moving or frictional parts. There is a system of grooves cast in the engine case that provides equal distribution of the oil and the return of the overflow to the reservoir. There are level cocks for each oil compartment and these determine the supply

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available at any time, as well as facilitating the flushing of the pockets for the removal of metallic particles.

Ignition and Carburetion.

The ignition is the dual type, the main current being supplied by a Bosch magneto which generates



Left Side of the Oakland Unit Power Plant, Showing the Fuel Intake and Exhaust and the Water Outlet Manifold.

a low-tension current that is intensified by a transformer coil. The spark plugs are located in the centre of the caps covering the intake valves, where the sweep of the fresh fuel will clear the electrode points and insure a large and efficient spark. The wiring system is simple and is well protected from wear and other influences for deterioration. There is a battery of dry cells provided for starting the motor and as a reserve.

The fuel is vaporized through a carburetor of the automatic float feed type that is claimed to be very efficient under all conditions of service and to afford a thoroughly uniform mixture. The intake manifold is large and has sweeping curves to insure a full supply of gas to the intake ports. Reference to the illustration of the left side of the engine will show the proportions of both the intake and the exhaust manifolds, and the reason for the power and silence of the engine.

The clutch is of the cone type with the cone engaging with a recess in the flywheel. The cone member is designed with spokes for lightness and the face is covered with a high grade of oak tanned leather. To insure ease in clutching the cover is put on over six flat springs that eliminate all harshness and prevent the possibility of slipping. The clutch spring tension may be adjusted by means of three nuts and bolts.

The transmission is mounted in a case at the rear of the assembly and the design is such that there is always perfect alignment of the driving shafts and the crankshafts. The gearset is of the selective type with three forward speeds and reverse, the countershaft being directly below the main shaft. The gears are large and of chrome nickel steel with wide face. They are mounted on large shafts of the same material. Imported annular ball bearings are used throughout the gearset, making for long life and high efficiency.

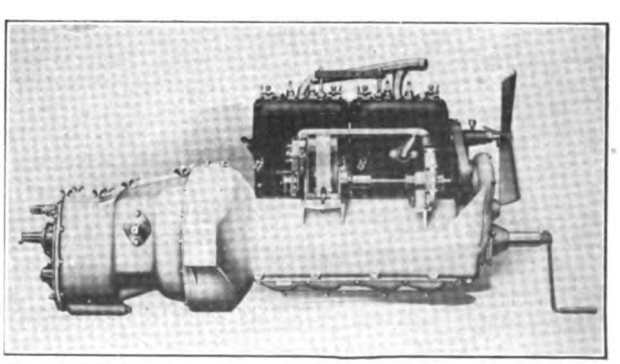
The driving system from the transmission is through a housed universal joint and a large driving shaft coupled to the pinion shaft by a second universal joint. These coupling joints are packed in heavy lubricant and are subjected to a minimum of wear.

Axles and Frame.

The rear axle is of the full floating type with a very large pressed steel shell that is reinforced by steel tubes through which the axle shafts are installed. The rear of the centre section of the housing may be removed for examination or adjustment of the differential cage and gears. The pinion shaft and pinion are carried on two New Departure ball bearings and the differential assembly is installed on the same make of bearing. These bearings may be readily adjusted and will permit of maintenance of a precise relation of the gears. The axle shafts are 1.375 inches diameter and are of high grade carbon steel. These are fixed to the wheel hubs by clutch plates and the wheels are mounted on New Departure annular ball bearings carried on the ends of the axle housing. The spring saddles and the brake shoes, on flanges on the axle housing, are bolted to the steel shell. The alignment of the axle is preserved by a heavy torsion rod that parallels the driving shaft and is attached to the stout cross member of the chassis frame.

The front axle is a steel I section, drop forged, and heat treated, the steering arms and knuckles being the same material. The spindles are fitted with improved cup and cone ball bearings 1.625 inches diameter. The cones are of the finest tool steel and the inner and outer balls are .75 and .625 inch diameter, respectively. The tiebar is according to standard practise, carried behind the front axle for protection.

The chassis frame is a high grade of carbon steel channel section, pressed cold and heat treated for special strength. It is stiffened by three cross members and by strong gusset plates at the rear. There is a



Right Side of the Oakland Unit Power Plant, Illustrating the Magneto, Water Pump and Fan Drive by Outside Camshaft.

double drop in this frame. The springs are of the highest quality crucible steel, hand-fitted and oil tempered, of the scroll type, semi-elliptic forward and three-quarter elliptic rear, the rear being respectively and 50.5 inches length, and 2.25 inches width.

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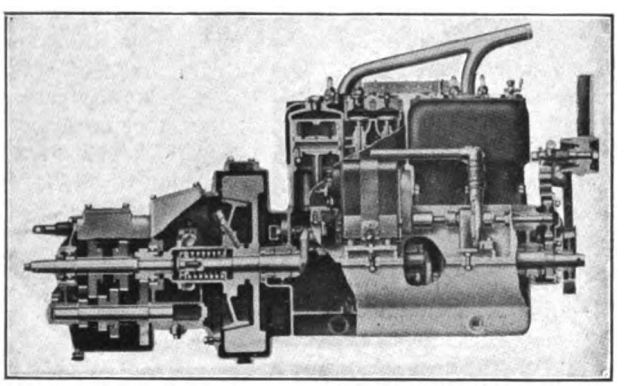
service brake is external contracting bands on drums on the rear wheels 16 inches diameter, and the emergency brake is internal expanding shoes in the same drums. Both brakes are equalized.

The control is by a large hand wheel on a steering column with a connection of the worm and nut type, all the wearing parts being enclosed and adjustable for wear. All the steering draglinks are of spring design and may be adjusted as desired. The left pedal operates the clutch and the right the service brake, and there is a foot accelerator between these pedals. The speed changes and the emergency brake are actuated by levers at the right of the driver. The usual spark and throttle levers are carried on a quadrant on the steering wheel.

The wheels are of the artillery type, of second growth hickory, 36 inches diameter, fitted with 36 by 4.5-inch tires on demountable rims. The wheelbase is 120 inches. The gasoline capacity is 20 gallons.

Details of Model 40.

The power plant for model 40 differs with that described in that the bore is 4.125 inches and the stroke 4.75 inches, this giving a power rating of 27.2 by the S. A. E. horsepower rating. The ignition is by a Briggs or Remy magneto and a dry cell battery through the usual transformer coil and distributor.



Sectional View of the Oakland Unit Power Plant, Demonstrating the Alignment of the Driving Shafts and Bearings.

There is a semi-floating rear axle assembly in which the housing is divided in the centre, and to this housing is bolted the torsion tube in which is carried the driving shaft. The forward end of the pinion shaft is mounted in a long Hyatt heavy duty roller bearing, and there is a thrust bearing forward of the roller bearing. The rear end of the shaft is mounted on a New Departure bearing. The differential assembly, of the bevel gear type, is carried on large Hyatt bearings that are adjustable and run on a hardened and ground sleeve. The outer ends of the axle shafts are supported by long Hyatt roller bearings and to these shafts the wheels are keyed.

The drive is through the torsion tube, which is reinforced by a pair of distance rods attached to the forward end and to the rear axle housing. The brake drum on the rear wheels is 14 inches diameter. The service brake is external contracting and the emergency brake, operated by the hand lever, is internal expanding. The foot brake is equalized. The springs are of the same type and length but are two inches width. The steering gear is the worm and gear type and in other details it has the same general features. The wheelbase is 112 inches. The gasoline tank will hold 16 gallons for the touring car and 37 gallons for the roadster. The wheels are artillery pattern and of second growth hickory, 34 inches diameter, with quick detachable rims and fitted with 34 by four-inch tires.

The Other Models.

The unit power plant for model 30 is with bore and stroke of four inches and a horsepower rating of 25.6 by the S. A. E. standard. The radiator is the fin-tube type and the ignition is by a Remy magneto and a dry cell battery with dash coil to intensify the current. The driving system is practically the same as for model 40 in all proportions. The chassis frame has a single drop and the wheelbase is 106 inches. The springs are 35.25 inches length and the rear springs 48 inches length, with width of 1.75 inches. The brake drums on the rear wheels are 12 inches diameter and the service brake is external contracting, and the emergency brake is internal expanding. The service brake is equalized. The steering gear is of the worm and nut type and is completely enclosed and adjustable for wear. The gasoline tank capacity is 14 gallons. The wheels are the same as with model 40 and are fitted with quick detachable rims and with 34 by 3.5-inch tires.

The Oriole roadster is not built with the unit power plant. The motor for this machine is four cylinders, L type, with bore and stroke of four inches and with a horsepower rating of 25.6 by the S. A. E. standard. The lubrication is by a positively driven force feed system and splash, the oil pump being adjustable. The lubricant capacity is six quarts. The ignition is by low-tension magneto and a battery of dry cells. The clutch is a multiple disc design of large efficiency. The transmission is the selective type with three forward speeds and reverse. The springs are semi-elliptic forward and full elliptic at the rear. The other details, save that the wheelbase is 100 inches, are the same as for model 30.

LEWISTON SHOW NEXT MONTH.

J. Henry Graham of Old Orchard, Me., has decided to abandon plans for the race meet long enough to manage the second annual show in Lewiston, Me., April 4-6. The event will be staged in Auburn Hall, and many from other cities have engaged space.

New England is much interested in the forthcoming race meet at Rockingham Park, Salem, N. H., Memorial Day. The contest board of the American Automobile Association has granted a sanction, and work will begin toward putting the track in first class condition as soon as the frost is out of the ground.

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HANDSOME NEW COLE CATALOGUE.

Strictly in keeping with the high class of workmanship bestowed upon the Cole cars, the 1912 catalogue of the Cole Motor Car Company, Indianapolis, Ind., just issued, is a handsome product of the printer's art. The various models are shown in a manner calculated to bring out their merits, and the various components are presented in like manner. In addition, other illustrations offer interesting suggestions as to the enjoyment that comes with the possession of a Cole car. The text amplifies the illustrations and leaves nothing to be desired in the matter of describing the 1912 product. The booklet is free upon request made the company, or the Henderson Motor Sales Company, Indianapolis, general sales agent for this product.

MARMON WINS AT HAVANA.

During the race meet at Havana, Cuba, March 10, a regular 1911 Marmon stock car, shipped to A. H. DeDiaz & Co., Cuban representative of the Nordyke & Marmon Company, Indianapolis, Ind., in the fall of 1910, defeated all the cars in its class. The Marmon was entered in two races, winning both of them against a Lancia, Chalmers, two Mercers, Locomobile and two Mercedes. It also was awarded the Championship prize for making the fastest time of any car in the races held during the meet. An interesting fact in connection with one of the events was that it was run over, the Marmon winning a second time with an even larger margin.

NEW EVERITT AGENCIES.

Everitt cars, made by the Metzger Motor Car Company, Detroit, will be handled in Baltimore, Md., and adjacent territory by F. E. Magee, 1200 Mt. Royal avenue, under the firm name of the Everitt Auto Company of Baltimore. George D. Prentice of Great Falls, Mont., has the Everitt agency for his territory. The Stearns Auto Company of Seattle, Wash., will handle this make throughout certain counties in Washington. George D. Holm & Co., of Helsingfors, Finland, will represent the Metzger company in Finland and several provinces in Russia.

NATIONAL'S ADVANCE MODELS IN BOSTON.

W. H. Stevens, Boston, local agent for the National car, made by the National Motor Vehicle Company, Indianapolis, Ind., is showing the first of the 1913 models, these presenting a trend toward low, comfortable bodies. The maker finds that it is not necessary for it to produce something entirely new for the coming season, and is concentrating its efforts on the four-cylinder 40 horsepower car. The new models therefore are very similar to those for 1912, with the exception of a slightly longer stroke motor, inclosed valves and automatic tire pump. The construction is somewhat heavier throughout, following the general design which was so successful in racing events last year. The body and upholstery work is entirely new, having low, straight line effects, and including the fullest possible equipment. All 1913 National cars will be fitted with self-starting devices and many other novel features which make for comfort and convenience.

VANDERBILT AGAIN ON LONG ISLAND.

A determined effort is being made to hold the 1912 Vanderbilt Cup race over a Long Island course, preferably in the vicinity of Riverhead. The contest board of the American Automobile Association has been asked to modify the rule regarding the policing of road courses by state militia, in this instance. Chairman William Schimpf has the following to say regarding the situation:

"The drawback in the matter of holding road races on Long Island is that we cannot see, in view of what happened on previous occasions, how a contest can be held safely unless military protection is insisted upon. Any race of the fame of the Vanderbilt Cup, held close to the most congested centre of population in the United States, is certain to draw an enormous assemblage.

"Personally, I would like to see the race brought back to this part of the country. The Vanderbilt is the Long Island classic, and this should be its home; but as an official of the contest board, I certainly would hesitate to take the responsibility of sanctioning such a contest, unless absolute assurance of safety to spectators and contestants could be given.

"That is the situation as it stands today. The contest board has the power to sanction a race anywhere, but if it does allow the holding of the Vanderbilt Cup race at Riverhead, or even on any other part of Long Island, it will only be when we are certain that the protective measures will be sufficient to insure perfect safety to all."

RECIPROCITY BALKED IN JERSEY.

Two weeks ago there was every indication that the so-called reciprocity bill, which already has been passed by the lower house in the New Jersey Legislature, would meet with the approval of the Senate and become a law without delay. Since that time, there has been an apparent change of heart among some of the senators, and the legislation is still in the committee. The Legislature is scheduled to adjourn April 26. Senator Colgate, who has the bill in charge, feels that he lacks two votes, and motorists hope to convince at least two men before the date mentioned.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

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FIVE CARLOADS OF CARTERCARS.

A special express shipment of five carloads of Cartercars was made recently to the Chicago branch of the Cartercar Company, Pontiac, Mich., in order to take care of the increasing demand in that territory. E. D. Knowles, branch manager in Chicago, went to the factory, so imperative was it that the shipment be made at once.

In commenting upon the outlook in Illinois, Mr. Knowles said: "I do not see how things could look better. The demand is substantial and not merely a boom. Men who are now buying motor cars are doing so after full deliberation, and are exercising great care in selecting a car that is suited to their particular needs and pocketbook."

WATERBURY TO HAVE SHOW.

The first automobile show to be held in Waterbury, Conn., is scheduled for the Auditorium, March 27-30. All of the available space for the display of pleasure and commercial vehicles has been taken, and very little remains in the section set aside for the accessory exhibits. The event is expected to stimulate business in a material degree throughout the entire Naugatuck valley.

KISSELKAR GIVES SATISFACTION.

J. E. Faggard of Dallas, Tex., recently purchased a KisselKar, made by the Kissel Motor Car Company, Hartford, Wis., with which he immediately set out on a 2000-mile trip throughout Texas. The route included Greenville, Gainesville, Forth Worth, Waco, Houston, Galveston, Corpus Christi, San Antonio and Austin. Both Mr. and Mrs. Faggard were immensely pleased with the performance of the car throughout. Particular attention was paid to the growth of the automobile business in this district, an example of which is shown in Houston, where there were but 250 cars three years ago and some 2300 today.

GENEVA PLANS AUTOMOBILE SHOW.

The Chamber of Commerce in Geneva, N. Y., has arranged with Louis Blumenstein, who conducted the successful show in Elmira, N. Y., recently, for the first organized exhibition of motor cars and accessories in Geneva, March 28-30. The Geneva Automobile Club will assist in making the event one long to be remembered in the history of the city.

MORE GOOD ROADS IN MAINE.

The Maine Legislature has passed a resolve submitting to the people for their approval at the regular state election in September, a constitutional amendment authorizing the issue of $2,000,000 in bonds for the construction of good roads throughout the commonwealth.

SEVERE INNER TUBE TEST.

A demonstration which should convince the most skeptical was conducted recently in Redlands, Cal., when William Thornquest of the Redlands Vulcanizing Works, agent for Fisk pure gum inner tube tires, made by the Fisk Rubber Company, Chicopee Falls, Mass, pulled a 3000-pound Cadillac car over the streets for some distance. A rope was attached to the back axle of Mr. Thornquest's machine and this was tied around the tire. Another rope attached to the Cadillac was made fast to the other side of the tire, the latter being the connecting link between the two ropes. When the two machines were stopped and started again, the tire would stretch a matter of 10 feet, but it was not damaged at the end of the demonstration.

BOSCH NEWS FOR MARCH.

The March issue of "The Bosch News," published by the Bosch Magneto Company, New York City, pays particular attention to the subject of spark plugs. It is pointed out that this engine accessory is given very slight consideration by the average operator, and particular effort is made to indicate that it has very important functions which should be understood. A copy may be secured by addressing the company at 223-225 West 46th street, New York City.

BIG DEMAND FOR CUTTING CARS.

During the past week an order was placed with the Clarke-Carter Automobile Company, Jackson, Mich., under the terms of which a carload of Cutting cars will be shipped each day to the Cutting Motor Company, Sioux City, Ia., beginning April 1 and ending July 1. This company also is shipping two carloads of Cutting cars each to Australia and New Zealand.

NEW BEDFORD JOINS SHOW LIST.

The first automobile show to be held in New Bedford, Mass., will be staged in the Elm Rink, March 27-April 2. Many new effects in decorations will help to make the building attractive, and the local dealers are enthusiastic over the prospects. Considerable interest in motor boating is noted in this vicinity, and an opportunity will be afforded to see boats as well.

WILL ADMIT ACCESSORY MEN.

Appreciating the value of membership in the Indiana Automobile Manufacturers' Association, the Remy Electric Company, Anderson, Ind., maker of Remy magnetos, recently made application for admission. Until that time, it was impossible for accessory makers to become members, but the bylaws and constitution were changed for this purpose. Besides the Remy concern, the R. J. Irwin Company, Indianapolis, Ind., body builder, has joined recently.

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This is the logical moment to think about Next year's business

Arrival of the Spring touring season multiplies responsibilities for tire dealers.

Thousands of cars which have been in winter retirement soon will be in service again. Your customers will want tires.

What tires are you going to sell them?

There are two important facts you should carefully consider in mapping out this season's campaign—the immediate requirements of your customers and the future of your business.

If you start right this Spring—establish your reputation for reliability—you not only satisfy your customers, but you lay the foundation for next year.

Once you satisfy a customer it is an easy matter to sell him again. Enough satisfied customers absolutely insure you a profitable business. Therefore, your permanent success as a tire dealer depends entirely upon the quality of the tires you sell.

United States Tires have wearing qualities not possessed by other tires because they

are the product of four great factories presided over by four groups of experts, presenting an aggregate of tire-building knowledge not even approached by any other tire concern.

In United States Tires these experts have assembled the strongest individual points of four world-famous brands of tires.

Tires made as these tires are made offer you an absolutely certain foundation upon which to build up a big, lasting, profit-yielding business.

And they cost no more than other kinds.

UNITED STATES TIRE COMPANY
New York.

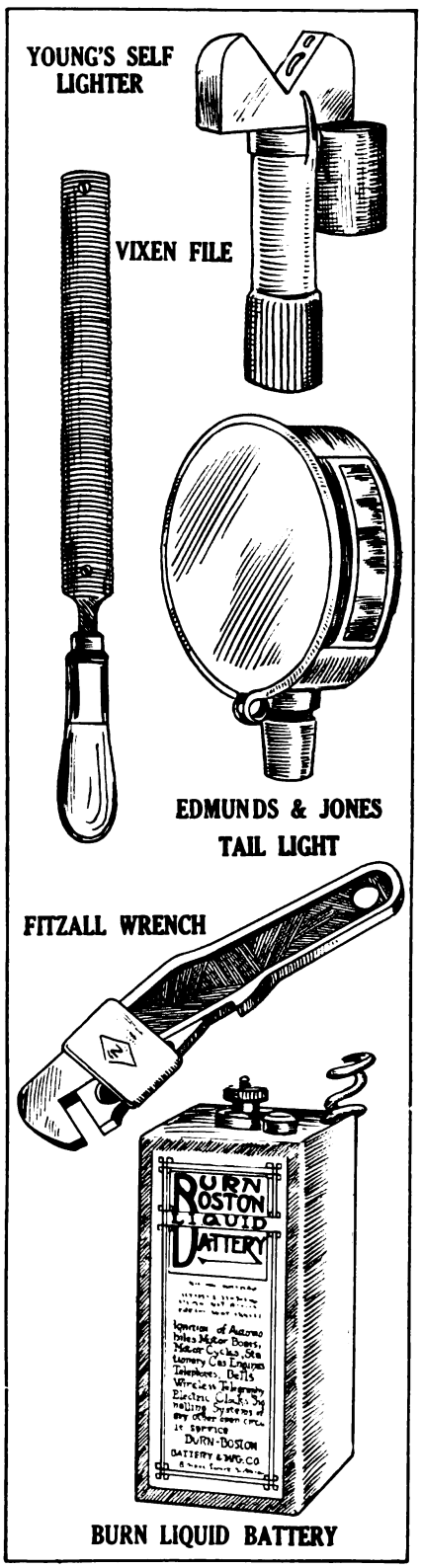
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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Young's Self-Lighter is a practical device which will appeal to motorists whose cars are equipped with acetylene. By it the lamps may be lighted or extinguished without the driver leaving the seat, the operation involving but a turn of a valve and a throw of a switch lever. A feature of the equipment is its simplicity. Anyone may attach the entire outfit in a few minutes and once installed it does not require any attention whatsoever. The burners consist of the usual members but carry a wire which is utilized for jumping a spark across the gap, which ignites the acetylene. The construction of the burners is such that the heat does not affect the lighting device or its operation. The system includes a special switch, a gas valve and the burners. The switch is fastened to the dash and a wire leads from it to one of the burners and a second lead to the secondary terminal of the regular coil. The gas regulating device is also mounted upon the dash and is operated easily. When the use of the lights is desired the valve is turned and the switch lever moved, thus closing a circuit and causing a series of sparks to jump across the gap in the wires at the burner. Another position of the lever extinguishes the lamps and shuts off the gas. The self-lighter is not expensive and does not interfere with the use of the lights in the ordinary manner. It is manufactured by A. G. Young, Pittsburg, Penn. William H. Pollack, 607 Webster avenue of the same city, is selling agent.

★

Edmunds & Jones Tail Light, produced by the Edmunds & Jones Manufacturing Company, Detroit, is operated by electricity and has in addition to the usual red semaphore a white lens by means of which the license plate is illuminated. The lamp is constructed of a high grade material, compact and very neat in appearance. By removing a set screw the member may be dismantled for inspection or adjustments. It is dust, moisture and weather proof.



★

The Vixen File, for which the maker claims non-clogging and superior abrasive qualities, is the product of the Vixen Tool Company, Philadelphia. It was invented by Alexis Vernaz of Switzerland and has deep semi-circular teeth on either side, the design of which produces, it is stated, a keen cutting edge as well as a shearing cut. The tools are made of a very high grade crucible steel and the teeth are cut one at a time with an end mill shaped like a hollow cylinder, and the edge beveled off to an angle of 60 degrees. This method of forming the teeth leaves the steel untouched as regards its constituent parts. The Vixen file will permit of resharpening from four to six times. It is made in different styles and sizes.

★

Fitzall Wrenches, so named because of their fitting and adjustable qualities, present a new application of a well known mechanical principle, that of the inclined plane or wedge. They consist of a shank having a fixed jaw, a wedge shaped slideable jaw or tooth block, and a movable locking band. The latter two members slide easily and are locked positively when pressure is applied. In addition to being instantaneous in action they are free from knurled nuts, screws, etc., and permit of openings of varying dimensions very quickly. The only wearing part is said to be the tooth block which is removable and may be renewed at a very slight expense. They are manufactured by the Standard Wrench & Tool Company, Providence, R. I.

★

The Burn-Boston Liquid Battery, made by the Burn-Boston Battery & Manufacturing Works, Boston, is produced in two forms, water and moisture proof, the lat-

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ter type being known as the Noloss. They are similar to the usual square dry cell and require the same number in a set, but it is claimed that they will give considerably longer service and will not deteriorate when out of service. This is due to the composition of the electrolyte which is liquid, non-freezing and non-sulphating, and will not evaporate. The zinc connection of each cell is a flexible wire, permanently attached. Each carbon terminal is equipped with a lock washer, preventing a connection from working loose by vibration. The voltage of each member is 1.5 and amperage about 20.

★

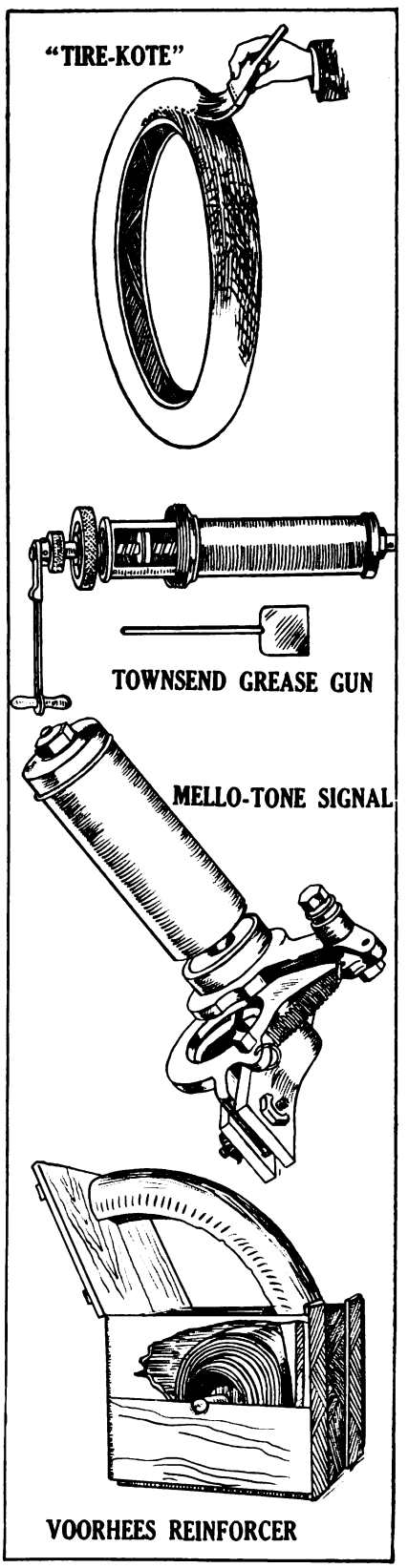
Tire-Kote is a liquid preparation made by the Page-Lester Company, Chicago, for preventing the deterioration of tires when not in use, as well as when in service. The fluid is applied with a brush after the surface has been cleaned thoroughly and it is said that it will dry in about 10 minutes. By its use cracks, crevices and cuts are filled and the preservative prevents action of oils, water, sun or other deteriorating influences. A feature emphasized of Tire-Kote is that shabby and travel-stained shoes are made to look like new as it imparts a white color. It is stated by the maker that the composition is not affected by mud and is thoroughly water and weather proof.

★

Voorhees Ideal Reinforcer is manufactured for the convenience of tire repairers and comes in reels of 50 and 150-foot lengths, mounted on a spindle which fits inside of the shipping case, this arrangement making for accessibility as well as keeping the material clean. It is utilized for the reinforcement and protection of tires, and is produced by the Voorhees Rubber Manufacturing Company, which concern maintains offices at Jersey City, N. J., New York City and Boston.

★

The Townsend Grease Gun differs from the usual device utilized for the handling of hard lubricants as it may be completely filled, is clean to handle, and is operated easily and quickly. It comprises two seamless brass tubes, telescoped together. The outer member is equipped with a threaded cap which is movably mounted upon a rod or plunger. The outer end of the larger barrel is threaded for the purpose of attaching a cap when the grease gun is being operated and to allow the inner barrel to be moved out when lubricant is being inserted. The inner tube is open at the forward end and closed at the rear. A screw .375 inch in diameter and eight inches long is journalled in the rear end of the inner tube, and is fitted with a jointed handle. Attached to the screw member is a piston with a lip which fills the opening and also stops the lubricant from crawling backward. This lip prevents the piston from turning, but when the handle is rotated the screw revolves and the piston travels along the tube, pushing the grease before it. The inner tube has a section cut away and this is filled with lubricant by means of a steel paddle. When the compartment is filled, the inner tube is moved inward and the cap screwed on. The device is 2.5 inches in diameter, eight long and holds about one pound of lubricant. The nozzle member is slightly curved and its opening is approximately .1875 inch in diameter. It is said that the gun may be filled and emptied in about 40 seconds and that it may be loaded without soiling the hands. Owing to the liberal sized opening in the inner tube and the fact that this member is loaded separately, air pockets are avoided and the gun may be completely filled. It is made by S. P. Townsend & Co., Orange, N. J.



★

The Mello-Tone Auto Signal is produced by the Electric City Manufacturing Company, Buffalo, N. Y., of which J. J. Kelleher, 612 Columbus avenue, Boston, is New England distributor. It is a neat, compact, signalling device, adapt-

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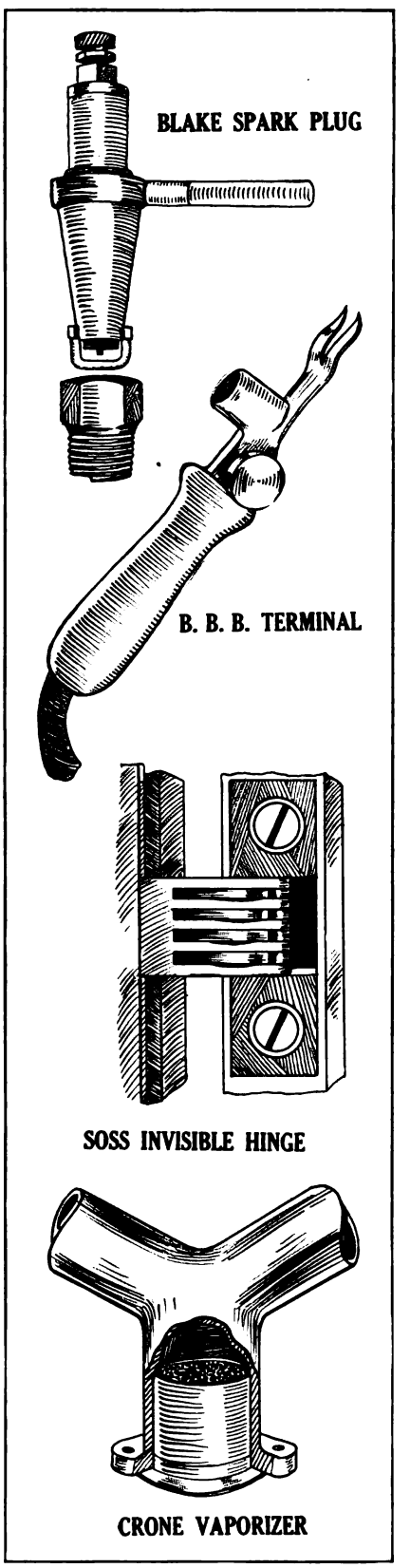
able to motor cars, boats, motorcycles, etc., and is operated by the pressure of the exhaust. The tone is clear and musical and the volume is varied by the amount of pressure upon the pedal actuating the device, this member controlling the size of the opening through which the gases pass. A wide range in tones is also possible. It is designed to be attached to the exhaust pipe leading from the muffler, and in fitting the device it is not necessary to cut or alter the exhaust pipe. It is installed easily and quickly by means of a patented clamp, a feature of which is that two sizes of these members will cover pipes from one to 2.5 inches in diameter.

★

The Blake Q. D. Spark Plug, produced by the Blake Spark Plug Company, Cambridge, Mass., presents interesting features, inasmuch as it may be quickly disassembled without the use of a wrench or other tools. Integral with the mica or porcelain member is a handle and by giving this a quarter-turn the plug is unlocked and removed easily, leaving the threaded part in the cylinder. The recess into which fits the metal member carrying electrode is tapered and a cam guide-like device forces the two parts together making the plug gas tight, and at the same time locking them securely. The handle is covered with wood, thereby preventing shocks when the plug is removed for testing the spark or cleaning the points. It is claimed of the device that these never have to be adjusted. It is of special value on cars not equipped with a priming cup as by the removal of the electrode member gasoline may be inserted in the cylinder without detaching the wire.

★

The B. B. B. Spark Plug Terminal will appeal to motorists who have experienced the unpleasantness of a shock when testing out a faulty spark plug. It is a combination device inasmuch as it serves as a regular terminal and provides means for proving the action of the spark when the plug is removed and laid upon the cylinder. The terminal is substantially constructed of metal, nickel plated, and may be attached to any type of plug. An enameled wooden handle is fitted to the terminal and is so constructed that the secondary wire may be inserted and locked securely. Being of wood, a non-conductor of electricity, shocks are prevented. The device is made in one size, this being adaptable to any plug, and is manufactured by the B. B. B. Combination Terminal Company, Dorchester, Mass.



★

Soss Invisible Hinges are produced by the Soss Manufacturing Company, Brooklyn, N. Y., and are designed for motor cars, although applicable to any type of door. When fitted they hold the door rigid, but provide a perfectly smooth action. They are constructed of a frictionless metal connected by links and are especially adapted where the body of a vehicle is curved. A feature emphasized is that they require less thickness of wood in the post or body, as the width of the plates is 1.125 inches, allowing them to be mounted in a post 1.25 inches wide, and at the same time provide for a throw of one inch. The hinges are made with a separation of .125 inch between the plates and it is claimed they will withstand rough usage. They are finished in black, oxidized copper, bronze, etc. The installation is simple, requiring only screws and washers.

★

The Crone Vaporizer is a device which may be inserted in the intake manifold of a hydrocarbon motor without alteration to the piping and which does not interfere in any way with making the regular connections mixture tight. The construction is of metal, one end having a lip or extension for fastening it securely. A fitting of corrugated mesh breaks up any raw gasoline that is draw from the carburetor and converts the fluid

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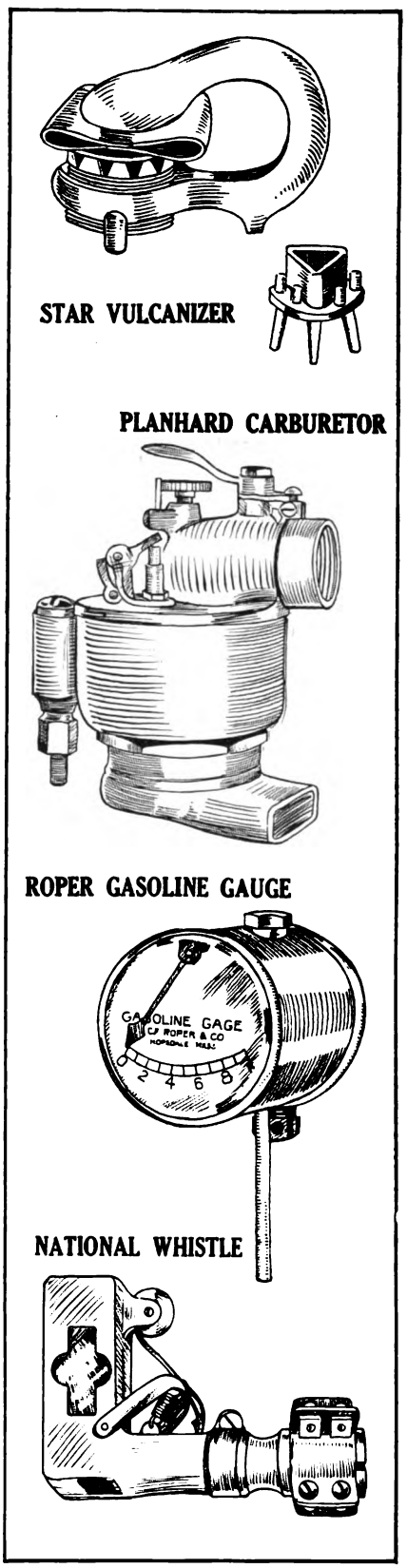
into a perfect and dry mixture. Being constructed in tubular form it provides a vaporizing surface, according to size, from 150 to 1000 square inches. Back pressure is absent and the mesh will not clog or get out of order. It is claimed that with the vaporizer, faulty action of carburetors is regulated and that a considerable saving of gasoline is effected. Carbon caused by too much fuel is prevented as well as danger of a backfire to the carburetor. It also is held that overheating of the motor is eliminated, inasmuch as the device provides a dry mixture. It is manufactured by F. G. Crone, Buffalo, N. Y.

★

Star Self-Regulating Vulcanizers, manufactured and marketed by the Star Rubber Company, New York City, are designed especially for the motorist who makes his own repairs to inner tubes. They are compact and put up in a strong, nicely finished hinged box adapted for carrying in the car. Being constructed of solid aluminum, they are very light. In practise the tube is clamped between the plates and one of the triangular heat units lighted. These give off the proper heat and the device does not require any watching or adjusting, the temperature being regulated automatically. The heat units come in boxes of 10 and are inexpensive. The equipment includes material for vulcanizing, etc.

★

Planhard Carburetors make for simplicity, inasmuch as they are free from springs, and have but one spraying nozzle, this being located in the centre of a cup shaped member and surrounded by a constant air opening. At low and intermediate speeds air is admitted through these openings, but upon the speed of the piston increasing, its suction lifts one or more balls in a plate surrounding the fixed air passages, increasing the amount of air admitted. This plate is adjustable and is fitted with six balls. A concentric float is utilized, enclosing the upper fixed air passage. This is controlled in the usual manner and equipped with a priming device. The needle valve proper is adjusted underneath and locked by a wing nut. It is claimed of the Planhard carburetor that a perfect mixture is obtainable and that economy of fuel is effected. It is made by the Planhard Manufacturing Company, Kokomo, Ind., with general sales offices at Philadelphia.



★

The Roper Gasoline Gauge is a device for indicating the amount of fuel in the tank. It is fitted to the dash and does not detract from its appearance, being not unlike a speedometer in design. The dial is calibrated in inches and a movable hand indicates the amount of fluid in the tank, whether the car is on the level or a grade. There being no complicated mechanism, there is nothing to get out of order. The gauge is enclosed in a polished brass case, has an enamelled dial and a beveled glass face. It is connected to the fuel tank by a .25-inch copper pipe and is installed easily without special fittings. It is manufactured and marketed by C. F. Roper & Co., Hopedale, Mass.

★

The National Whistle, manufactured by the National Signal Company, Brooklyn, N. Y., is attached to the exhaust pipe of the muffler and is operated by the pressure of the burnt gases. It is constructed of aluminum, trysquare in shape, and is said to be carbon proof and productive of a rich, mellow tone, yet of sufficient strength to be audible over traffic noises. It is fitted with movable valve which in normal position closes the sound chamber allowing the gases to flow directly out into the open air. When the valve is moved forward by a cable actuated by a pedal, it almost closes the exhaust passage, leaving a small opening through which the gases are forced in a thin air current, these breaking against a sharp edge of the valve and being deflected into the whistle.

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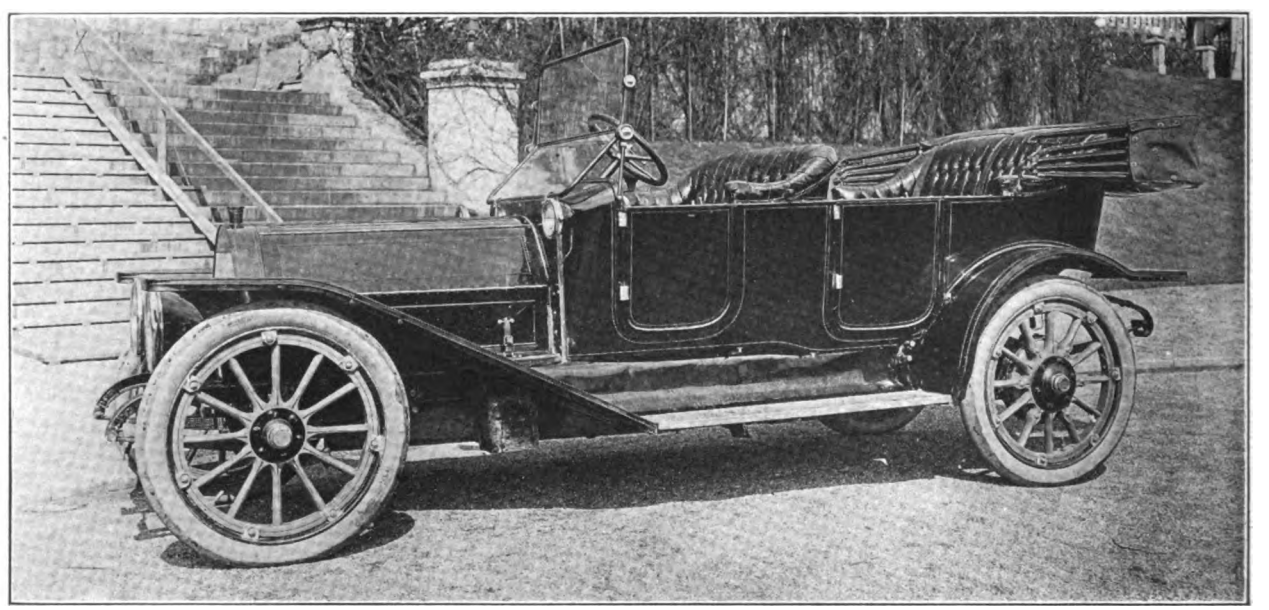
THE VERA SIX-CYLINDER CARS.

HAVING determined by careful and extended demonstration and experimentation every feature of design and quality of construction the Vera Motor Car Company, Providence, R. I., has placed in the market the Vera pleasure car, a six-cylinder machine with a conservative power rating of 50 horsepower. But one type of chassis is produced on which is installed either two or three-passenger roadster and five or seven-passenger touring bodies. It is not in any sense experimental, for its design combines only qualities that have been established as thoroughly mechanical and enduring, and are approved from every engineering viewpoint.

The Vera car has several features of construction that make it distinctive. It is well nigh noiseless, being silenced admirably. It may be driven on second speed without evidence of the operation of the gearset, so quiet are the gears. The control is unusual in that the machine may be throttled to practically a walking pace and the flexibility is highly commendable. The chief feature is that the machine is driven through the torsion tube and chassis frame instead of the springs and distance rods, while the full floating rear axle relieves the driving system of any thrust whatever and eliminates stresses that might result from road shock.

The car has great accessibility, it being believed that the saving of time in its care and maintenance is a decidedly important factor with any purchaser. The components have a wide margin of safety, and the quality of materials is extremely high, insuring abundant strength and endurance with comparatively light weight. The car is finished with unusual care and so far as the body installation and equipment is concerned it may be regarded as a "custom built" vehicle. The purchaser has latitude in the choice not possible with the usual stock productions of other manufacturers.

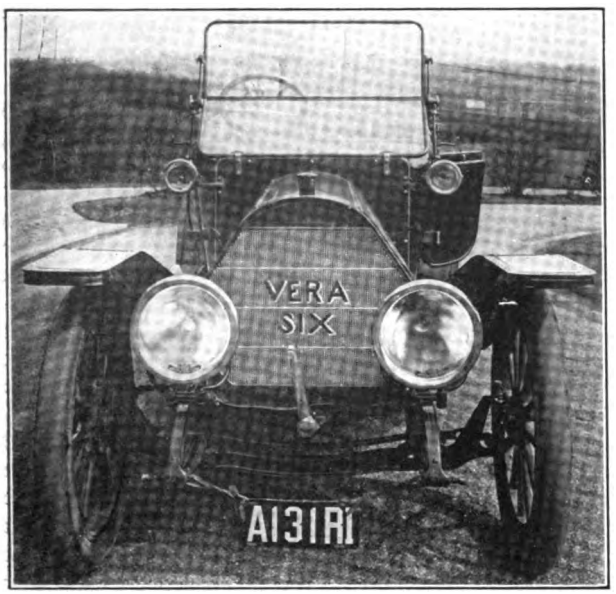
The car is the joint design of H. J. Willard and F. V. Cooke. Mr. Willard is a pioneer of the industry, has had life-long engineering experience, and for 3.5 years was connected with the American Locomotive Company, directly supervising the production of Alco power plants. He is a mechanic both from a creative and a productive viewpoint. Mr. Cooke has been identified with the motoring world for 10 years in practically every capacity save actual manufacturing, being connected with the Packard Motor Car Company's eastern selling organization for a considerable period.



The Vera Six-Cylinder, 50 Horsepower, Five-Passenger Touring Car, Built by the Vera Motor Car Company, Providence, R. I.

The Vera Motor Car Company has as executive president, Johns H. Congdon of the Congdon & Carpenter Company, Providence; as vice president and general manager S. J. Greene, treasurer of the Eastern Coal Company, Providence; as secretary and treasurer F. D. Simmons, president and general manager of the Eastern Coal Company, and these three with Mr. Cooke, as sales manager, and Mr. Willard, as superintendent and engineer, compose the board of directors. The officers of the company are business men of large and mature experience. The assembling and testing of the cars is directed by William J. Harris, assistant superintendent, for six years in charge of the assembling department of the Ameri-

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The Vera Six-Cylinder Five-Passenger Touring Car Head-On, Showing the Strength of the Forward Suspension and the Sightly Radiator and Hood.

can Locomotive Company, who was the mechanical expert in charge of the racing cars in all the events in which Alco machines were entered during his connection with the company.

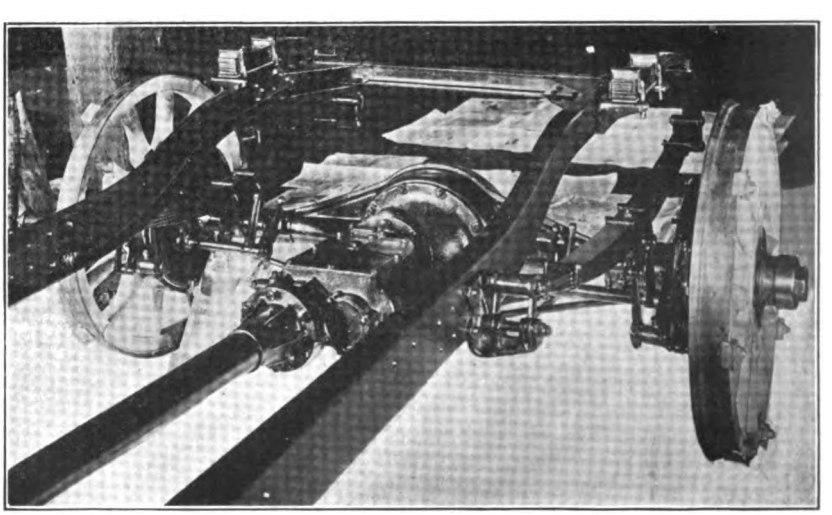
The purpose is to produce a car in every sense individualized and specialized, that has power and speed beyond what is necessary for even extraordinary conditions, and will yield extremes of service well within its capacity, so that there should be no demand so severe as to reach the full limitations of the construction. In addition the car is designed to have every quality that will make for comfort and luxury.

No detail of mechanical construction has been accepted without the fullest experiment to ascertain its desirability and fitness. Large margins of safety have been provided with relation to every wearing part. Provision is made for adjustment that the entire assembly may be perfectly maintained. Care has been taken to produce a high quality machine that is practically standardized and may be accepted as mechanically correct throughout. The name of the car, the Latin for true, was applied because, in the opinion of the officers of the company, in every detail and as a whole it is what the name implies—a true car.

The Vera motor cylinders are cast in pairs from fine close-grained gray iron with valve chambers, cylinder heads and water jackets integral. The cylinders are T type with the fuel intake at the right and the exhaust at the left side. The cylinder heads are reinforced with cross ribs and the cylinders and the valve passages are entirely water jacketed, a cock at the lowest level affording perfect drainage of the jackets. The top of the water jacket is open, which insures uniformity of casting and complete cleaning of the core sand. The openings are closed by bronze plates, to which the water outlet manifold is attached.

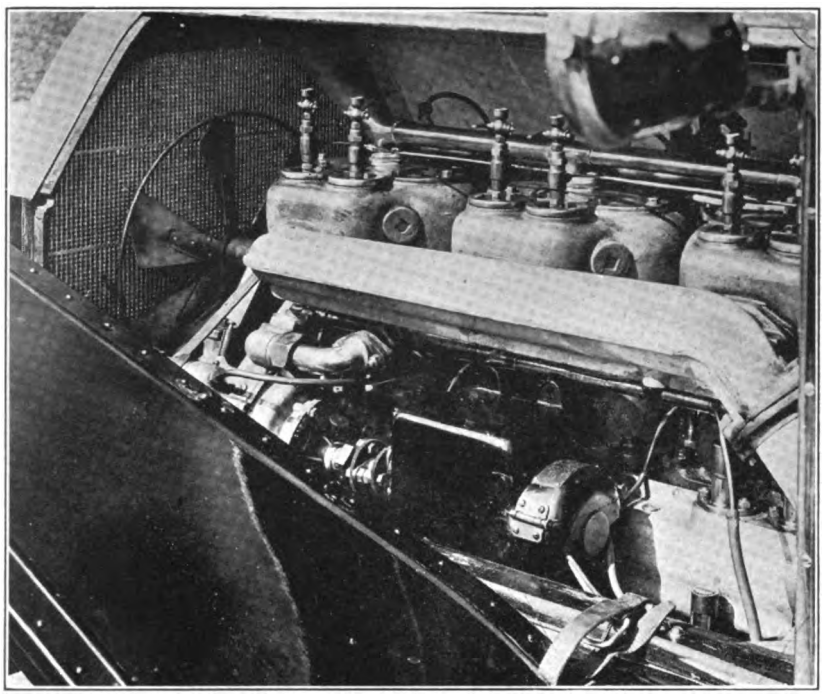
The castings are sand-blasted, pickled and hand-filed before the machine work is begun. The cylinders are bored on a special machine weighing eight tons. After reaming they are allowed to age and are ground to a precise fit. To insure against imperfection or leak they are subjected to a heavy water pressure test. The base flanges of the cylinder units are reinforced by bosses through which the bolts retaining them to the engine case are passed. The valve caps are set into the cylinder heads with asbestos filled copper gaskets on the cap seats.

The pistons are of the same material as the cylinders. After casting they are pickled, and when turned and ground to exact size are slightly taper, there being .003 difference between the top and bottom of the piston walls to allow for expansion. The wristpin bosses are reinforced by webs to give additional strength. Each piston is fitted with four rings of semi-steel and has four oil grooves. The faces and both edges of the piston rings are ground and accurately fitted to the ring channels. The rings are first turned eccentric in a lathe, and then cut and ground to exact cylinder size, this insuring perfect retention of the compression pressure. In the piston, in line with the wristpin, is a wide groove that collects oil from the cylinder wall and leads it to the wristpin bearings. The wristpin oscillates in the bosses. It is of tool steel, hollow, carefully ground



Rear Section of the Vera Six Chassis Frame and the Rear Suspension, Illustrating the Suspension on the Double-Shackled Three-Quarter Elliptic Springs, Mounted on the Full Floating Axle.

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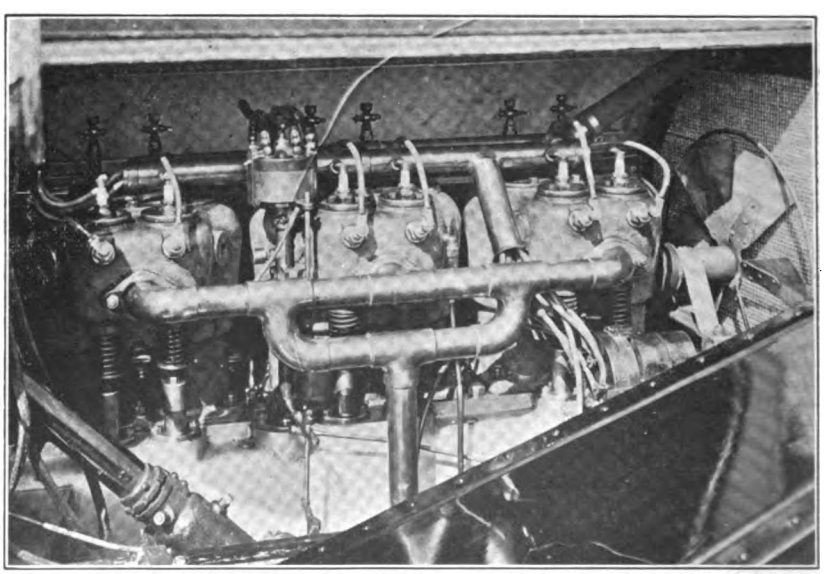
The Vera Six-Cylinder Motor, Exhaust Side, Showing the Apico No. 4 Ignition and Lighting System, Tire and Water Pumps.

and hardened, and is fixed to the connecting rod by a bolt, there being a larger bearing surface than were the pin fixed in the piston.

The bore of the cylinder is 4.25 inches with stroke of five inches, and the cylinders are offset .75 inch. The S. A. E. horsepower rating is 43.3, and at 1650 revolutions the engine will yield full 60 horsepower. The engine case is aluminum and is divided longitudinally. The lower section forms the oil reservoir. The case is divided into three compartments by heavy cross webs which, with the ends carry the large main bearings. These webs strongly reinforce the case. The bearings are held independently of the lower section by large through bolts. The bolts retaining the cylinders are supplied with a collar that holds them in place and the cylinders may be removed without taking off the lower section. There are two breather openings, covered with knurled nuts containing fine wire gauze screen. These are close to the oil gauge and are used for supplying the oil replenishments. Outside of the engine case proper is a compartment containing the timing gears and all these gears may be exposed by the removal of the cover. With the cover removed the camshaft, the idler, water and magneto gears may be taken out.

The diameter of the crankshaft at all bearings is two inches. The length of the rear bearing is 3.5 inches. The crankshaft is 40 per cent. carbon steel and is drop forged, heat treated to insure great strength. The forging is carefully pickled and is turned and ground to exact size. The flywheel flange is forged integral with the shaft. The shafts are accurately balanced on Norton running balance machines. The shaft bearings are of Parsons' white bronze. The camshafts are 40 per cent. carbon steel .9375 inch diameter, carefully ground to size. The cams are oil-tempered and ground to a master cam and are keyed and pinned to the shaft. The bearings are of bronze and the front and centre bearings are 2.5 inches long. The connecting rods are I section drop forgings of 30 per cent. carbon steel and are fitted with Parsons' white bronze bearings 2.5 inches length. These bearings are adjustable by shims.

The valve pushrods are large diameter and of tool steel with extra length bearings and have a case hardened adjusting screw. The guides are of phosphor bronze and are retained to the engine case by studs and lock washers. The valves have nickel heads electrically welded to steel stems, both intake and exhaust being interchangeable. They are 2.25 inches diameter and are carefully ground and lapped. The



The Vera Six-Cylinder Motor, Intake Side, Illustrating the Simplicity of Construction and the Strength of the Steering Gear.

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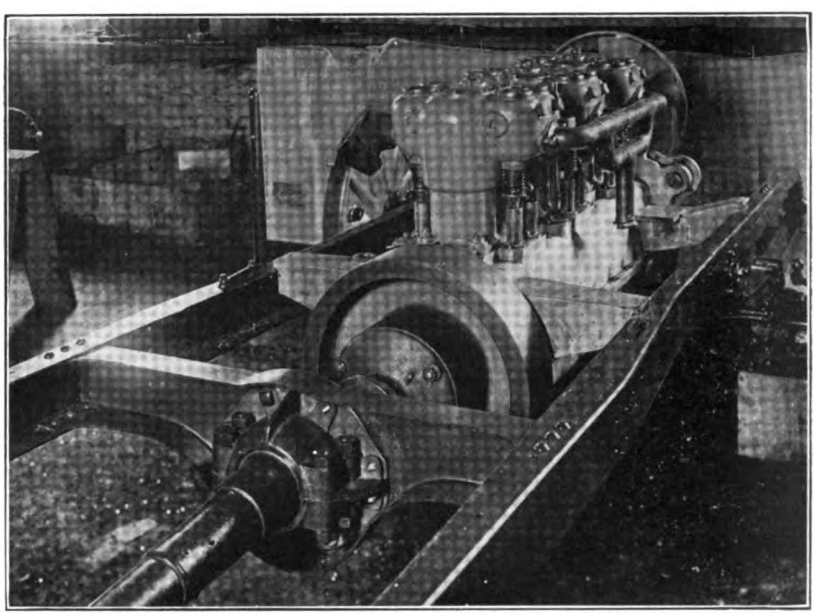
cast iron guides are extra length. The very large springs are retained by beveled split bushings and are easily removable. The timing gears are spiral cut with faces 1.25 inches width, are extremely rigid and are of machine steel, semi-steel and cast iron, being fastened to the shafts with woodruff keys and split pins. The faces are ground and machined on hobbing machines. The gear teeth are marked so that when a motor has been taken down it may be assembled and timed with absolute accuracy.

The exhaust manifold is a single steel casting, 2.75 inches diameter, at the outlet ribbed to insure lightness and strength. The intake manifold is of compound yoke pattern with large section and easy curves to insure fullest flow of gas under all conditions of operation. The water inlet manifold is attached to the base of the water jackets and the coolest fluid is circulated about the exhaust valves. The outlet manifold is through the bronze plate covering the cylinder unit head. The motor is cooled by a positive water circulation through a centrifugal pump driven by a gear on the exhaust camshaft, and a large cellular radiator through which a draft is forced by a fan mounted on a bracket carried on the crankcase, ahead of the forward cylinder. The fan is a one-piece steel stamping and is carried on an adjustable ball bearing. The drive is off the pump shaft by an endless water proof flat belt.

The system of lubrication is remarkably efficient. By it the full supply of 1.5 gallons of oil in the crankcase reservoir may be completely circulated in seven minutes. On the exhaust side of the motor case is a ball float oil gauge. If the oil is maintained between the high and low level indications there is no possibility of smoking or damage to the engine. The oil flows from the compartments to the oil well at the rear of the crankcase where, at the exhaust side, and outside the case, is an oil pump driven by spiral gears from the camshaft. The oil is drawn through a filter screen and thence is forced through a large duct integral with the engine base and copper tubes of large diameter to the top of the main bearings. The crankpins are drilled at right angles and at every revolution the holes register with the oil tubes. The bearings are grooved to retain the oil. Through the shaft, the crankpins and the webs or cheek pieces are channels through which the oil is forced to the crankpin bearings and completely distributed to the oil grooves. There is no splash lubrication, but the camshafts, camshaft bearings, wristpins, and the cylinders and pistons are lubricated by the oil thrown off from the crankshaft by centrifugal motion. The timing gears operate in a bath of oil supplied by the drainage from the front main bearing. Every bearing aside from the crankshaft is of phosphor bronze and each bearing is pocketed and grooved for complete lubrication. All the crank and connecting rod bearings are carefully fitted with copper shims for adjustment.

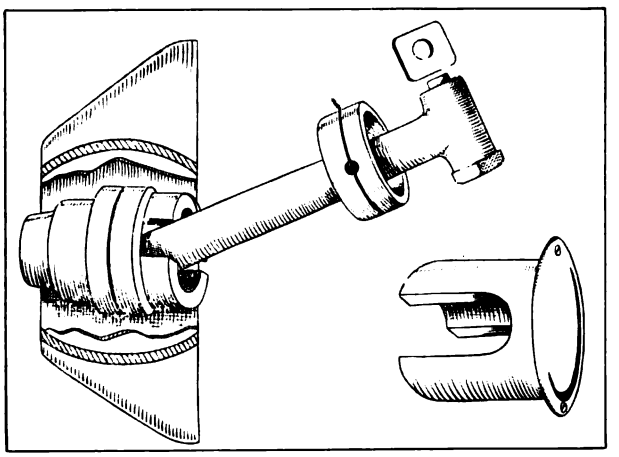
The ignition is the true double system, using the Apico No. 4 combination ignition and lighting system driven from the pump shaft. This system employs a dynamo that generates an electric current and this in turn is supplied to two storage batteries. There is automatic regulation of the current generated so that the batteries are charged whenever drawn upon and the engine is running, there being such control that there is no possibility of over-charge and no danger whatever of exhaustion. The standard of amperage is maintained and there is always sufficient energy available to insure efficient ignition. During the day the excess current generated is stored in the batteries, but it is utilized for both lighting and ignition at night. The ignition is by two sets of spark plugs in the intake side of the motor, one set of plugs at the sides of the valve pockets, and the other above the inlet valves, the sweep of the incoming fuel cleaning the electrodes and insuring uniform and efficient firing. It is possible to use either or both sets of plugs as desired, the firing with the entire number making for more complete combustion and greater power, with a larger economy of fuel. The carburetor is an automatic float feed type that is very efficient.

The flywheel is of cast iron, accurately machined and balanced and bolted to a flange integral with



Cross Member of the Vera Six Chassis, Showing the Vera Rocking Clutch Coupling, the Clutch and Driving Shaft, the Rear End of the Clutch Being Within the Globe of the Torsion Tube.

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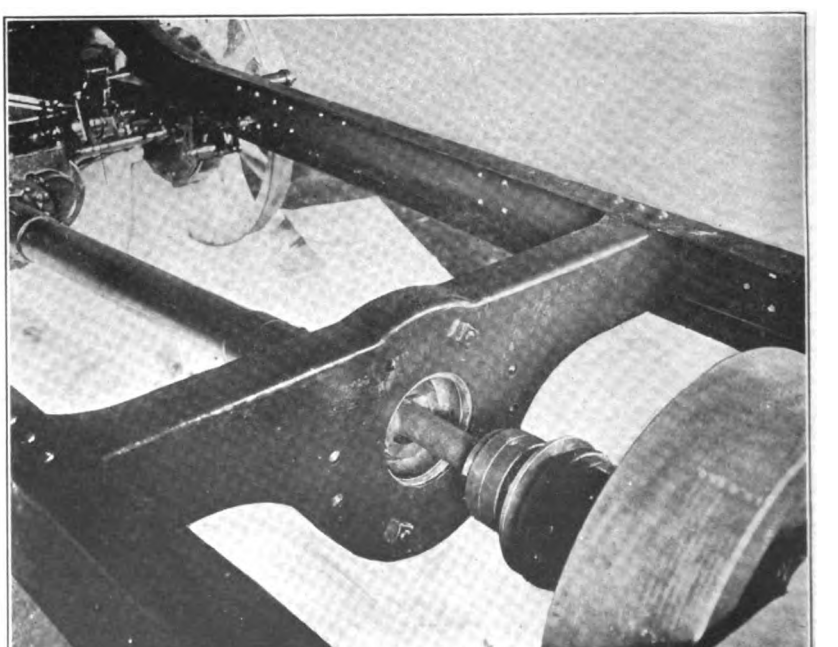
The Vera Rocking Clutch, the Forward Members Being Disassembled and the Driving Member Lifted to Show Its Extreme Movement, and the Rear Members Represented in the Broken Globe of the Torsion Tube. The Shaded Semi-Circular Lines Indicate the Babbitt Metal Lining of the Globe Socket.

the crankshaft. The face of the wheel is marked so that the timing of the valves may be done quickly and precisely. There are many other minor details of construction, such as the large diameter valve springs to insure elasticity, retained by a collar held by a split taper steel bushing fitted into a groove in the valve stem, the bronze compression relief cocks, the hand-filed finish of the cylinders, the smooth-finished engine cases, the polished water and fuel manifolds, and the generally perfected workmanship, worthy of attention. Every hardened part is tested on a scleroscope.

The clutch is of the multiple disc type completely enclosed, with the 39 pressed steel discs operating in an oil bath. These are engaged by a spiral spring of adjustable tension. The thrust collar is fitted with a brake that is engaged automatically when the clutch is disengaged, which effectually prevents spinning and insures the meshing of the gears without clashing. The shafts and the sleeves are designed with a view to prevent leakage of oil and to have abundant strength. The thrust races are grooved to retain the balls and eliminate noise. All the bearings are automatically lubricated when the clutch is disengaged, this increasing the life of the bearing bushings. The clutch has great power, is remarkably smooth in action, and has especially long life with freedom from renewals.

The clutch is bolted to the flywheel and is coupled to the driving shaft by a connection designed especially for this car and known as the Vera rocking clutch. This clutch takes the place of the usual universal joints in the shaft and besides compensating for every possible misalignment of the chassis eliminates the possibility of end thrust upon the driving system. This clutch is illustrated by a sketch not drawn to proportions and by reference to it the mechanism may be better understood. The slotted sleeve shown apart from the other members is bolted to the rear of the clutch casing. Into the slots are placed the blocks carried on the trunnions of the T head of the shaft member. The blocks are square-faced where they contact with the shaft member, but are rounded at the outer side, so that the shaft may be moved from side to side freely, the blocks sliding in the slots in the sleeve. The shaft may also be moved correspondingly up or down on the trunnions held by the blocks. The blocks are retained in the sleeve by the collar, which is slipped on to the sleeve and fixed by a screw that is wired to prevent it slackening.

The rear end of the shaft member is similarly formed and it is fitted into a block that has the same construction as the sleeve, this block, however, having a tapered octagonal channel through it behind the T of the shaft member. Into this channel is fitted the end of the driving shaft and this is secured by a woodruff key, a large nut and a cotter pin. Between the driving shaft and the shaft member is placed a helical spring that constantly forces the shaft member forward into the sleeve bolted to the clutch. The entire assembly is retained in a water and oil tight housing that is packed with a heavy lubricant.



Forward Section of Vera Six Chassis, Showing the Globe-Headed Torsion Tube Installed in the Heavy Cross Member, the Clutch, Flywheel and Power Plant.

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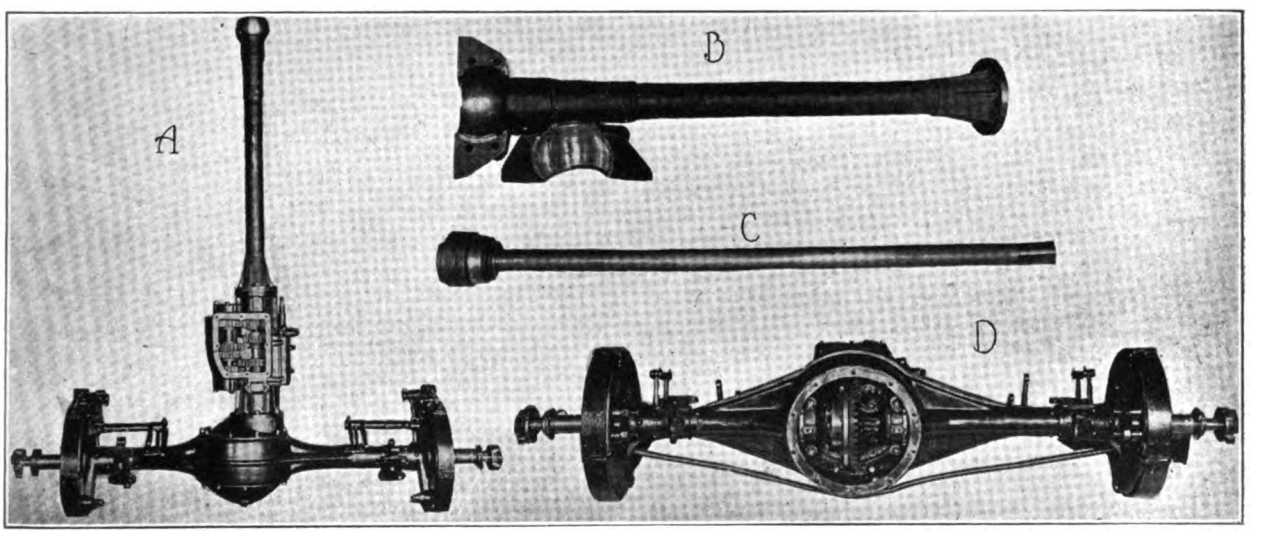
The driving shaft is carried in a very heavy steel torsion tube, on the forward end of which is attached a sleeve, the free end of the sleeve being formed as a globe with the forward side removed. At the base of this sleeve, in the torsion tube, is fitted a large, heavy-duty roller bearing. The shaft is mounted in this roller bearing and is perfectly aligned. The globe end of the assembly is mounted in a globe socket centred in a heavy frame cross member. This socket is lined with genuine babbitt metal to the depth of .25 inch and scraped to the same fit as is an engine bearing. In this socket the globe is free to move in any direction as the torsion tube is swung, but there is no play in the joint. After a test of more than 25,000 miles of driving an experimental assembly showed absolutely no wear. This socket is assembled with shims for adjustment, however, and it is always possible to maintain a perfect fit. In five minutes the assembly can be dismantled and the coupling removed. The globe is packed with grease and is always perfectly lubricated.

The rear end of the torsion tube is bolted to the transmission case, which is in turn bolted to the differential housing of the full floating rear axle. The transmission is the selective type with three forward gear ratios and reverse, and being carried in correct relation to the differential and rear axle assembly, with the driving shaft always turning at engine speed, there are no undue stresses upon the driving system. The transmission gears are large and with extremely wide faces, making for extreme endurance. There is a large cover to the transmission housing that may be quickly removed for examination of the gears and shafts.

The rear axle housing is of pressed steel, strengthened by heavy webs, and in this the differential cage is mounted on large annular ball bearings that are easily adjustable, so that the precise relation of the bevel and pinion gears may always be preserved. The differential assembly may be removed quickly should this be desirable. The driving shafts are of nickel steel and the clutches bolted and keyed to the outer ends engage with clutch members in the wheel hubs. The wheels are mounted on double sets of ball bearings on the axle housing and there is no road shock stress or strain upon the driving axles, differential, driving pinion, transmission or shaft.

On the axle housing the spring saddles are mounted so as to have slight movement, there being grease cups to afford lubrication and prevent wear of the bands retaining the saddles. Free of the springs the saddles may be moved about the axle shell. The axle relation is preserved by the torsion tube, and the driving movement of the car is always through the torsion tube against the globe and socket in the heavy cross member of the frame, which is forward of the centre of the chassis, and for that reason there is the same steadiness and absence of swing that is found in a car moving on rails. The springs are shackled at both ends and this relieves them of all driving or braking strains, the torsion tube moving easily with every wheel or chassis movement and, being in practically a straight line at all times, there is no loss of power through shaft angularity. No torsion or distance rods are necessary, the torsion tube supplying every need. Mechanically it gives a three point suspension for the entire driving system. Examination of the illustrations will evidence the simplicity and strength of the construction.

The chassis frame is of the finest pressed chrome nickel steel channel section, heat treated, with unusual depth and width, cambered at the rear for the



The Vera Driving System: A, the Complete Torsion Tube, Transmission and Rear Axle Assembly; B, the Globe-Headed Torsion Tube and the Globe Socket Through Which the Car Is Driven, Showing the Socket Divided and the Lining of Hand-Scraped Babbitt Metal into Which the Globe Is Fitted; C, the Driving Shaft and the Rear Member of the Vera Rocking Clutch; D, the Rear Axle with the Differential Casing Open, Showing the Adjustable Annular Ball Bearings and Differential Gears.

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installation of the three-quarter elliptic springs, and has great strength and resiliency. The forward spring horns are very long and the suspension is such that the body is practically within the axle centres, the 130-inch wheelbase making for extremely easy riding. The springs are of the finest electro-silico-manganese steel and are guaranteed for the life of the car. The front semi-elliptic springs are of 42 inches length and two inches width, and the rear springs are 50 inches length and two inches width.

The front axle is an I section steel drop forging and has unusual strength. The wheel spindles are large and these are fitted with three sets of annular ball bearings for the wheels. The tiebar is carried behind the axle to afford protection against road obstruction. The brakes are of large size, with external expanding shoes in drums on the rear wheels for the service brake, and contracting bands outside the drums for the emergency hand lever brake. The wheels are artillery type, of wood, 36 inches diameter, of best second growth hickory, with 12 spokes to each wheel. The tire equipment is 36 by four inches forward and 36 by 4.5 inches rear for roadster or five-passenger touring car, with 36 by four or 36 by 4.5 optional, and 36 by four inches forward and 37 by five inches rear for seven-passenger touring car, landau or suburban. The machines are fitted with Dorian demountable rims and two spare rims are supplied as equipment.

The control is by two pedals, the left being the clutch and the right the service brake, with foot accelerator and cut-out. The machine is driven by an 18-inch hand wheel on a steering column with worm gear connection, the spark and throttle levers being above the five-spoked aluminum spider of the wheel.

The body is protected by large and graceful mudguards covering the wheels, and the running boards are shielded by a skirt extending from the chassis frame. The hood is sightly and with its length gives a decidedly pleasing impression from the driver's seat. The body is large, of aluminum, of straight-line design, with a cowl that completely shields the dash. The fore and rear doors open from the back. The front doors are 19.25 inches and the rear doors 20 inches width. The front seat cushion is 17 by 41 inches and the rear seat cushion 18 by 50 inches in width and length. There is 35 inches space between the seats.

The upholstery is of Strauss' hand-buffed leather, grain or pebble or dull or satin finish. The cushions are nine inches depth and the back may be either eight or 10 inches depth. Any reasonable option is given as to body detail and finish. The standard body color is brewster green with a fine French gray stripe. The body hardware is all nickelled and black enamel, the footboard and running board bindings being nickel.

Under the rear seat at the back of the body is a storage compartment in which may be carried the tools, spares, etc., and at the back of the tonneau are carried the extra shoes and rims, leaving both running boards free. The gasoline tank is installed under the front seat and has 20 gallons capacity.

The equipment of the car includes a silk mohair top, complete electric lighting system, windshield, Warner auto-meter, Disco self-starting system, power tire pump, robe rail, foot rail, and the usual tools and tire repair kit.

NEW MOTORING LAW IN MAINE.

The Maine Automobile Association of which John C. Scates, Westbrook, Me., is secretary, has prepared a booklet containing valuable information concerning the new motoring law in that state, which went into effect Jan. 1. This book is free to those who make request, and should be in the hands of those who anticipate touring in that commonwealth during the coming season. The features of the law, which appeal to non-resident motorists, may be described briefly as follows:

Non-residents are allowed 30 days in the state without registering their cars, providing the operator is licensed and the car registered in another state and number plates are displayed. If they remain longer than 30 days they are subject to the same registration fees as residents. In the open country the speed limit is 25 miles an hour; in the built-up portion of a city, town or village, 10 miles, but the speed at all times must be reasonable and safe, having due regard to the traffic and the use of the road by others. When passing a team, the car must come to a stop if the occupant of the team raises a hand. Where there are legally erected danger signs on the right hand side of the road, bearing the legend, "Automobiles, Go Slow," speed must be reduced to five miles an hour.

PEORIA CLUB IS ORGANIZED.

Motorists in Peoria, Ill., organized the Peoria Automobile Club in that city, March 10, with the following temporary officers: Chairman, E. J. Case; secretary, Willis Evans; committee on bylaws, R. H. Johnson, S. K. Hatfield, Thomas H. Webb, Frank Miller and Carl Block. The new club will take an active interest in the promotion of good roads, particularly in Peoria, Lacon, Varna, Wenona and Chillicothe.

NEWARK INDUSTRIAL EXPOSITION.

The Board of Trade in Newark, N. J., is planning to hold a monster industrial exposition in that city, May 13-25. It is claimed that 100,000 different articles, including automobiles, parts and supplies, are manufactured in the 3000 shops of Newark's industrial district, and the object is to bring these directly to the attention of the general public in this manner. The committee in charge of the arrangements is composed of the following: Curtis R. Burnett, Thomas A. Edison, Franklin Murphy, Forrest F. Dryden, Frederick Frelinghuysen and Thomas M. McCarver.

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INJUSTICE OF AUTOMOBILE TAXATION.

APROPOS of the recent special message of Gov. Foss of Massachusetts, asking the Legislature of that state to increase the registration fees from 38 to 80 cents a horsepower, which already has been followed by the preparation of a bill embodying the governor's recommendations, the following communication will prove of interest. The writer is a resident of Springfield, Mass., who spends his winters in the South:

Editor, Automobile Journal—

Ever since the automobile was introduced, the owner of it has been subjected to "graft" in every conceivable way. Many ingenious laws were passed to authorize and encourage a sort of legal highway robbery by disgraceful trapping, and country constables and old fogy justices were in many cases, it was alleged, in secret partnership in holding up automobilists on most trivial technicalities, and although entirely innocent of any endangerment of the public safety, were fined outrageously. Over-charging at some hotels, and for anything they wished to buy, was common practise. Then a former governor of Massachusetts, wishing to curry favor with the farmers, who were at first "agin" automobiles, though they are now buying them, proposed to heavily tax the machines for use of the roads, while at the same time taxing them for their property value. The tax thus exacted amounts to one-tenth of all the taxes collected by the State of Massachusetts! And yet this is not thought to be the limit of endurance, for the present governor proposes to increase this tax 2.5 times more!

It is time for automobilists to demand some sort of fair-minded justice, and if they are to be taxed for the maintenance of the highways, it is no more than right that all other vehicles shall be taxed in reasonable proportion. That horses and steel-tired vehicles do great injury to the roads is well indicated by a communication which the late Horace Parks, the sage of Russell, Mass., sent to the newspapers in 1901, which was before automobiles were seen oftener than once a month, complaining that the macadam roads were rapidly wearing out Later, after the automobile appeared, the entire blame for destroying the roads has been wrongfully placed upon those vehicles. But that man is wilfully blind who cannot see that a pair of horses, with shoes having 24 steel calks, purposely sharpened to dig into the surface of the road to give necessary pulling power when drawing a heavily loaded wagon, with steel tires, grinding into dust the particles of stone which have been loosened by the steel points on the horses' shoes, are doing destructive injury to the road. Then comes the automobile, which blows the dust away, or pushes it back—though not by suction, be it understood, for there is absolutely no injurious suction to an automobile tire—and thus the surface of the road wears out.

But it is unjust to impose the whole burden of maintaining the highways of the state on automobilists, who are not, I am grieved to say, all millionaires. And then, if one takes his automobile to Florida, for instance, for the winter months, he is called upon to pay another tax to support the highways in that state. It will soon be that only millionaires can run automobiles. Instead of taxing one sort of vehicles, not more destructive of the highways than some others, to maintain the roads of the state, let all be taxed in just proportion. Otherwise, the automobile tax becomes graft.

The former chairman of the state board of highway commissioners, Mr. McClintock, once declared that an automobile passing over a highway at not more than 15 miles an hour, did no more harm to the road than a man walking over it. And this is undoubtedly true. It is equally true that not much more harm is done to the road at a speed of 20 miles an hour, and it is only at speeds exceeding 25 miles an hour, that any very serious damage is done to a well built highway. It must be admitted that on a dirt road about the only harm an automobile does is to splash the mud out of all hollows much faster than narrow tires do.

It is just as reasonable to demand that all vehicles using the highways shall be taxed for their maintenance, as it is that any one kind shall be taxed for such purposes, since all are doing a share in wearing them out. Why should an automobile truck, carrying a load of freight, be taxed $20 or $30 a year for use of the highway, while a pair of horses, drawing the same amount of freight, and unquestionably doing equal damage to the roadbed, go free? If automobiles are to be taxed for maintaining the highways of the state, because their owners are supposed to be fit subjects for graft, and the owners of other vehicles are not, let the fact be acknowledged and the injustice admitted.

MARCUS H. ROGERS.

Daytona, Fla., March 10.

MAXWELL WINS IN ARGENTINA.

Word has been received from Buenos Ayres, Argentine Republic, that Juan Yrigoyen, driving a Maxwell car, made by the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., a constituent of the United States Motor Company, New York City, has won the national automobile endurance run of that country. This event was held under rules similar to those which governed the so-called Glidden tour in this country in 1911. It will be remembered in this connection that the Glidden trophy was won by a team of Maxwell cars last year.

Mr. Yrigoyen made a perfect score in a contest of eight days' duration, competing against skilled drivers and some of the best known cars in Europe and America. The route included no hills, but encircled a large area comprising swamps and rough roads, many of which had never been traversed by motor cars. The contest was conducted by the Argentine Motor Club.

WILL TEACH KNIGHT MOTOR.

Following the adoption of the Knight motor by the makers of the Columbia, Stoddard-Dayton, Atlas and Stearns cars in this country, several automobile schools throughout the country have decided to add a course of instruction in this type of engines. One of the latest to make announcement of this nature is the Y. M. C. A. school in Boston, having an enrollment of 800 students and 14 instructors. J. H. MacAlman, distributor of Columbia-Knight cars in that city, has arranged to place all of the necessary equipment of motors and chassis at the disposal of the school and to provide experts to assist in the lecture and shop work.

LUBRICATING THE MOTOR.

The Joseph Dixon Crucible Company, Jersey City, N. J., is issuing a booklet entitled, "Lubricating the Motor," and the brochure teems with interesting hints upon the function performed by several lubricants. The advantages derived from utilizing graphite are clearly outlined as well as its employment in the transmission and other working parts of the car.

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MOTORING NEWS OF NATIONAL IMPORT.

South Much Interested in Racing as Result of Montgomery Meet---Many So-Called Minor Shows Occupy Attention of Dealers in Various Sections---Want National Display in Detroit This Summer.

The first sanctioned track races of the year were held at Montgomery, Ala., under the auspices of the Alabama Automobile Association during the early part of the month. Representatives of eight manufacturers took part, and in the nine events, cars made by the Studebaker Corporation were victors eight times. Three drivers, Lundgren, Cohen and Odom, all of Atlanta, with two 30 horsepower E-M-F machines and one 20 horsepower Flanders, thus secured all but one race.

Henry Cohen, with the E-M-F which won the Tiedeman trophy over the Savannah course last fall, was the largest winner, taking four events, including free-for-alls in which he defeated the Stutz, Oldsmobile, Buick and Overland entrants. Lundgren, driving a Flanders, won three races, a free-for-all handicap, and two class events. Odom's E-M-F won the big 50-mile event in 52:37.

The success of the Montgomery meeting has caused a revival of interest in automobile racing in the South, and already applications for sanctions have been received from Birmingham, Memphis, Nashville, Macon and other cities. It also is understood that Atlanta is anxious to see the speedway reopened and that a new management is expected to hold a number of meets thereon during the coming summer.

LARGE TENT HOUSES SPLENDID DISPLAY AT INDIANAPOLIS.

The Indianapolis Automobile Trade Association, Indianapolis, Ind., tried the plan of holding a special "opening" week at the various agencies last year, and thought they liked it much better than an organized show. This year the same scheme was adopted, and business was stimulated early in the season, but for some reason it was decided to resume the old order of things. Accordingly, the annual exhibition of the association was opened in a tent, bordering University Park, March 23, and will continue until the night of March 30.

As is well known, the manufacturers in Indiana have been active in exploiting the machines produced in that state, and they assisted the local association materially in planning the display which will hold the attention of the people in Indianapolis and vicinity during these seven days and nights. Ample space has been provided in a tent covering three city blocks from curb to curb. The canvas used measures 38,000 yards. Seventy-nine poles from 20 to 22 feet in height support the centre column, and 400 side poles, 10 feet high, are required for the guide ropes. The services of 18 expert canvas men were required for two days in making the tent ready for erection.

Those who are making display of cars are: American Sales Company, American; Archey-Atkins Company, Pierce-Arrow, Hudson, Detroit electric; Conduitt Auto Company, Peerless; Capital Garage Company, Lion; Buick Motor Company, Buick; J. I. Case Threshing Machine Company, Case; Cadillac Auto Company of Indiana, Cadillac; Carr's Auto Palace, Little Giant truck; Fisher-Gibson Company, Stearns-Knight, Stoddard-Dayton-Knight, Flanders electric, Everitt, Brush, Overland, Fiat, Empire; Finch-Freeman, Marathon, De Tamble, Service truck; Ford Moter Company, Ford; Avery Company, Avery truck; Waverley Company, Waverley electric; Walker Electric Company, Walker electric truck; Frank P. Fox, Pope-Hartford; Hearsey-Willis Company, Mitchell, Hupmobile; Henderson Motor Sales Company, Cole; Haynes Automobile Company, Haynes; Indiana Auto Company, Reo, Penn, Chalmers; Ideal Motor Car Company, Stutz; International Harvester Company, International wagon; Auburn Auto Company, Auburn; Empire Auto Company, Empire; Baker Electric Sales Company, Baker electric; Morton Place Auto Company, Moline; Motor Car Manufacturing Company, Pathfinder; Merchants' Electric Auto Company, Woods electric, Westcott, Kelly truck; McFarlan Six Sales Company, McFarlan, Whitesides truck; Mais Motor Truck Company, Mais truck; Nordyke & Marmon Company, Marmon; National Motor Sales Company, National; O. B. Jameson, Staver; Premier Motor Sales Company, Premier; Rinne & Pfaff, Lambert; Frank Staley Company, R-C-H; Studebaker Bros. Company, E-M-F, Flanders; Sterling Motor Car Company, Paige-Detroit, Firestone-Columbus; State Auto-Company, Marion, K-R-I-T; United Motors Indianapolis Company, Columbia-Knight, Maxwell.

Motorcycle exhibitors are: Merkel Motorcycle Company, Merkel; H. L. Dipple, Harley-Davidson; George C. Detch Wheel Company, R-S, Pierce, Pope; G. H. Westing Company, Indian; Gus Habich, Excelsior, Thor; Flanders Motorcycle Company, Flanders.

Other displays include the following: R. J. Irvin Company, bodies and tops; Hide, Leather & Belting Company, accessories; National Refining Company, lubricants; Auto Lighting & Electric Company, lighting systems; Acme Foundry Company, castings; Frank S. Feeser Company, lighting systems; Fisher-Gibbons Company, sundries; B. E. Griffy Company, advertising novelties; Guarantee Tire & Rubber Company,

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tires; Haywood Tire & Equipment Company, vulcanizing outfits; Hearsey-Willis Company, accessories; Henry Manufacturing & Grease Cup Company, grease cups; International Metal Polish Company, metal polishes; Indianapolis Top & Rubber Tire Company, tops; General Oil Works Company, lubricants; Electric Light & Starter Company, self-starters; Indianapolis Brass Company, brass goods; Motor Starter Company, self-starters; Motor Accessories Company, accessories; Charles H. Moore Company, lubricants; Irwin Robbins Company, bodies; Pumpelly Battery Company, batteries; Wyoming Lubricating Spring Company, springs; Sanborn Electric Company, electrical supplies.

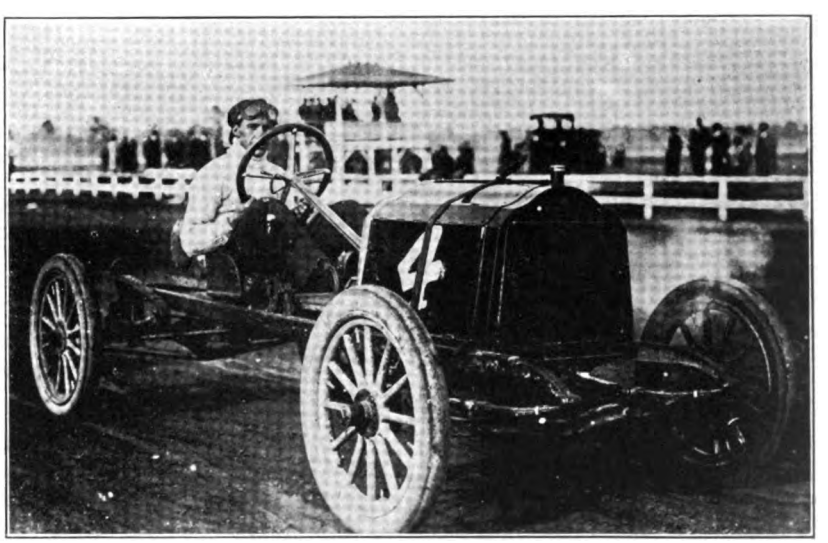
CROWDS FILL STATE ARMORY AT LOUISVILLE'S EXHIBITION.

Twelve sales were reported by one dealer the first night of the fifth annual show of the Louisville Automobile Dealers' Association, in the state armory at Louisville, Ky., March 7-10. There were scores of others. In fact, this proved to be a fair indication of what was to be expected as a result of the exhibition and the business transacted was far in excess of any previous year.

The decorative scheme was that of a garden enclosed by stone walls, and lower walls of the same nature were utilized to mark off the various exhibits. Potted plants and flowers were placed along these at intervals, and vines were disposed to still further accentuate the garden effect. Hanging brackets were suspended from the ceiling.

Despite the poor weather, large crowds attended the event daily, and in every respect it was the most successful display the Louisville dealers have experienced. The show committee was composed of the following: President Prince Wells, Vice President Edward G. Reimers, Secretary-Treasurer Philip S. Longest, Ira S. Barnett, Lee Miles and Frank Glenn.

Cars were displayed as follows: J. I. Case Threshing Machine Company, Case; Radcliff Motor Car Company, Cole, Stevens-Duryea; Thomas Garage, Winton; Inter-State Motor Car Company, Inter-State; Longest Bros., Longest trucks; Urwick Motor Car Company, Marmon, Hudson, Baker electric; Ruby Carriage Company, Mitchell; Kentucky Wagon Manufacturing Company, Urban electric; Layman Motor Car Company, R-C-H, Buick; Prince Wells Company, Rambler; Glenn-Bauer Motor Car Company, Pierce-Arrow, E-M-F, Flanders, Broc electric; Waverley Electric Company, Waverley electric; Reimers Motor Car Company, Locomobile, Ohio electric; Oldsmobile Company, Oldsmobile; Hite D. Bowman, Stearns-Knight, Rauch & Lang electric, Chalmers; Kentucky Electric Company, Kentucky electric trucks; Wieland Motor Car Company, Elmore; Yager Motor Car Company, Peerless, Hupmobile, Columbus electric; Rommel Bros, White, Brush, Marathon; Ford Motor Car Company, Ford; Wilder Motor Car Company, Everitt; Miles Auto Company, Packard, Detroit electric; Kentucky Auto Company, Cadillac, Standard electric; Transit Motor Car Company, Stanley steamer, Alco truck; Glossbrenner Commercial Car Company, Overland.



Twenty Horsepower Flanders Car, Driven by Lundgren with Splendid Success at Montgomery, Ala.

Accessories were shown by: Kentucky Electric Company. electric fittings; Louisville Automobile Supply Company, general line; Levy Bros., clothing; Andrew Cowan & Co., Polarine oils; James Clark & Co., Remy magnetos; Wayne Oil Tank & Pump Company, Wayne storage systems; Racine Auto Tire Company, tires; Moran Flexible Steam Joint Company, brass goods; Aull Sides Klean Company, sundries.

FIRST VIRGINIA SHOW MEETS WITH SUCCESS IN NORFOLK.

The recently organized Norfolk Automobile Trade Association held its first show, which also was the initial exhibition of motor cars in Virginia, in the Fergus Reid building, Norfolk, Va., March 11-16. Fred H. Reh of the Washington Decorating Company was in charge of the work of transforming the interior of the structure for the occasion, and this was accomplished by a liberal use of bunting, flowers and electrical effects. The display was well attended and the result was one which gives abundant reason for expecting a splendid year's business throughout the entire commonwealth.

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Those who displayed cars were: Ball & Co., Pierce-Arrow, Stoddard-Dayton-Knight, Kline-Kar, Franklin, Buick; A. Wrenn & Son, Cadillac, Wrenn, Modern truck; Coburn Company, E-M-F, Flanders, Thomas, Brush; Tidewater Auto & Garage Company, Locomobile; C. E. Wright & Co., Overland, Marmon; Chalmers Agency of Virginia, Chalmers; Bell Motor Company, Ford, Spoerer; Reliance Electric Company, Waverley electric; Southern Electric Light & Supply Company, Detroit electric; New York Auto Exchange, R-C-H; Mitchell Agency of Norfolk and Plymouth, Mitchell; International Harvester Company, International truck; C. M. Bayne, Case; E. L. Myers, Maxwell; W. O. Daughtridge, Oakland; Reo Truck Agency, Reo truck; Virginia Auto & Garage Company, Paige-Detroit, Oldsmobile.

Accessories were shown by: Bell Motor Company, Reliance Electric Company, Southern Electric Light & Supply Company, New York Auto Exchange, E. E. Guy's Sons, Standard Oil Company.

ROCKY MOUNTAIN DISTRICT EXPOSITION IN DENVER.

The 11th annual Denver automobile show, termed the Rocky Mountain district exposition this year, was held in the Auditorium, Denver, Col., March 12-16, under the management of G. A. Wahlgreen. Special rates were granted on all railroads coming into the city, these tickets being good until March 20, and as a result the attendance was drawn from a large section of the state, and parts of Kansas, Wyoming, New Mexico and Utah, as well.

A particular feature of the exhibition was the attention paid to commercial vehicles, this being the first show in the Rocky Mountain district in which an effort was made to segregate this type. Several demonstrators were on the ground and every effort was made to convince the visitors of the practicability of the motor truck for industrial purposes. As a result much business was transacted in this field.

Among those who made display of pleasure cars were: Tom Botterill, Pierce-Arrow, Hudson, Columbus electric; Havens Bros., Dorris; Elmore Automobile Company, Elmore; McDuffee Motor Company, Chalmers, Stearns-Knight; W. W. Burnett, Stoddard-Dayton-Knight, Alco; Metzger Motor Car Company, Everitt; Mead Company, White; Voss Rubber Company, Mercer; J. I. Case Threshing Machine Company, Case; Colburn Auto Company, National, Colburn, Glide, Rauch & Lang electric; Charles Blitz, Franklin; Matthewson Automobile Company, Locomobile, Oakland, Reo, Premier, Ohio electric; A. T. Wilson, Mitchell; Western Motor Company, Abbott-Detroit, Marion; Inter-State Automobile Company, Inter-State; Fernald Automobile Company, Maxwell, Columbia-Knight; Felker Automobile Company, Bergdoll, Stevens-Duryea, Waverley electric; Studebaker Auto Company, E-M-F, Flanders; Alkire Motor Company, Thomas, Midland; John Deere Plow Company, Velie; Stanley Motor Car Company, Stanley steamer; Cole Motor Company, Cole; E. R. Cumbie, Rambler; Fritchle Automobile Company, Fritchle electric; W. E. Dineen, American; E. W. Swanborough, R-C-H, Hupp-Yeats electric; Maxwell-Chamberlain Motor Company, Haynes, Peerless; Overland Automobile Company, KisselKar, Overland, Baker electric, Apperson, Winton, Brush.

Commercial types were shown by: Havens Bros., Kelly; W. W. Barnett, Alco, Federal; Mead Company, White; Charles Blitz, Chase; Tom Botterill, Pierce-Arrow; Fernald Automobile Company, Sampson; John Deere Plow Company, Velie; Maxwell-Chamberlain Motor Company, Peerless; Overland Automobile Company, KisselKar, Seitz.

Motorcycles were represented by: Hendee Manufacturing Company, Indian; W. W. Whiting, Harley-Davidson; Mead Autocycling Company, Excelsior.

The following exhibited accessories: Auto Equipment Company, Denver Auto Goods Company, Fry & McGill, Boss Rubber Company, Colorado Tire & Leather Company, Regent Tire Company, Continental Oil Company, Gould Storage Battery Company, Jackson & Wood, Denver Rock Drill, Mann-Aldrich, Denver Auto School, Byron Motor Truck Company, Better-Than-Air Tire Filler Company, Brackett Welding Company.

TWO BUILDINGS NECESSARY TO HOUSE SYRACUSE DISPLAY.

Fifty-five different makes of machines were displayed by 35 dealers at the fourth annual show of the Syracuse Automobile Dealers' Association, Syracuse, N. Y., March 12-16. Two buildings, the State Armory and the Alhambra Auditorium, were necessary to house the exhibition, and the attendance was particularly pleasing.

The interior of the armory was transformed by the use of a blue canopy ceiling and lattice work entwined with smilax. Festoons of electric lights helped to make the scene brilliant and attractive. The auditorium was treated similarly, but more in the nature of a woodland setting, in which numerous canaries were disposed to add to the realistic impression.

Pleasure cars were to be seen at the following booths: H. A. Moyer, Moyer; Kerr-Doane Motor Company, Amplex, Everitt, Velie; C. Arthur Benjamin, Packard, E-M-F, Flanders; F. P. Anderson, Alco, Hupmobile; Overland Syracuse Company, Overland, Garford; T. A. Young, Peerless, R-C-H; A. M. Zimbrich, Stoddard-Dayton-Knight; United Motor Syracuse Company, Columbia-Knight, Maxwell; J. H. Valentine Company, Paige-Detroit, Chalmers, Brush; W. R. Shaw, Rambler, Reo; W. King Smith Company, Stearns-Knight, Moon; Willis Motor Car Company, Oldsmobile, Oakland; Syracuse Motor Car Company, Ford; Genesee Motor Car Company, Cadillac; H. H. Franklin Manufacturing Company, Franklin; Buick-Keating Garage, Buick; J. L. Youman, Mitchell; James Auto Company, Stevens-Duryea; A. A. Lederman Company, Pierce-Arrow; National Motor Sales Company, National; Hazard & Ryan, Michigan; L. H.

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Leonard, K-R-I-T; J. I. Case Threshing Machine Company, Case; American-Cole Sales Company, American, Cole; Abbott-Detroit Sales Company, Abbott-Detroit; Souter & Tuttle, Jackson; H. B. Conkling, Elmore; W. F. Horton, Marathon, Bergdoll; Wightman & Rich Company, Winton; Acme Garage, Pullman; Brighton Garage, Detroiter; Sabine Auto Company, Cutting; Syracuse Regal Company, Regal.

Commercial cars were shown by: Sanford-Herbert Company, Sanford; C. Arthur Benjamin, Packard; Buick-Keating Company, Buick; Syracuse Motor Car Company, Ford; Genesee Motor Car Company, Mack; F. P. Anderson, Alco; Chase Motor Truck Company, Chase; W. E. Hookway Motor Truck Company, G. M. C.; Overland Syracuse Company, Overland.

Motorcycles were displayed as follows: Olmstead & Co., Indian; Potter Company, Harley-Davidson; A. H. McGraw, Thor, Excelsior.

Accessory exhibitors were: Syracuse Rubber Company, sundries; Loggie Bros., Miller tires; Standard Oil Company, Polarine oils; F. H. Aubeuf, headlight brackets; Wayne Oil Tank & Pump Company, Wayne storage systems; Hoyt & White, tops and seat covers; J. H. Valentine Company, Hanna self-starters; E. Q. Williams, ignition apparatus; Syracuse Auto Supply Company, sundries; Ignition Starter Company, Disco starters; Jones & Pimm, tops.

CEDAR RAPIDS DEALERS HOLD THIRD ANNUAL EXHIBITION.

Every inch of available space provided by the Cedar Rapids Automobile Dealers' Association in the Auditorium at Cedar Rapids, Ia., for its third annual show, March 12-16, was filled with representatives of the 1912 models and accessories. Ferns, palms and artificial flowers were combined with American flags and bunting, in transforming the interior of the building for the occasion. The attendance was much larger than in former years and the business transacted was quite satisfactory in every respect. As usual many visitors were present from other sections of the state.

Cars were shown by the following: Moline Auto Company, Moline; Courtney Motor Car Company, Ford, Abbott-Detroit; Miller Auto Company, Buick, Marquette; Cedar Rapids Auto & Supply Company, Hudson, Reo, Chalmers, Maxwell, White, Michigan, Stoddard-Dayton-Knight, Waverley electric; Schreiber Auto Company, Staver; Iowa Auto & Tire Company, Cadillac; Foy Automobile Company, Overland, Regal; Fawcett-Russell Company, Everitt, E-M-F, Flanders, Garford; Barton-Ford Motor Car Company, Velie, Detroit electric; Bunting Auto Company, Oakland; Windsor Hotel Garage, Thomas; Mitchell Auto Company, Mitchell; M. V. Bolton, Hupmobile.

DISCUSSING POSSIBLE NATIONAL SHOW IN DETROIT.

Automobile manufacturers and others in Detroit are actively engaged in the promotion of a national show for that city to be held next fall, and while plans already have been made for two exhibitions of this character in New York and Chicago next January and February, following along lines which have been in vogue for a number of years, there is disposition on the part of some makers to advocate that the Detroit display take the place of the other two. In discussing this phase of the situation recently, R. C. Hupp, president of the R-C-H Corporation expressed himself as follows:

"The 1912 show season which has just been closed with the Boston show has brought home more forcibly than ever the necessity of a readjustment of the whole proposition, insofar as the manufacturers are concerned. There are but few makers who have not announced their models for the following season by July 1. The new models usually are in the hands of the dealers within 60 or 90 days thereafter, at the outside. They are discussed in the motor car publications and in the newspapers, and by late summer or early fall the public is thoroughly familiar with them when the show season opens in January.

"From the viewpoint of the manufacturer, it would be infinitely better to have a central show some time during July. I believe in Detroit, because of the fact that it is the centre of the motor car industry, and on account of its excellent geographical location it is the logical place. It would, of course, be necessary to erect a large building, designed especially for the purpose. This could be arranged so that all of the cars could be displayed on one floor and nothing but cars should be shown.

"Coming in July, when the best of the selling season is over, such a show doubtless would attract more dealers than all the other large exhibitions combined. I believe it would be a good idea to have the management in the hands of the manufacturers, each factory to be represented equally on the board of control.

"As it stands now, motor car manufacturers practically are compelled to exhibit in the larger shows, when, as a matter of fact, they are retail propositions. The expense, insofar as the manufacturer is concerned, is so greatly in excess of the benefit obtained therefrom as to constitute a serious problem. By making the big central show strictly a dealers' proposition, the expense to the factories would be reduced to a minimum, or perhaps, if properly managed, it could be made to return a good profit.

"This is not intended as a criticism of the large shows that are held each year. They have their value, and while I believe it would be a better proposition from a retail point of view to have them just before the spring opens instead of in the winter, this is a matter that is governed largely by local conditions. I earnestly hope that the present movement to build a large exposition hall in Detroit will be successful.

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ALMOST UNIVERSALLY USED IN FRANCE

SHOCK ABSORBER



THE RAGE IN ENGLAND

LEARN AT OUR EXPENSE

how to get the maximum of comfort and wear out of your car

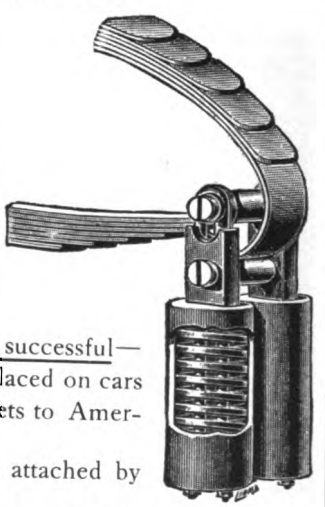
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give you greatest comfort, because they prevent jolting and jarring from stones, ruts, car-tracks; swaying and rocking from uneven roads, when traveling at good speed;

save expense, because your tires are kept on the ground, do not whirl at high speed in the air to be suddenly slowed upon return to the road and consequently the "J. M." increases largely your engine efficiency as well as tire service.

Note that the "J. M." is not a "rotary friction" shock absorber—and is not to be confused with the devices embraced in the recent decision of the Court of Appeals.



Experience in Europe has proven that the "J. M." is the most successful—and most efficient—shock absorber. Tens of thousands have been placed on cars abroad—and the highly satisfactory results led to the sale of many sets to Americans before we had any branches in this country.

Made in three models—applied to any car whose springs are attached by means of shackles. **Prices $35 to $50.**

Try it on your car—don't pay us a cent till it proves our claims. Send coupon below pinned to your business letterhead for booklet D and full information on this offer. Mention the name, model, weight and width of rear springs of the car you run.

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DEALERS — GET OUR ATTRACTIVE TRADE PROPOSITION
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THE SOURCE OF EMERY.

There is a romance attached to the production of emery of which very few people are aware. It was for a long time brought from the Island of Naxos in the Grecian archipelago, the Greek government having granted a monopoly of its trade to an English merchant. In 1847, Dr. J. Lawrence Smith, an explorer in the employ of the Turkish government, discovered large deposits of the mineral at various points in Asia Minor, and the English monopoly was broken and prices greatly reduced. Since that time, deposits of emery have been found in the Carolinas, Georgia and Montana. The supply in these places, however, is too small to compete with the older fields.

Emery is ore of iron, found in opaque grayish black or blue lumps, and is prepared for use by crushing in a stamp mill, and then passing the powder through different degrees of fineness. Fifteen to 20 large wheels for external grinding are used by the Remy Electric Company, Anderson, Ind., in the manufacture of magnetos and electrical supplies each year. A small wheel for internal grinding revolves 50,000 times a minute, and a new one is required each day.

CITY MAY REGULATE SPEED.

The legal department of the city of Minneapolis, Minn., has decided that the law of Minnesota does not impair the right of the municipality to enact ordinances regulating the speed of automobiles and forbidding them the use of certain streets. The opinion states: "The city has the right to regulate traffic and the use of its streets. This is necessary for public safety and the last Legislature never intended to take the power away. The provision forbidding general regulation was made to prohibit unreasonable ordinances in small cities where prejudice might exist against automobiles. Of course, this opinion is subject to possible revision by the courts, but it would appear that the Legislature failed to made its intention fully clear in this instance.

MASSACHUSETTS' LEGISLATIVE RESULTS.

By a vote of five to 14, the Massachusetts Senate has refused to substitute the bill prepared by Mayor Fitzgerald of Boston, allowing that city 25 per cent. of all the fines collected from automobilists in that city. The lower house, by a vote of 12 to 46, also refused to substitute for an adverse committee report the bill requiring owners of automobiles to make a deposit of $5000 as a guarantee for damages when making application for registration. The committee on roads and bridges has instructed a sub-committee to draft a bill embodying the views of Governor Foss in a special message recommending an increase in automobile fees from 38 cents a horsepower to at least 80 cents. This is expected to increase the revenue for highway improvement by about $1,000,000.



COMING EVENTS.

March.

March 25-29—Show, Manchester, N. H.
March 25-30—Show, Indianapolis, Ind.
March 27-31—Show, Waterbury, Conn.
March 27-April 2—Show, New Bedford, Mass.

April.

April 8-13—Show, Oswego, N. Y.
April 8-13—Show, Birmingham, Ala.
April 27—Speedway meet, Los Angeles, Cal.
April 27—Roadability run, Philadelphia, Penn.
April 29-May 4—Show, Burlington, Vt.

May.

May 4—Road race, Santa Monica, Cal.
May 14-17—Commercial car trials, Chicago, Ill.
May 17-18—Track races, Denver, Col.
May 30—Track events, Salem, N. H.
May 30—500-mile race, Indianapolis, Ind.

June.

June 6—Reliability run, Washington, D. C.
June 20—Algonquin hill climb, Chicago, Ill.

July.

July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach meet, Old Orchard, Me.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex
Aug. 23-24—Road races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.

NOVICE'S SUCCESS WITH FLANDERS.

G. A. Gilman of Phoenix, Ariz., had never driven a car previous to the afternoon on which he appeared at the headquarters of the Arizona Motor Car Company in that city and purchased a 20 horsepower Flanders, made by the Studebaker Corporation, Detroit. This did not deter him from driving the machine home, after which he packed his suit case and set out across the desert for San Diego, Cal. He arrived at his destination in less than four days, which is considered excellent time over a section of the country which is shunned usually by experienced drivers. Not even a tire puncture marred his first long distance ride.

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TAXING THE AUTOMOBILE.

Judging from the position outlined in the special message of Gov. Foss of Massachusetts, asking that the Legislature at least double the registration fee in that state, the motorists who have been clamoring for good roads are to be compelled to bear the entire expense of such improvement. Gov. Foss is not alone in his opinion, since throughout the length and breadth of the land there appears to be a general impression that the wisest course to pursue is that of raising the necessary funds by automobile taxation. Moreover, the Governor seems to have struck a responsive chord among the legislators, as was perhaps to be expected, and the committee on roads and bridges has prepared a bill meeting with his recommendations.

Inasmuch as increased registration fees do not lessen in any degree the amount of property tax imposed upon the owner of an automobile, whether it be of the pleasure or commercial type, it readily is seen that the motorist is obliged to submit to a double taxation. He shares with all others in the expense of maintaining state departments, excepting that of highways, and this leads to the suggestion that he alone is to be held responsible for construction and maintenance in this particular field. Massachusetts expects that the increased registration fees will place nearly $1,000,000 extra at its disposal for this purpose.

Charles Thaddeus Terry, counsel for the American Automobile Association, at a hearing before the New York State Legislature, recently declared that the whole system of collecting money from automobile owners for highway improvement was unconstitutional, and that motorists were inclined to submit to it only because of their interest in good roads. He hinted in no uncertain terms that there was a limit to this good nature, however.

It would appear that his remarks were decidedly timely, and that they might apply with equal force in Massachusetts and elsewhere. The public is beginning to realize in a measure that the motor vehicle has an economic value, and as such its development is of direct personal interest to all. This view undoubtedly applies more particularly to the commercial type, but there is no disposition to differentiate between types in applying the tax. In fact, it may even be regarded that horse drawn vehicles reap a decided benefit from good roads. No matter what the viewpoint, the policy of making the motorist bear the sole expense is wrong, and sooner or later he will be compelled to make known his determination that he intends to submit no longer.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

MORE CAREFUL DRIVING.

The growing tendency of owners and drivers of motor vehicles to give considerable time to the careful study of the mechanical construction of their cars has been the subject of much comment of late. This is a result for which manufacturers and motoring magazines have been working for some time. In its last analysis, it will mean more careful driving and a decidedly lessened number of accidents.

A large proportion of the pleasure of motoring lies in the feeling that one is complete master of the machine; that all its parts are known, and that they respond to the touch as readily as if they realized who was at the wheel. It is not surprising, therefore, that owners and drivers are beginning to realize how valuable this knowledge is to them.

There is little question that careful attention to

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the details will mean a large saving in repair bills. The same thing applies to the care of tires and other equipment. The day is past when it was considered necessary to dispose of the old model at the end of the season in order to secure another of later design. Proper care not only results in reduced maintenance expense but in minimized deterioration, thus prolonging the life of the car.

In the matter of careless driving, there has been too much risk in the past. A more thorough knowledge of the machine means a better understanding of what it is called upon to accomplish. With this knowledge comes the desire to avoid mishaps, and the needless expense which they occasion.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

BOSTON'S FIRST TRUCK SHOW.

As was to be expected, the attendance at the first commercial vehicle show in Boston was by no means as large as that which passed through the doors of Mechanics' Building during the 10th annual display of pleasure cars. But in this respect, it far exceeded that of so-called national exhibitions in New York and Chicago. The business transacted is sufficient indication that the people who viewed the initial assembly of industrial transports in New England were prepared to purchase.

Doubtless, few persons who attended the display had any idea of the large number of makers engaged in this field. In fact, it was freely commented upon during the show, even by those who considered themselves more or less well informed, that the matter of making selection was by no means as easy as they had been led to suppose.

Particular attention was paid to the matter of body design, a feature which might be expected to make a decided appeal in this territory. New England, from which the attendance was drawn, is essentially a manufacturing community, and the varying requirements of its industries call for specialized efforts on the part of the body designer. In this respect, at least, the Boston show was in a separate class.

Those makers, who, at New York and Chicago, contented themselves with presenting a chassis simply, felt compelled to utilize their space by adding several body types, and the result was a much better representation of the industry as a whole. It is interesting to note, however, that many of these bodies were the product of makers who specialize in this particular field.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

THE BUSINESS SITUATION.

The entire estimate of the business to be transacted by the automobile industry throughout the coming season must be revised as a result of the recent Boston show. No one occurrence in the history of motor car manufacturing has caused more surprise than the fact that over $2,000,000 worth of cars were sold in that city during one week. And this is expected to have a decided bearing upon the situation throughout the entire country.

The splendid success of the Boston display has overshadowed for the moment the long list of so-called minor shows which have been staged this year, but it should not be forgotten that in practically every instance these have served to stimulate business in a remarkable degree. There appears to be reason for suggesting that the demand for cars is to be much more pronounced than ever before.

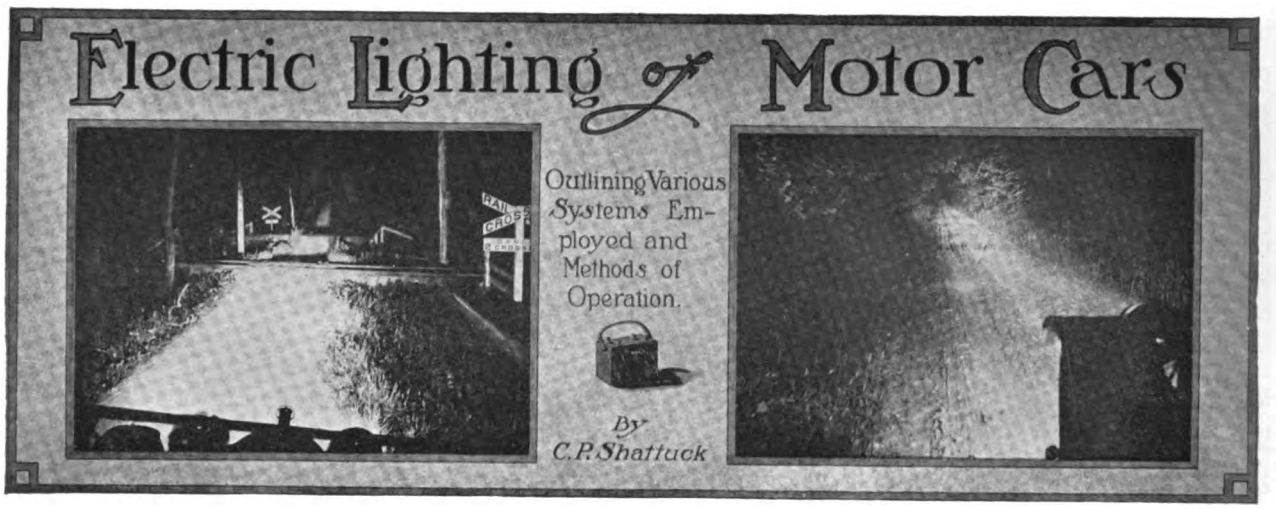
There is no danger of over production. Conditions have changed materially during the past few years, and the reports of the Department of Commerce and Labor are sufficient indication that a decided foreign market has been built up. Moreover, the business of the industry has been placed upon a more conservative basis. It follows that those who are contemplating the purchase of cars must make their decision early, if they are to secure their machines in time to be of service to them during the touring season.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

LEGISLATION ON RACING.

Few will be disposed to argue that the proposed legislation prohibiting automobile racing in New York State is carrying the matter much further than necessary. The bill is based upon the assumption that such contests endanger the spectators, but it may be pointed out that both track and road events have been held for many years over certain courses without accident of any nature. The secret seems to be in the proper policing of the course.

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Part IV—The Berdon Matchless System.

IN THE production of a practical electrical lighting system for the motor car, engineers have been forced to overcome many difficulties which do not exist in the installation of the ordinary equipment, such as required for factory, street or residential lighting. With these the engineer can estimate readily the necessary apparatus, number of lamps, resistance of wires, drop in voltage, loads, etc., but the automobile presents very different problems with its variable speed, method of operation and service.

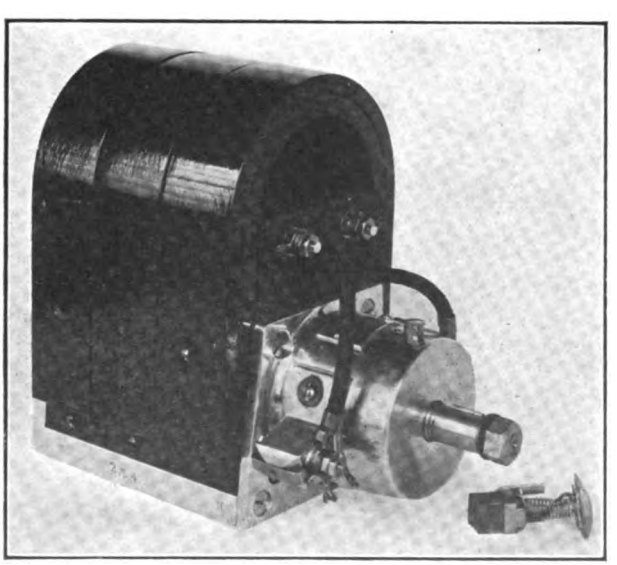


Fig. 23—The Berdon Matchless Generator, Having but One Moving Part and Operates at Slow Speed.

It is absolutely essential with any automobile lighting equipment that the current be steady and the source constant as long as the use of the lamps is required. Any fluctuation will be noted instantly as the lamps will lose their brightness. This variation is best explained by the house equipment. When the lamps are burning brightly the generators supplying current are working at a stated capacity or load. If more lamps are taken care of or the speed of the generator falls, the lights become dim, but when this overload is removed they recover their customary brilliancy.

Speeds Affects Operation.

Unlike the generator of the lighting station, that fitted to the automobile is in constant operation, day or night; that is, its armature is revolving when the motor is running. The number of rotations varies considerably as one owner may drive at a conservative speed while another operates from 10 miles an hour to 60. Then again, one motorist may not use his electric lights but a few hours weekly while another burns them night after night for long periods.

It has been explained that with all lighting systems a storage battery is a part of the equipment, it being utilized when the motor of the car is idle to furnish current to the lamps. These batteries may be employed as an auxiliary or as standard, but in either case when charged by mechanical means on the motor car, the flow of electricity to the battery must be regulated, else the member will be injured.

These requirements are met with the Berdon Matchless system, manufactured by the Esterline Company, Lafayette, Ind. The design of the equipment is based on the fact that the lighting requirements of no two cars are the same, and that the amount of light utilized varies at different times of the year. The features of the system emphasized are: The generator output is proportional to the light used; the generator cannot be reversed in polarity and can be taken apart and put together without affecting its operation; it operates at slow speed and is free from governors or mechanical devices; it delivers sufficient current to the lamps at a car speed of five miles an hour, and the battery is safely and properly charged.

Automatic Control of Current.

The striking feature of the system is that the output of the generator automatically increases when the lamps are lighted and decreases when they are

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extinguished. This automatic regulation of the current is obtained by using a permanent magnetic field, superimposed upon an electro-magnetic field. At slow

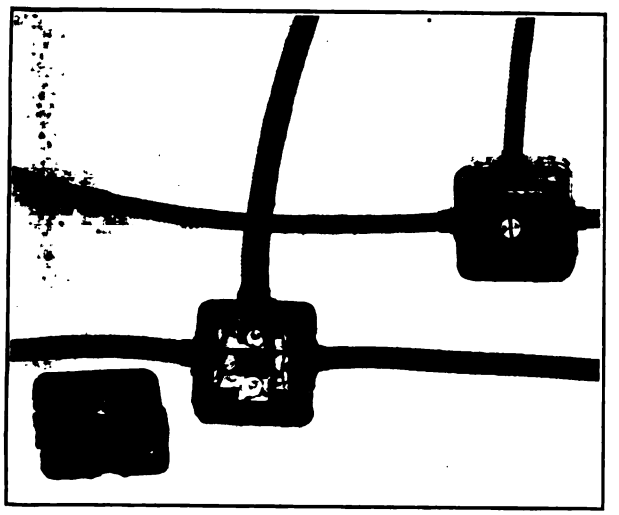


Fig. 24—Neatly Molded Junction Boxes of the Berdon System Eliminate Splicing and Make for Durability.

speeds the permanent magnetic field and the electro-magnetic field operate together in developing a charging voltage. If the current is being delivered to the battery only, the electro-magnetic field is inoperative, but as soon as the lights are turned on, the field of the permanent magnets is aided by the electro-magnetic field.

The Esterline Company maintains that the use of a permanent magnetic field is desirable if not essential, as it insures a low charging speed and makes the generator absolutely irreversible. No governors, clutches or speed controlling devices are fitted to the generator, the latter being driven positively by shaft, gears or silent chain.

The generator is a combined permanent magnet and wire wound type having the stability of the former and the flexibility of the latter. It is carefully designed, the material and workmanship being of the best. The shaft is made of alloy steel, ground accurately to size and runs in an annular type of bearing with large balls. These are enclosed in an oil containing compartment, insuring perfect lubrication and oil is prevented from entering the armature space. The armature windings are impregnated with a water proof, oil resisting compound.

At Fig. 23 is depicted the generator and it will be noted that it is compact and simple, all working parts being fully enclosed and dust and moisture proof. A feature of the device is the removable brush holder which is so constructed that it may be removed and replaced with one hand and it is not necessary to solder flexible connections to insure good contact. The brushes are held at an angle to the commutator surface, not radially, and they do not chatter or spark.

How Switch Operates.

The unique feature of the system is the Berdon automatic switch, depicted at Fig. 27, which makes and opens the connection between the generator and the battery. It is an automatic, self-setting, reverse-current circuit breaker and is built on the same principle as the D'Arsonval electric meter, having a moving coil in a permanent magnetic field, a description of which is presented herewith. The Berdon device is in reality an electrical instrument of very rugged construction, closes the circuit precisely the instant the generator is at the proper voltage to begin charging the battery and disconnects from the generator the instant the charging current ceases. It does not rely upon reverse currents for its operation and as it opens and closes the circuit at the instant the voltages are balanced, there is no exchange of current at the time and therefore no sparking.

The controlling of the voltage by the automatic switch is best illustrated by an analogy between a pump and reservoir of water, and generator and battery. At Fig. 28 are four illustrations, these showing this relation clearly. Here the pump corresponds to the generator, the check valve to the automatic switch, the reservoir to the battery, and the discharge pipe to the lamps. It should be taken into consideration that in the first place the pressure upon the discharge pipe depends altogether upon the level of the water in the reservoir and that the voltage on the lamps is the same as that of the battery.

How Constant Pressure Is Maintained.

At A the pump is illustrated inactive, the check valve closed and the water to the discharge pipe is all supplied from the reservoir. Correspondingly, the generator is at rest, the automatic switch open and

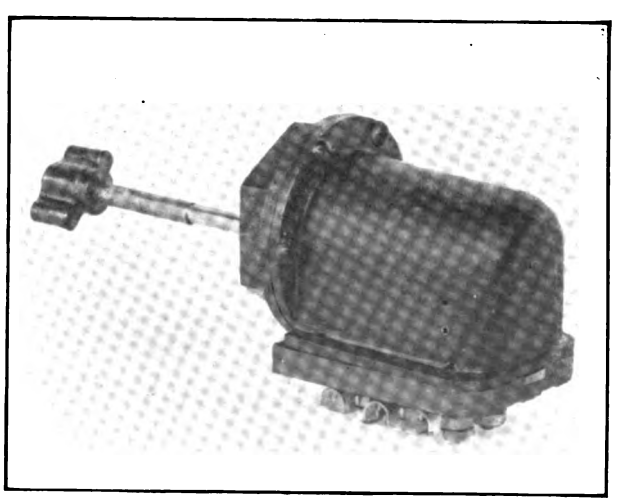


Fig. 25—The Berdon Four-Point Switch Is of Metal and Molded Insulation, Fool Proof, and May Be Locked to Prevent Tampering with the Lights.

all current to the lights supplied by the battery.

At B the pump is running slowly and is delivering a portion of the water to the discharge pipe, the check

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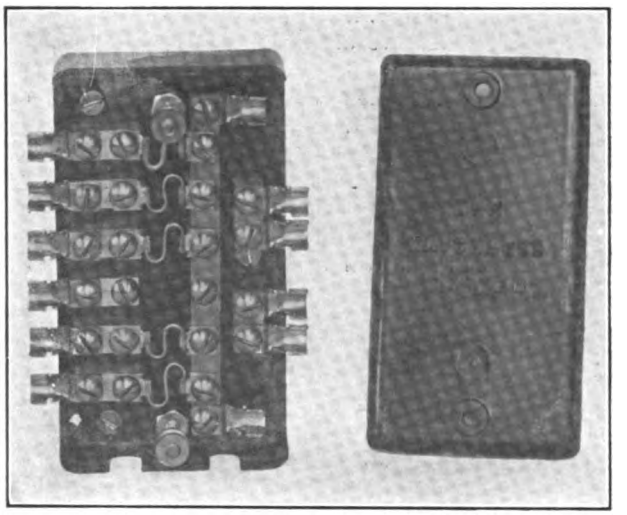


Fig. 26—A Fire Proof Fuse Panel Is a Feature of the Wiring System Which Is Notable for Its Simplicity and Ease of Installation.

valve is open and all of the fluid delivered by the pump is going through the discharge and the excess required is supplied by the reservoir. Correspondingly, the generator is delivering a part of the current to the lights and the balance needed is supplied by the battery.

At C the pump has attained a speed where it is just supplying enough water to furnish the discharge pipe and no fluid is going into or coming from the reservoir. Correspondingly, the generator is operating at a speed where its current is equal to that required by the lamp load. No current is going into the battery and none being utilized.

At D the pump has attained a speed whereby it is supplying more water than is required by the discharge pipe and the excess is going into the reservoir. Correspondingly, the generator has reached a speed where it produces more current than is required by the lamps and the excess is flowing to the battery.

Throughout the different conditions of operation of the pump the pressure on the discharge has remained practically constant, due to the same head of water in the reservoir. In the same sense the pressure on the lights is practically constant and this is due to the fact that the battery is at all times connected to the lamp circuit and it either provides the current required or absorbs the excess electricity generated. This automatic switch is neat and compact, occupying a space upon the dash 2.5 by six inches. The coil, armature, etc., are fully protected by a removable cover and the device does not require any attention whatsoever.

Fuse Panel and Wiring Methods.

Refinement is noticeable throughout in the Berdon system. The lighting switch is composed of metal and molded insulation, and as porcelain or springs are not utilized there is nothing to break or come loose and interfere with proper contacts. All exposed parts project downward and the stem or key is removable at any position so that any group of lights may be left burning and tampering with the system is prevented. The switch provides for four positions. It is located under the hood, with the stem extending through the dash.

The same minute attention has been paid to the wiring attachments. These include a fuse panel molded of fire proof material and each circuit is fused so that should any one of the group become short circuited the fuse will blow. This makes for an easy location of the faulty circuit and does not interfere with the proper operation of other members. Molded junction boxes eliminate the necessity of splicing duplex cable, and make for a neat wiring installation.

The generators are manufactured in three models, each having the same output and differing only in the speed at which they are driven. These machines deliver a maximum current of 15 amperes when the lamps are lighted, a normal current of 12 amperes at a car speed of 15 to 18 miles an hour, and are wound to begin to deliver current at a motor car speed of five to 6.5 miles an hour.

The model E generator runs at crankshaft speed on a four-cylinder automobile and at 1.5 crankshaft speed on a six-cylinder motor. The model H operates

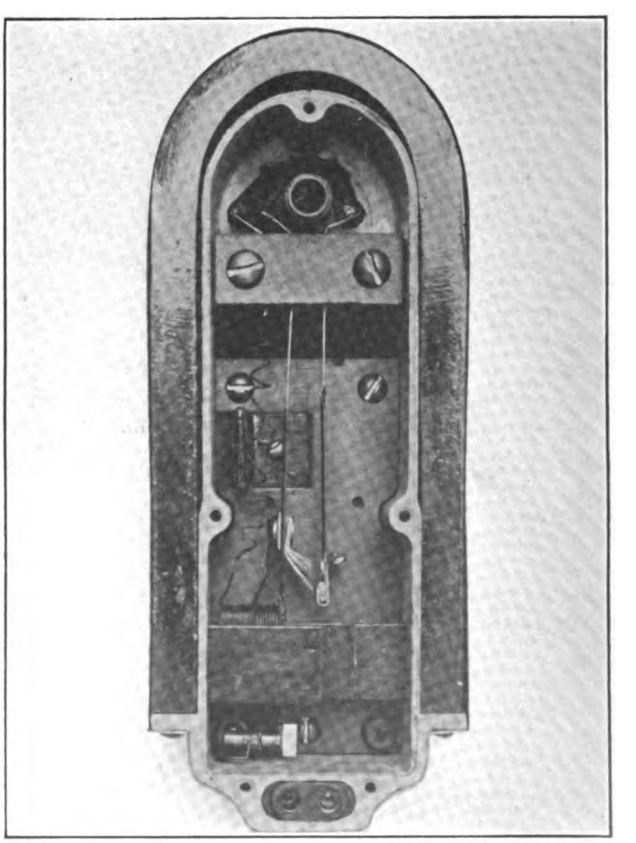


Fig. 27—The Berdon Automatic Controller Which Opens and Closes the Circuit the Instant the Current Is at Zero.

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at double crankshaft speed. Models E and H generators can be supplied for lighting only, or for ignition and lighting, and are so designed that the ignition equipment may be added easily. Regarding the instrument, some idea of its simplicity may be obtained when it is stated that anyone may take it to pieces and reassemble the parts without affecting its operation.

The D'Arsonval Instrument.

Reference has been made to the ampere meter, also to the D'Arsonval instrument, the latter in the description of the Berdon system. The D'Arsonval, so named after its French inventor, consists of a permanent horseshoe magnet with pole pieces, these being near each other so as to develop a powerful magnetic field between them, as shown at Fig. 29. Attached to a light pivoted coil of insulated wire mounted in this field, is a pointer arm or indicator, the latter projecting out over a graduated scale. This coil causes a wire placed in a magnetic field and carrying a current to tend to move at right angles to the direction of the field.

Function of Springs.

A uniform reading scale is obtained in the D'Arsonval instrument by equalizing the retractive force of the springs, and a uniform field. The former is obtained by winding the springs in opposite directions, or right and left handed, and by placing one above and one below the moving coil. By this arrangement, as the coil deflects it opens out one spring and at the same time contracts or closes the other. Uniformity of field is obtained by proper strength of the permanent magnet, quality and proportioning of the soft iron pole members and the air gap.

Electrical indicating instruments utilized commercially may be divided into two main types, those having a moving coil, such as above described, and those having a moving iron armature. The latter include

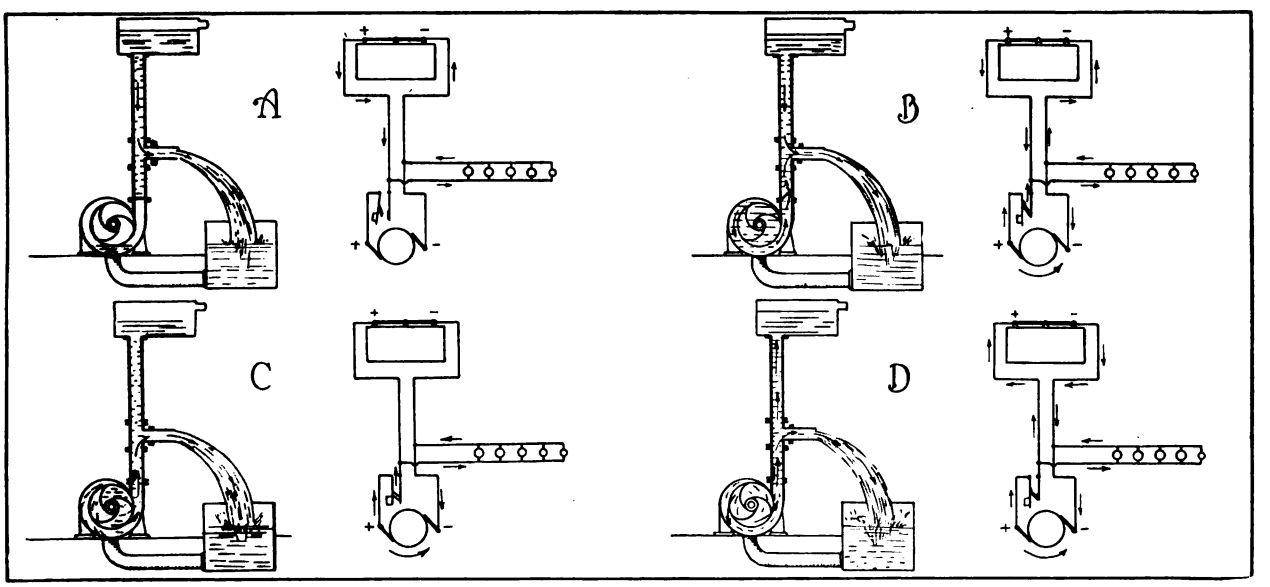


Fig. 28—Illustrating the Action of the Berdon Controller by an Analogy Between a Pump and a Reservoir, and the Generator and Battery.

is composed of very fine wire and the small amount of current that passes through it is proportional to electromotive force passing through the instrument.

Those utilized in connection with the motor car, however, are fitted with a pair of light spiral hair springs of resilient, non-magnetic metal, these serving to oppose the movement of the coil by a force directly proportional to the electricity passing through the coil. When no current is passing through the instrument the pointer stands at zero on the scale, but when a circuit is made, and current passes through the instrument, the pointer moves indicating its strength. The movement of the coil against the springs is caused by the reaction between the strong field of the permanent magnet and that due to a weak current passing through the coil, in accordance with the principle of magneto-electric induction, which the so-called pocket instruments familiar to motorists. In these the moving element to which is attached the pointer consists of a single armature or vane of soft iron. This is mounted on pivot bearings in a magnetic field. In one class of these instruments a coil having a fine and coarse wire winding, respectively, is so mounted as to set up a magnetic field at right angles to the permanent magnet field, and the armature is caused to deflect by the fluctuation in the strength of the coil's field due to the variation of the electromotive force in the circuit to which the device is connected.

In operation the indicator or pointer arm attached to the armature is normally held in the zero position by the field of the magnet. The magnetic flux due to current passing through the coil distorts the main field, causing the armature and its pointer to move

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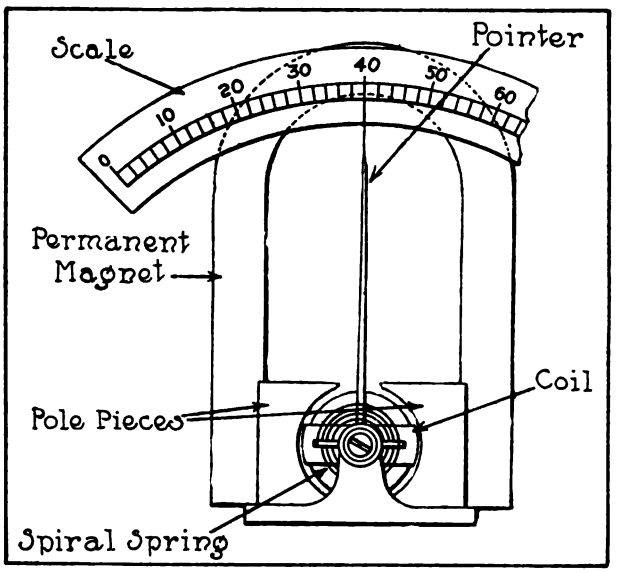


Fig. 29—The D'Arsonval Instrument, the Operation of Which Is Similar to That of the Berdon Automatic Controller.

from the zero position and the extent of the movement is approximately proportional to the strength of the current.

Dead Beat Action.

Reference has been made to a dead beat action. This is brought about by the use of the so-called eddy or Foucault currents. A dead beat pointer in an electric indicating instrument is one that comes to rest promptly at the proper point on the scale, when the circuit is closed, without moving back and forth.

The moving coil is wound upon a light frame of high conductivity metal, usually aluminum, and encloses a soft iron cylinder attached to the base of the instrument co-axially with the coil and permanent magnet pole pieces. This is arranged in such manner that a strong magnetic field is developed with a small air gap, this consisting of the clearance in which the coil frames move freely. Eddy currents are generated in a conductor when it is moved in a magnetic field, and in the generation of these currents, power is absorbed, this tending to check the motion of the conductor. In this way any movement of the aluminum frame in the field is checked quickly. When the instrument is placed in circuit, the pointer comes to rest when it reaches its proper place upon the scale, this making for quick reading and preventing injury to the pointer.

Operation of Meters.

The difference in the operation of a voltmeter and ampere meter may be said to be that with the latter it is connected in the circuit in series and that the entire current of the circuit passes through it. In the instrument itself, nearly all of the electricity goes from one terminal to the other through a bar of resistance metal, in which occurs a small but definite fall of potential equal to the product of the current, and the resistance of the bar. The difference of potential between the ends of the bar is directly proportional to the current passing through it. The moving coil is connected to the ends of the bar, and the difference of potential causes a weak current, proportional to the same, to pass through it. The resistance bar is called the shunt, inasmuch as it diverts from the moving coil most of the current passing through the instrument.

In the voltmeter the circuit goes from one terminal post to the other through the moving coil and a fixed resistance coil in series, the total resistance of the instrument circuit being high. The instrument may be connected directly across the terminals of a battery or generator having an electromotive force within its range without injury, since the current which the full voltage can send through the instrument is very small, and cannot lower the electromotive force of the battery or other source of electricity. It is, however, proportional to the electromotive force and the instrument may be calibrated in volts.

Meters are constructed for measuring both the voltage and amperage in combination; that is, the indication of the amperage is given prominence over that of the voltage in the majority of these devices utilized in electric lighting systems. As has been explained previously, it is highly important that the flow of current from the generator to the battery be at a certain rate. The discharge rate is also considered and provision made for ascertaining the same. In combination instruments the voltage is obtained by pressing a button or similar means. This type is illustrated at Fig. 30. It is mounted on the dash and its dial is illuminated so as to make it possible to note the action of the current.

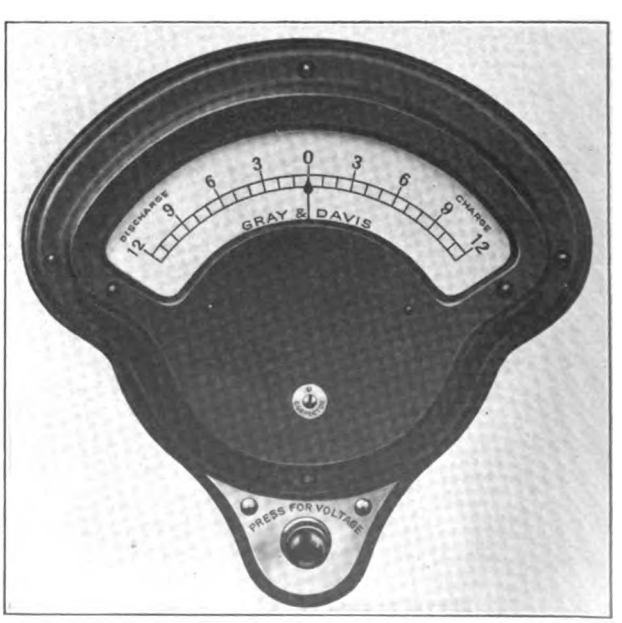


Fig. 30—A Type of Standard Combination Meter for Measuring Voltage and Amperage of Electric Lighting Equipments.

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FIGHTING TIRE DATING BILL.

Makers of tires have taken a determined stand against the passage of the proposed bill in New York seeking to compel the dating of automobile tires, and have issued a circular setting forth their reasons, addressed to the dealers in that state, which reads in part as follows:

"This bill will create a situation for the dealers in tires in the State of New York that it will be almost impossible for them to work under. It will place tires in the class of perishable goods. Consumers will decline to accept tires unless dated a few days prior to time of purchase. It is physically impossible for manufacturers to supply the trade of this country under such conditions. Tires cannot be manufactured in sufficient volume to permit dealers to have fresh stock on hand at all times. Dealers could not afford to stock tires in the uncertainty that they would be sold speedily enough to still allow the dates to be sufficiently recent to warrant customer taking the same.

"Manufacturers of cars could not be taken care of so that they could always ship cars to the garages for sale with fresh tires on. It would seriously handicap every dealer handling cars in the sale of cars. The purchaser would insist on old dated tires being taken off and recent dated tires placed thereon. This issue is more vital to the dealers' class of this country than to the manufacturers of tires. You would be left to work off your stock as best you could.

"There is no public injustice righted by this bill, simply a destruction of necessary working conditions under which you must labor. All reputable manufacturers adjust with consumers without reference to the date of production. No public policy is therefore served, but a distinct injury to a large class of dealers engaged in the industry."

Those signing the statement are the following firms: Motz Tire & Rubber Company, Swinehart Tire & Rubber Company, Ajax-Grieb Rubber Company, Diamond Rubber Company, Empire Tire Company, Federal Rubber Manufacturing Company, Firestone Tire & Rubber Company, Fisk Rubber Company, B. F. Goodrich Company, Goodyear Tire & Rubber Company, Kelly-Springfield Tire Company, Lee Tire & Rubber Company, Michelin Tire Company, Pennsylvania Rubber Company, Republic Rubber Company, Seamless Rubber Company, Stein Double Cushion Tire Company and United States Tire Company.

WILL MANUFACTURE ELECTRIC CARS.

The Buffalo Electric Vehicle Company has been incorporated in Buffalo, N. Y., for the purpose of manufacturing electric pleasure and commercial cars. The capital is $1,000,000, of which $700,000 is common stock and the balance preferred. The directors are W. P. Seipp, W. C. Fletcher, Thomas B. Wheeler, Frank E. Lane and Marcus Alexander.

RAMBLER'S 10,000-MILE GUARANTEE.

Ten thousand miles is a long distance to travel, but that is the figure fixed in the new guarantee just made public by the Thomas B. Jeffery Company, Kenosha, Wis., maker of Rambler cars. This means that it would be possible to drive the machine from New York to San Francisco, thence down the Coast to Los Angeles and back across the country to New York by way of New Orleans and Atlanta, when there would still be sufficient mileage remaining to carry the car to the Golden Gate once more with considerable reserve.

"We are making this guarantee," says Charles T. Jeffery, president of the company, "because of our unbounded confidence in every single part that goes into every Rambler car. We make 96 per cent. of these parts, therefore, know what each one can do. The first Rambler Cross Country model that left the factory made a 3000-mile test trip through nine states, over the mountains of Pennsylvania to New York, Albany, Boston and back to the factory. Since then its fame has spread and its service has extended to every state in the Union, to every province of Canada, to Mexico, Australia, South America, Europe and the Orient. Everywhere this Rambler has gone its performance has strengthened our confidence in its ability to fulfill this guarantee."

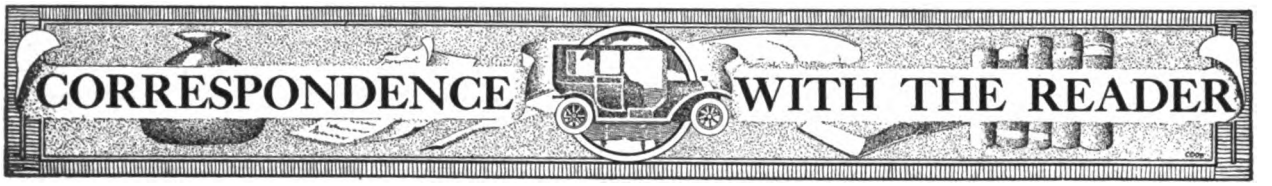
SUCCESS WITH REO CAR.

E. H. Morse, the well known educator and business expert of Hartford, Conn., is enthusiastic over the success he has had with a Reo car, made by the Reo Motor Car Company, Lansing, Mich., which he bought last year. In a recent letter to the distributor for this line, R. M. Owen & Co., New York City, Mr. Morse expressed himself as perfectly satisfied with the results obtained. He writes as follows:

"Before selecting a car, perhaps I went into a more exhaustive search than most men. I visited the New York, Boston and Hartford shows, and personally tried out what I considered the seven best makes ranging within the price I desired to pay. I put all these to a test on Cedar mountain, a steep hill leading from the New Britain road to the New Haven turnpike. The Reo made it on second speed, and made it easily. No other car which I tried could do it on the second; several could go over on the low speed, and a few could not make the hill at all.

"Last summer, I made a trip through the White mountains, and the northern part of Maine, and returned home by the coast line of New Hampshire and Massachusetts. In that trip and since that time, I have not had the slightest trouble with my car, except such as I could easily remedy myself by the turn of a screw driver. I believe it is running smoother today than it has ever run before."

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Acetylene for Starting Motor

(1350)—If one should install a motor starter of the acetylene type and if a large quantity of gas should be permitted to go into the cylinders, would there be any danger in exploding the charge? What I wish to know is would there be any danger with a large amount of acetylene and if it would be injurious to the engine. Suppose the device to be so arranged that there would be small brass tubes leading from the distributor to the cylinders. Would there not be enough gas left in these tubes after the motor started? If so would there be any danger of these tubes becoming hot enough to cause the gas to explode? UTTUS WHEAT.

Holland, Texas, March 15.

Various methods are utilized in self-starters employing acetylene, but the basic principles are similar, that of mixing a stated quantity of air with the gas, conveying it to the combustion chamber of the motor and exploding the mixture by a spark. As with gasoline, it is essential to know the proper amount of air to combine with a given quantity of acetylene to obtain the correct efficiency. Too little or too much in proportion to the fuel will result in a poor mixture and starting conditions will be affected thereby.

An explosive point is reached when only 3.35 per cent. is acetylene and the balance air. Regarding the correct proportion of acetylene to air to ensure proper combustion and maximum force, the experiments of Berthelot and Vielle show that with a 10 per cent. acetylene and 90 per cent. air mixture an explosive force of 11 atmospheres is derived. With an increase in proportion of gas up to 50 per cent., at which point it is 22 atmospheres, the maximum is reached and beyond equal parts, it decreases.

Supt. O. H. Skinner of the Prest-O-Lite Company, Indianapolis, Ind., states that the best results are obtained by using one part acetylene and 10 of air, approximately, and that when this is ignited it will burn explosively and produce a force considerably greater than if gasoline were used, provided, however, some means of obtaining air is installed other than taking it through the intake manifold.

In considering the application of acetylene in a form of self-starter, some form of regulating valve should be incorporated and when the member is of the automatic type the sizes of ports or valves open from the line would accurately gauge the amount of gas being used. The pressure of the latter when brought from a tank should be reduced, as acetylene should not be piped about the car at a pressure greater than two atmospheres, or about 30 pounds. The pressure may be reduced by fitting a two-way valve to the tank when the latter is utilized both for starting and lighting.

Regarding the effect of acetylene upon the cylinders, a well known authority states that it will not injure them provided the mixture is correct and that the explosions brought about are not unduly high. The tubes carrying the mixture to the cylinders would not become heated enough to explode any gas left in them if there were any. If the device should be so constructed as to leave any mixture in the tubes it would be drawn into combustion chamber by the instroke of the piston, and as the amount would be small, it would not affect the gasoline mixture operating the motor. It is obvious that the acetylene from the tank would be prevented from flowing except when the self-starter was being employed.

Regarding Disco Self-Starter.

(1351)—I am considering a self-starter and regarding the Disco system desire to obtain the following information: When the engine has stopped at dead centre and does not start the first time, what becomes of the explosion, also on a cold day when it fails to start? Has there ever been such a thing as blowing off the cylinder head with this starter? Will the explosions injure the motor in any way when it fails to start?

Red Hook, N. Y., March 11. JOHN R. FINGAR.

Regarding the motor stopping at dead centre, the maker of the Disco device states: "Should the Disco fail to start the motor, owing to the latter being on dead centre, it is only necessary to make a quarter turn with the crank and then start on the spark." Stopping on dead centre rarely occurs, however.

As to an explosion taking place and not enough energy being developed to start the motor, or in other words, if the pressure be not strong enough to force the piston down far enough to bring up to dead centre the piston of the next cylinder to fire, the burnt gases will remain and be forced out through the exhaust valve when the motor is cranked a quarter turn or the cylinder in question charged and exploded properly.

Regarding blowing off of a cylinder head with the Disco system, the writer does not see how this could take place, owing to the fact that the gas and air is mixed in proper proportions by the distributor of the system. As to the proper proportions and danger of injury to the cylinders, these questions are answered in the previous communication.

Semi and Full Floating Axles.

(1352)—I am greatly interested in your "Correspondence with the Reader," and believe you will cheerfully answer these questions for me. What is the difference between a semi-floating and full floating rear axle? What advantage or disadvantage has the four-cylinder upright motor with cylinders cast en bloc over one with cylinders cast separately or in pairs? Is it true that a two bearing crankshaft of an en bloc motor has an advantage over the three or five bearing crankshaft of the motor with cylinders separate, or in pairs? A. J. RIKER.

Moundsville, W. Va., March 8.

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In the full floating type rear axle the housing is constructed substantially in order to support the weight of the car. Each outer end of the tubing surrounding the axle is provided with a hardened steel bushing or cup upon which the balls or rollers of one of the driving wheel bearings are adapted to run, so that the wheels are entirely supported by the ends of the housings. The differential gears have their bearings within the central expanded portion of the housing. Each end of the two axle shafts is squared and fits similar recesses in the hubs of the gears of the differential. The outer ends of the shafts enter corresponding squared out cavities in the hubs of the driving wheels. This makes for a form of jaw clutch and a certain flexibility is given to the power transmitting portion of the axle and any slight deflection of the casing results in no binding of the moving parts. This construction is varied in several ways but the principles are similar.

In the semi-floating type the wheels are mounted directly upon the axles, which carry the weight of the car as well as transmit the power. The axles revolve in bearings mounted in the axle housing. The difference in construction will be noted in the accompanying drawing which depicts full floating and semi-floating types of rear axles.

The advantages claimed by the advocates of four or six-cylinder motor cast en bloc is a shorter and more compact power plant, and there is a growing tendency among the automobile manufacturers to adopt this design. The twin and single-cylinder castings are favored by many makers, however.

Regarding the two bearing crankshaft of an en bloc motor and the type fitted with three or five bearings with cylinders cast in pairs or singly, the designers strive to achieve the same results, that of strength and durability. It is obvious that where two bearings are employed these must be larger and stronger than where five are utilized and these points are considered in the design of the crankshaft and crankcase, which are shorter with the en bloc type of engine.

Locating Poles of Battery.

(1353)—I acquired a second hand storage battery recently and wish to do my own charging. The pole marks are not shown on the battery. Will you please tell me how to locate them? WILLIAM E. NEVINS.

Richmond, Va., March 12.

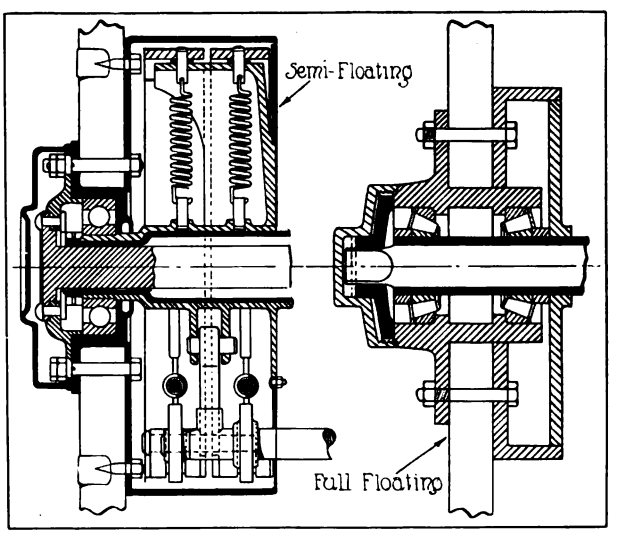
Attach a wire to each terminal and place the ends in a glass of water taking care that they do not touch. The negative wire will give off bubbles and this terminal of the battery should be marked thus —. The other will be the positive and should be marked thus +. In charging, the leads from the charging apparatus should be similarly connected.

Driving Out Ball Races.

(1354)—I have a model ——— car and the large ball races in the front wheels are worn out. Have secured new members from the factory but cannot get the old members out. Have tried the suggestions contained in instruction books, but without success. Have been told that I will have to apply heat to draw the temper and then break up the races with a cold chisel. Is there any method you can suggest? C. B. FORDHAM.

Portland, Ore., March 7.

The easiest and quickest way to remove the races is to dismantle the wheel. The hubs and flanges may be taken apart easily by removing the nuts and driving out the bolts. The hub and flange will come apart and it will be noted that the flange member in which the ball race is located has three holes. These were incorporated by the manufacturer for the purpose of removing the races when other means fail. By utilizing a punch and hammer the race may be removed. The dust ring will come out with the race so it will not be necessary to remove the former separately. In using the punch, it should be employed alternately in each opening of the flange to equalize the driving strains. In fitting the new member, it should be driven in with a lead mallet or with a block of hard wood inserted between the hammer and race, as these members are hardened and break easily.



Depicting Types of Semi and Full Floating Rear Axles.

RECIPROCITY IN MARYLAND.

Several important changes of interest to motorists generally will be made in the automobile law of Maryland if a bill just introduced into the Legislature of that state by Senator Goslin becomes a law. Included in the provisions is one granting full reciprocity, with absolute freedom for motorists of other states and territories to enter Maryland whenever they choose, remaining as long as they desire, so long as the same privilege is extended to Maryland tourists in those states.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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EDENBURN WITH REMY COMPANY.

The predilection of the Remy Electric Company, Anderson, Ind., maker of Remy ignition and lighting equipments, for newspapermen is made still more evident by the enrollment of W. D. Edenburn as publicity and assistant advertising manager. This is the sixth graduate from the news gathering field which has been added to the Remy force, and he is by no means the least known of the six.



W. D. Edenburn, Publicity Manager, Remy Electric Company,

Mr. Edenburn goes to the Remy people from the Indianapolis Sun, where he was manager of the automobile department. He was formerly automobile editor of the Indianapolis Star, where appeared many of his expert articles on racing, shows and other features of motor car activity.

Last summer Mr. Edenburn was closely associated with the Indiana Automobile Manufacturers' Association, and one of the active promoters of the idea of the Four-States tour, which developed into one of the most important contests in the Middle West and one of the best advertising campaigns of the season. His new position with the Remy company will give him even broader scope in the promotion of plans for the general good of the industry.

TRUFFAULT-HARTFORD BOSTON SALES.

The sale of cars during the 10th annual Boston automobile show early in the month was not the only indication that the event exceeded all past records in the matter of sales. Many of the accessory exhibitors found the results equally satisfactory in this respect. D. F. Harvey, manager of the New England branch of the Hartford Suspension Company, Jersey City, N. J., maker of the Truffault-Hartford shock absorber, reports a larger sale than ever before at a similar show. He adds that the business of this concern in Boston, where it is located at 319-325 Columbus avenue, has increased 120 per cent. during the past year, and that he feels confident of an even greater increase during 1912. This company also manufactures the Hartford auto-jack, which is claimed to be second to none.

MERCERS FOR WELL KNOWN DRIVERS.

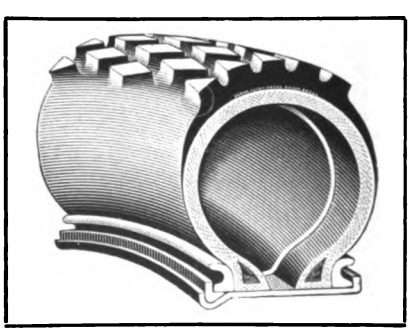
An interesting bit of automobile news was made public recently in the announcement that David Bruce-Brown and Ralph De Palma, both of whom are well known as American racing drivers and with cars of foreign make, have purchased Mercer raceabouts, produced by the Mercer Automobile Company, Trenton, N. J., for their own personal use. Bruce-Brown was twice a winner of the American Grand Prize, once in a Benz, and a second time in a Fiat. De Palma has made a number of records in Fiat cars, but was at the wheel of a Mercer car in numerous victories in 1911. The former will take his Mercer to Europe and will test it out over the French Grand Prix course.

WEBSTER CLUB HOLDS BANQUET.

The first annual banquet of the Webster Automobile Club, Webster, Mass., was held at the Joslin House, March 14. Among those present were: Hon. Eben S. Stevens, Dr. J. O. Genereux, Nathaniel T. Hurlburt, Clarence E. Cleveland, Dr. L. A. Bragg, Arthur H. Racicot, Dr. George Littlefield, Charles E. Mason, Andrew J. Bates, Louis E. Pattison, A. Samuel Roberts, Nicholas C. Giles, Joseph Dumas, Patrick Prout, Dr. Q. H. Merrill, William Winter, Emil Kisro, N. J. Pierce, Edward H. Pattison, Arthur Choiniere, Herbert G. Alton, Armand J. Brissette, John C. Templeman, Leon J. Kreft, Victor E. Djiembouski, John T. King, John Breen, Bates Craner, E. H. Horton. The officers of the club are: President, Alexander N. Racicot; vice president, Dr. Joseph N. Roy; secretary, Joseph C. Dandurand; treasurer, Arthur G. Pattison.

GOODYEAR NO-RIM-CUT TIRES.

Unfortunately, the drawing selected to illustrate the Goodyear No-Rim-Cut tire in the article on "Tire Equipment and Demountable Rims," in The Automobile Journal for Feb. 25, failed to do this well known product of the Goodyear Tire & Rubber Company, Akron, O., full justice. In several respects, the impression conveyed was erroneous. Herewith is presented a half-tone of the same tire, and it will be noted that the non-skid tread has a series of diamond shaped protuberances, instead of square as the former illustration would seem to indicate. It also will be found that the bead is of somewhat different shape and construction than was indicated in the drawing to which reference has been made.



Section of Goodyear No-Rim-Cut Tire.

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NEW HUPP-YEATS FACTORY.

In order to care for the steadily increasing demand for the Hupp-Yeats electric cars, it has been found necessary to provide a much larger factory, and the buildings in Detroit, formerly occupied by the Herbert Manufacturing Company, have been leased for the future home of this car. The Hupp-Yeats has been constructed in the plant of the R-C-H Corporation on Lycaste street, Detroit, the new R-C-H gasoline car also being manufactured in this plant. Although several buildings have been added during the past six months, the growing requirements of the business in connection with the two machines made a change imperative.

Establishing the Hupp-Yeats in new and larger factory quarters not only will permit of a greatly increased output of electric cars, but the space gained at the R-C-H plant will enable the R-C-H Corporation to increase its output of gasoline machines over 50 per cent. One of the important features in connection with the change, is the association of C. W. Fox with the Hupp-Yeats interests. Mr. Fox is widely known throughout the industry because of his connection with Fox Bros. & Co., occupying for a number of years a foremost position in the construction of automobile bodies. He will devote a large part of his time to the production of Hupp-Yeats electrics, although he will retain his interests with the body building business.

There will be no change in the distribution of the Hupp-Yeats, and as heretofore, the car will be sold through the R-C-H Corporation's branches and dealers.

WANTS GLIDDEN TROPHY RETAINED.

Benjamin Briscoe, president of the United States Motor Company, a constituent of which, the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., made the cars which won the Glidden trophy last year, wants this famous cup retained as the chief award in the national tour of the American Automobile Association. He says, in part:

"The Glidden trophy was donated by a sportsman purely in an altruistic spirit. No good reason for its rejection has been advanced. The simple reason that the trophy bears the name of an individual is not sufficient to cause the prestige of our great national contest to be sacrificed to the whims and fancies of a few. It is a menace to the industry to kill the Glidden tour, and it would take years of unappreciated competition to inspire public confidence in a new tour and make the public realize its value."

NEW GOODYEAR BUILDING.

Immediately after the fire which destroyed the branch of the Goodyear Tire & Rubber Company at 251 Jefferson avenue, Detroit, steps were taken to secure a building in a desirable location, but when this was found impossible it was decided to build. The site chosen was at the southeast corner of Antoine and Jefferson avenues. The proposed structure will be five stories in height, 50 feet wide and 200 feet long, of fire proof concrete construction and with a stone front. It will be owned by the Goodyear Tire & Rubber Company, Akron, O.

The new branch will be thoroughly modern in both external and internal appointments, and with plenty of floor space. Opportunity thus will be afforded to carry a large stock of Goodyear tires and other products to cope with the rapidly increasing Michigan trade in a satisfactory manner. The company has concentrated, temporarily, its stock at what was formerly the branch No. 2, 846 Woodward avenue. E. F. Jackson, manager of the Detroit branches, expects the new building will be ready for occupany about July 1.

BOARD OF TRADE'S HANDBOOK.

The ninth annual handbook of gasoline automobiles has been issued by the Automobile Board of Trade, successor to the Association of Licensed Automobile Manufacturers. It is a 207-page volume, listing and describing the product of the members of the organization, and includes more than 500 models of pleasure cars and trucks. A copy may be had upon application to the Automobile Board of Trade at 7 East 42nd street, New York City.

HARRISBURG CLUB'S COMMITTEES.

The following committees have been announced for the ensuing year by the Motor Club of Harrisburg, Penn.: House, E. C. Markley, A. C. Logan, H. H. Hefkin; membership, R. F. Blough, R. L. Morton, Andrew Redmond; contests, J. Clyde Myton, William B. Douglas, Frank A. Stees; auditing, A. H. Frain, John Hoffer, Jr., W. S. Hurlock; signboards, James McCormick, Jr., D. M. Dull, J. Carroll Kinter; routes and maps, W. O. Kickok, F. A. Stees, F. F. Hahn; roads, C. C. Cocklin, William Jennings, V. C. McCormick, R. C. Haldeman, H. C. Wright, D. M. Dull, A. G. Eberly; laws and ordinances, Charles E. Penny, W. E. E. Lancer, Caspar Dull.

SPEEDWAY CASE TO SUPREME COURT.

The famous Speedway test case in Brooklyn, N. Y., is to be carried to the United States Supreme Court, according to the latest information. The question arises over the action of the authorities in restricting the Ocean parkway in that city to the use of horse drawn vehicles. The Long Island Automobile Club feels that an injustice is being done to every motorist who has occasion to use the parkway, and it is for that reason that the organization has decided to have the matter of constitutional rights determined by the highest court in the land.

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MOTORING BEYOND 62 DEGREES, NORTH.

An Account of the First Automobile Trip from the Tidewater at Skagway, Alaska, to the Headwaters of the Yukon in the Klondike Region.

(By Charles G. Percival, M. D.)

BACK in the spring of '98, when the whole world was ringing with the wild reports of great gold discoveries in the Klondike, Skagway, Alaska, at the head of Lynn canal, became the key to the new Eldorado beyond. The sole line of communication with the interior was by the trail leading over the White Pass, used by Indians—a mere footpath blocked at every turn with rocks, boulders and fallen timber, and in many instances abruptly amputated by a stream or swamp.



Skagway Camp No. 1, Arctic Brotherhood, from Which the Trip Was Started.

Many people have an idea that a trail constitutes a sort of bridle path, clearly mapped and practically free from obstructions. The White Pass trail was not only rough, but strewn with the bodies of so many hundreds of dead pack horses, that it later became known as the Dead Horse trail. During the height of the rush, and for a greater portion of the 40 miles through to Bennett, neither man nor horse could travel faster or slower than the speed of that "huge living serpent that slowly wound its way over the Pass. To try to go faster was to be stopped simply; to go slower for a man meant climbing the rocks up or down off the trail, but a horse could not do this and had to keep in line or fall on the trail. A fall meant death, as a rule, unless he could get up quickly, which, overloaded and exhausted, he seldom could. The law of the trail was this: That a man be given time to remove his pack from a fall horse, and then the procession moved on."

I have reviewed this situation, simply to indicate the condition of the country through which we undertook to drive from Skagway to Dawson. The Skagway of 1898 with its transient population of 20,000 has dwindled to a permanent city of 1800. Bennett, which claimed a like number in 1898, is now a deserted city, with but four persons left. The White Pass trail still exists, but communication with the interior is by means of the White Pass & Yukon Route, a railroad, the construction of which was begun in July, 1898, by the late S. H. Graves, a member of the London brokerage house of Close Bros.

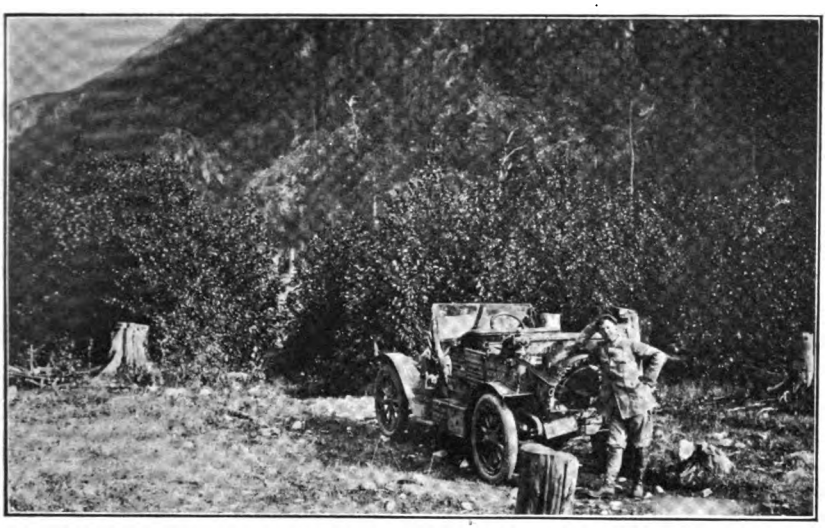
It was for the purpose of taking the Abbott-Detroit "Bull Dog" into the farthest North region, that I undertook the journey from Skagway to Dawson, accompanied by George Brown and J. J. Chambers, the latter a representative of the Daily Alaskan, the oldest newspaper in Alaska, and a registered guide of note in the district.



Native Born Alaskan Children Enjoying Their First Ride in an Automobile.

Alaska, meaning Great Country, is indeed rightly named. Not only is it great in area and natural resources, but in scenic grandeur it is the greatest of all

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A Picturesque Glimpse of the Old Skagway Trail Near Boulder, Alaska.

countries, for here and in northern British Columbia and the Yukon territory adjoining Alaska on the east, nature has painted her most magnificent pictures—now of soft, wondrous beauty, almost tropical in their setting of luxuriant verdure, then suddenly changing to one that is wild, rugged and forbidding.

The Abbott-Detroit "Bull Dog" proved to be the very first automobile to reach Skagway, and the population who had never seen a real live motor car came out in droves to have a look and take a ride. It will give a vague idea of the number of "lifts" we gave to those who had never before ridden in a car, to state that in one afternoon Brown rolled up 50 miles on the speedometer on the limited 3.5 miles of Skagway streets.

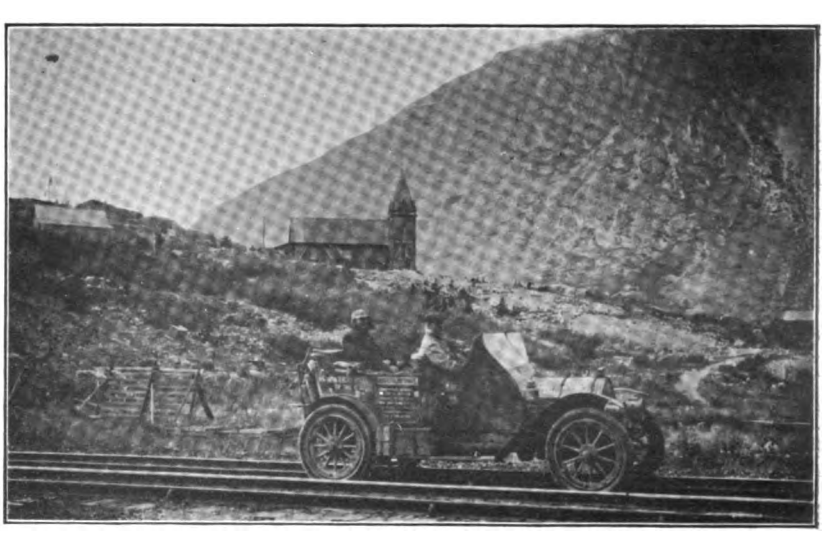
When I learned what I have recited here with respect to the trail as far as Bennett, there was but one card left to play—the 112 miles of railroad over the White Pass & Yukon Route, with its 104 bridges, culverts, cantilevers and tunnels. Nothing daunted, I called upon General Manager O. L. Dickinson, and requested permission to take the car over the ties to White Horse, from which point I expected to make Dawson.

Mr. Dickinson was very courteous. He explained the dangerous nature of the undertaking, dwelling at length upon the fact that the road was narrow gauge, being only 36 inches wide instead of the standard four feet 8.5 inches. The ties, he said, were but a little over six feet in length and would not give sufficient clearance to the 56-inch tread and 4.5-inch tires of the "Bull Dog." He showed me a profile map of the road, pointing out the big cantilever bridge 1020 feet long, above the 297-foot deep Dead Horse gulch, where in the old days so many pack horses lost their footing and were killed. Mr. Dickinson refused us permission to make the attempt.

That afternoon, however, we deliberately drove out 12 miles on the roadbed and successfully negotiated the track and one of the smaller bridges. The next day, by appointment, I again met Mr. Dickinson, Supt. V. I. Hahn and other officials of the company, and displayed for their benefit my album of photographs, showing pictures of the car crossing the high bridge of the Santa Fe over the Colorado river at Parker, Ariz., and of Brown and I driving on the ties in Mexico. A waiver of damages, which Brown and I both signed, brought the meeting to a close.

The permission of the road to make the trip had been won, and the following Sunday, when all trains were pulled off, we started. At that time, we both figured the entire distance on the ties to White Horse, 112 miles, could be made easily in a single day, but we little knew what was ahead of us.

The start was made in a drizzling hail and snowstorm. Owing to the difficulty of obtaining supplies between Skagway and Caribou, a distance of 67.5 miles, we were compelled to carry a great deal heavier load than was deemed wise for such a bumpy, rough journey. The car weighed in the neighborhood of 4700 pounds. In addition to 20 gallons of gasoline, three gallons of lubricating oil and 20 pounds of carbide, we had two 12-foot planks 2.5 inches thick and 10 inches wide. To this we added blankets, for three



Presbyterian Church and Hotel Behind It in Deserted City of Bennett, B. C.

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Overhanging Rock on White Pass & Yukon Route, 4000 Feet Above the Sea.

persons, canned goods for three days' rations, cooking utensils, five gallons of alcohol for the radiator, two rifles and ammunition, several changes of clothing, 12 inner tubes, two extra outside casings, an air bottle, pump, tools, spades, axes, Graflex camera and a small tent.

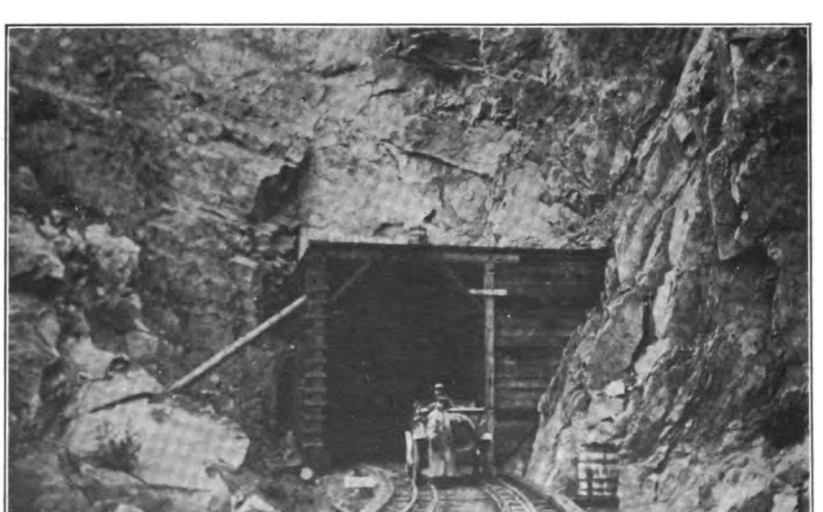
The first seven miles of Section 1, though upgrade, was in excellent condition, and the distance was made in a little over an hour. We began to pat ourselves on the back, thinking of the ease with which we would roll into White Horse before it became dark. But, hardly had we gone beyond Boulder and Liarville, when the upgrade by the famous Denver glacier started our troubles.

Here, despite all the care, caution and money vainly spent by the White Pass & Yukon Route, the elements had conspired to keep the dirt and gravel from between the ties. The constant erosion of the melting and dripping glaciers and the heavy storms had all assisted in washing away the protecting dirt, so that we slid and bumped and crept dizzily from tie to tie.

First, the front wheels would drop down between the ties, then slowly and laboriously they would mount the next one, while the heavily weighted car with its load of freight and three passengers would slide its rear wheels over the same identical way, until it seemed as if the mechanism, frame and springs could not possibly stand such fearful and unequal strains. If the bumping and twisting on the car were anything like the effect it had on the three passengers, I can only add that I felt extremely sorry for the innate composition of steel, rubber and wood that was withstanding this strain nobly under us.

Upgrade, every foot of the way, we travelled straight into a dense glacial fog, through which we patiently made our way at the rate of three miles an hour until the high altitude warned us it was time to put on heavier clothing. A little later we reached that point on the road from which it is possible to see the dead city of White Pass, 1500 feet below. Chambers pointed out the few remaining buildings, and we could see dimly the famous old trail as it wound along the banks of the rushing river, and up the mountain side to disappear between two points around which the railroad climbs. This old trail, pounded hard by the countless feet of gold crazed men and their pack horses, seems like the ghastly slash of an unhealed wound, and strange to say, all along the 22 miles of the old White Pass trail, no vegetation has been able to grow, though nature in her bountiful luxuriance has crept over and smothered every other handiwork of man.

In the heavy fog bank we passed over many of the bridges about which we had been warned. They were called to our attention largely on account of the faster speed permitted, owing to the ties being set closer, and the consequent absence of bumping. The very impediments in the minds of the railroad officials proved, therefore, on close trial to be the easiest portions of the road. The big steel cantilever bridge which curves over and around the dreaded Dead Horse gulch, was negotiated at a speed of 15 miles an hour, and my only regret was the extreme density of the atmosphere which prevented obtaining a picture. Later, when the clouds of dense glacial vapor had



Entering One of the Many Tunnels on the White Pass & Yukon Route.

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Self Starting System

¶ We will equip any car in our line with our most practical self starting system (not including gas tank) for only twenty dollars additional.

¶ This system we believe to be the best made. So simple a child can operate it. Nothing complicated or intricate. Put on the car in less than one hour.

¶ Write at once for full particulars.

The Willys-Overland Company
Toledo, Ohio

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Fording the Skagway River Bed Between Caribou and White Horse.

partially cleared, the ride proved from a scenic point a really gorgeous one, and hardly to be equalled in any other part of the world. I can well realize why travellers have called Alaska the Alps of America. We passed glacier after glacier, the colors of which radiated like a Niagara rainbow. Frequently we could peep through the cleft mountain ranges, which snow crowned to their very tops, stood out in solemn grandeur, making one feel that here was the end of the earth or the jumping-off place. Away beyond, we could see through the intermitting avenues of glistening green spruce and cedar the vast glaciers, shoulder to shoulder, like a massive army of giants keeping silent but guardful vigil over the inland empire of the snow king.

For miles, we drove along the side of a great precipice, where steel and concrete retaining walls alone, withheld us from dropping down into the sullen gorge thousands of feet below. The sensation of driving or riding over the narrow 36-inch rails and the six-foot tires with next to nothing at your elbow is disconcerting, to say the least.

At 20.4 miles, we reached the summit of White Pass, where the United States and Canada have joined forces in the erection of two flag poles, a concrete boundary post and some customs buildings. Here, we stopped for lunch.

At Log Cabin, once a city of 7000 inhabitants, we tried to secure a photograph of the picturesque old building from which the town took its name, but the snow spoiled my luck. While I was endeavoring to obtain a decent focus I heard a snorting and bellowing behind me, and a warning shout from Chambers caused me to turn to face a big bull caribou gazing at the automobile in evident astonishment and rage. He departed, however, before Chambers had opportunity to test his skill with the rifle. From this point to Bennett, we scared up numerous "Tommikins," as the old timers call them—the ptarmigans, or snow white grouse of the Arctic Circle. The heavier bodied Alaska grouse also were plentiful, and Chambers kept us well supplied with them.

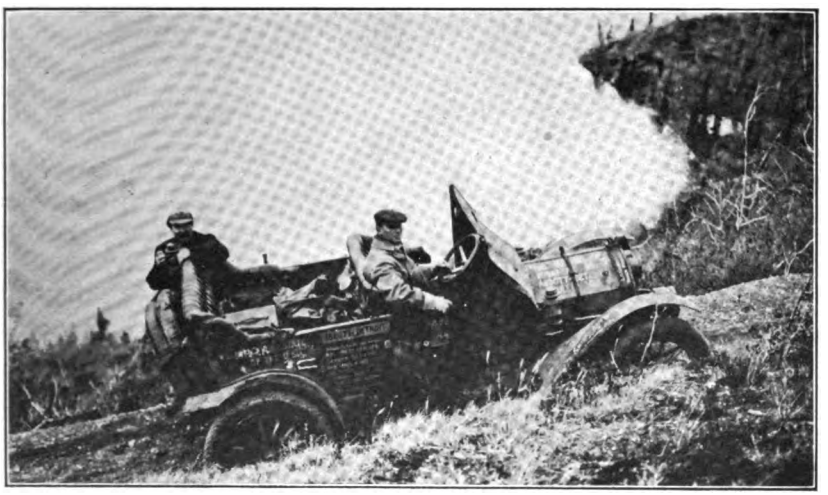
Finally we reached Lake Bennett. Here we found the shipyards and docks, where thousands of craft, from rowboats to huge steamers, were built and launched. Here also is what remains of Bennett City. We saw the graveyard where many a daring and foolhardy gold seeker is buried, after being dashed to death in the rapids, murdered for his "poke," or perhaps a suicide from losing his all in the rapids or on the gaming table. Many a human interest story, and many a secret is hidden here beneath the soil of this old cemetery. The wooden headstones have fallen and decayed. Even the carved inscriptions are beyond deciphering, and aside from the neat white painted palings, which the White Pass & Yukon Route keeps around the little plot, there is nothing to tell the story of another inglorious incident of the Klondike and the wonderful rush for gold.

Chambers led us up the little hill, where the vast caravan of buildings stand with sagging doors and gaping windows, all lonesome and deserted. Schoolhouses and churches are there still, weather beaten and battered, and testify to the once prosperous condition of the thriving city. Bennett was the last stop of the gold seeker after making the dreaded White



Alaskan Dog Sledges and Abbott-Detroit "Bull Dog" at Canadian Mounted Police Station.

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Climbing 30 Per Cent. Grade at Nine-Mile Lake on the Dawson Trail.

Pass. Here he built himself a boat or a raft and floated down Lake Bennett to Caribou. Reaching Tagish lake, he then proceeded up Six-Mile river to Lake Marsh, then down the Fifty-Mile river, shooting Miles canyon in a 15-mile-an-hour current. Emerging therefrom, the dangerous White Horse rapids, with their whirling white foam and jagged rocks lay before him, barring the entrance to the city of White Horse.

In the extreme winter months, the smooth, hard surface of the lake and rivers offered an easy passage to the swift moving dog sled, so that all the year around Bennett was the rendezvous for the gold seeker. The town flourished and became a metropolis. Hence, the numerous buildings, fragments of what were once lace curtains waving all forlorn in the windows, furniture and furnishings still intact. It cost 10 cents a pound to bring them in. It would cost too much to take them out.

It was after 4 in the afternoon, when we left Bennett, and the railroad skirting the border of Lake Bennett as far as the British Columbia and Yukon territory boundary line, seemed rougher and rougher, and the ties wider and wider apart. The culverts made it necessary for Chambers and I to hop along beside the car with planks in hand, ready to lay them down, so the car might cross in safety. It was hard, tiresome and dangerous work.

Darkness enveloped us before we were within even seeing distance of Caribou. We were still 70 miles from White Horse and the next day —the trains would be running. It certainly looked like an all night siege, but tired as we were after the day's exhausting trip, we continued to plod along. Lighting our lamps we found progress as good as before, but the wide spaces between ties and the annoying culverts continued.

About 8 that night, and to our great amazement, a broad ray of light appeared in the heavens, and played here and there in the firmament. It looked like a searchlight, and before long it was augmented by a second and a third. When, finally, the three rays combined played down the rails in our direction only to disappear and then once more appear, Chambers explained: "It's the steamboats from Atlin, the new mining camp. They're docking at Caribou." We learned later that the citizens of Caribou had received telegraphic information of our coming, and not having heard from us, were playing searchlights to locate us and show us the way to town. It was nearly 10 when we swept around the curve and over the bridge at Upper Caribou Crossing, the first automobile party to reach Caribou, and the whole population of the town, numbering some 200 souls, whites and Siashes, were out to greet us.

The next morning we left the railroad and took to the old government trail, which had not been used, so we were informed, since the introduction of the railroad. We ploughed a track through the deep sand which encompasses Caribou for about four miles, and were underway again. At eight miles, the road disappeared entirely, having been washed away by recent rains. Here we labored over one bad place, only to find another a few miles beyond, and so for 15 solid hours we worked with shovels and axes, digging dirt, filling gullies, brushing swamps, making bridges and laying corduroy roads, until with-



Stuck in Arctic Tundra Beyond 62 Degrees, North—Note Pry Under Wheel.

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in eight miles of White Horse, where we found an excellent road. We took the town of White Horse entirely by surprise, for nobody expected that we would make the place inside of three days, if at all.

The third morning out, we looked up Supt. Herbert Wheeler of the Royal Canadian mail and Dawson stage lines, who for the past 11 years has had immediate supervision over the carrying of mails in this region. He informed us there was no hope of reaching Dawson, since at this time of the year the Yukon, Pelly and Stewart rivers were not frozen over, and there was no provision for crossing them, as the last boat had come down for the winter. He said we might be able to make Carmack, and he wanted to go with us, because if an automobile could traverse the road, he certainly wanted one for hauling the mails, and he had as yet been unable to find a manufacturer who was willing to give him a demonstration.

And so, after a day's rest, the "Bull Dog" started from White Horse with another passenger, another axe and shovel, extra blankets and provisions. The Dawson trail differs from the old road from Caribou. It has many grades, and in spite of the work that has been done on it for 65 miles at an expense of $25,000 to the Canadian government, it is still a hard road for this distance. In carrying the mail, six horses are used at a time, and in relays of only 22 miles. Three relays are made in a single day of 12 hours' travelling.

For two days we sank up the hubs, and many times over the rims. Only by constant prying, and building up firm foundations of logs under all four wheels and making a firm roadbed beyond could we extricate the car. One favorable thing that can be said of the Yukon, is that there is no need of starving. The country fairly teems with moose, caribou and bear; grouse and rabbits are plentiful, and every stream is alive with trout and grayling. We drove through acres of wild berries of all kinds, and ate them until our faces and hands were stained.

On several occasions we passed encampments of Indians out for their winter's supply of meat and provisions. No amount of persuasion on our part, however, could induce them to stand and have their pictures taken, and in each and every instance they left their camps and took to their heels at the approach of the chugging automobile. They resisted every blandishment of both Wheeler and Chambers who offered them presents of tobacco.

Just before reaching Carmack we encountered the dreaded Arctic tundra. This is three feet deep with moss, underlaid with live springs, and is passable only after heavy cold snaps. It took us three hours to make 100 yards, and then only after we had used every method of prying the car out of the mass, and built corduroy roads. We were compelled to turn back at Carmack, a station on the Yukon river, 128 miles from White Horse, and 30 miles beyond parallel 62 degrees, North.

The return trip was but a repetition of the outward journey, excepting that we had been over the road and knew what to expect. Not once did we sleep in the open. Every 20 miles or so we found one of the deserted cabins of the Northwestern Mounted Police, and the Royal mail and stage stations. One night, beyond Nordenskjiold, it looked for a time as if we would be compelled to camp out, but the quick wit of Wheeler, in blazing out a new trail around a bad piece of swamp, saved the day.

The car withstood the strain remarkably well. We averaged 8.8 miles to a gallon of fuel throughout the entire trip, and used about two gallons of lubricating oil. Despite the terrific racking of the machine, and the extreme weight upon the tires while bumping over the ties, we did not experience a single blow-out or puncture.

We were the first to take an automobile from the tidewaters of Skagway to the headwaters of the Yukon, and besides winning the silver shield trophy offered by the Daily Alaskan, Brown and I were honored by being admitted into the famous secret order of the Arctic Brotherhood, into which none is admitted except he has made the trail beyond 54 degrees, North.

SAN ANTONIO CLUB GROWING.

The San Antonio Automobile Club, San Antonio, Tex., inaugurated a campaign recently to obtain new members and to stimulate efforts in this respect a gold medal was offered to the member obtaining the largest number of applicants. The prize was won by R. T. Pruitt, whose labors resulted in 101 names being added to the membership roll, bringing the total up to 300 and it is expected that another 100 will be secured by the next meeting.

In order to erect a clubhouse, shares of stock at $10 each are being sold and the members have subscribed liberally, assuring the success of the plan. The club has made arrangements for a large number of signs and these will be placed upon the highways and include danger signals. The officers of the club consist of: President, Dr. F. J. Fielding; vice president, W. H. Furlong, Jr.; secretary, W. J. Pearson.

ST. PAUL TO WINNIPEG.

The Minnesota State Automobile Association has taken up the matter of the annual tour for the Dispatch trophy in earnest and is outlining plans for a trip from St. Paul to Winnipeg and return, along similar lines to those which obtained in the tour from Minneapolis to Helena, Mont., last year. The tentative route calls for the following: First day, St. Paul to Little Falls and Wadena; second day, to Ada and Crookston; third, to St. Vincent and Winnipeg; fourth, in Winnepeg; fifth, to Neche and Grand Forks; sixth, to Wapleton and Elbow Lake; seventh, to Paynesville and St. Paul.

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Special Finish: White or Black Nickel and Gun Metal, $5.00 extra.

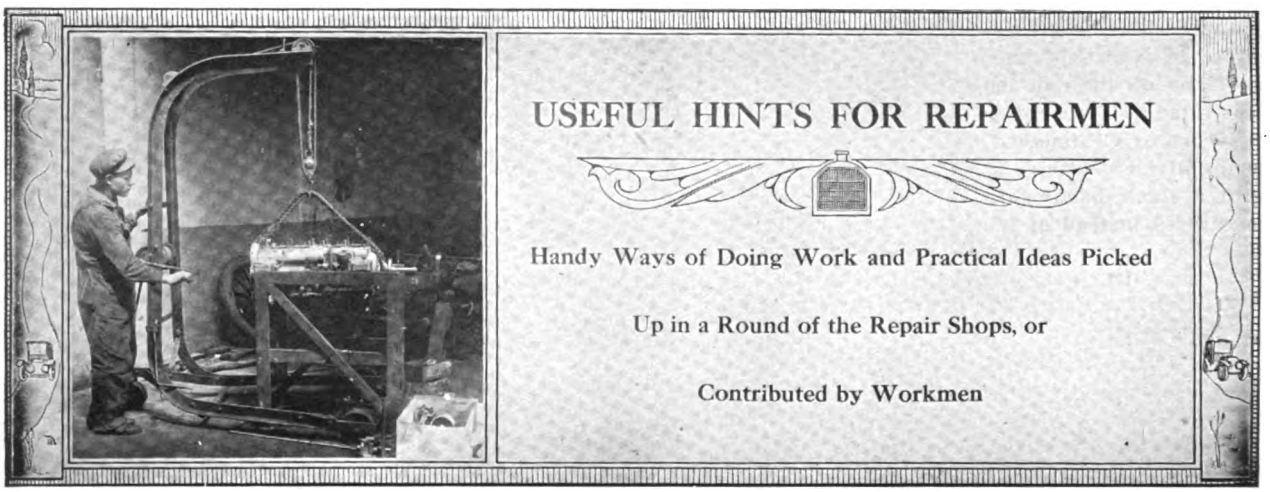
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MEASURING DEVICES FOR THE SHOP.

In equipping the shop with measuring devices, calipers should not be overlooked as these tools are very essential. They are made in several forms and are not expensive, although in purchasing these members it is poor economy to select cheap instruments.

Those shown at Fig. 1 A may be used either plain or with a spring nut. The device depicted at C is an inside transfer caliper and may be obtained either with a spring or a solid nut. The bow is stiff, making the instrument reliable. It is especially adapted for

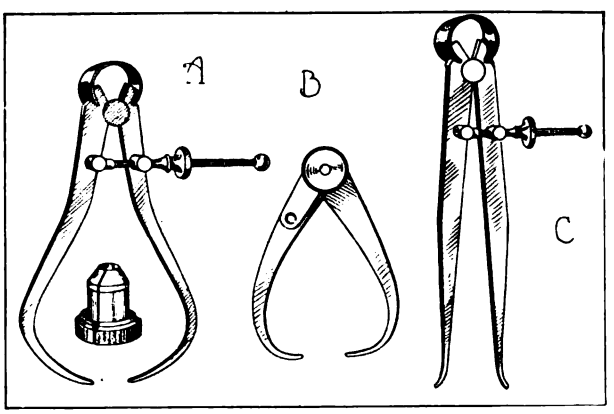


Fig. 1—Some Measuring Devices: A, Calipers; B, Adjustable Firm Joint Members; C, Inside Transfer Calipers.

calipering the inside of a chambered cavity and this is accomplished by springing in the legs so that the tool may be withdrawn. Upon releasing the grip the legs will spring back to their original position, showing the exact size of the opening calipered.

Adjustable Firm Joint Calipers.

The calipers shown at B are made in various sizes and can be instantly adjusted to their full extent, as quickly locked firmly in the joint, and are fitted with means for making a sensitive adjustment. These are an improvement over ordinary forms inasmuch as they are made with a tapering socket joint, locked or released by a partial turn of the knurled disc drawing it together. A spring washer fitted under the disc maintains an easy friction in the joint when unlocked.

In the underside of the short arm is a slot containing a stiff spring. Riveted into the middle leg and projecting through an opening in the arm, is a threaded stud on which is a knurled nut having a beveled hub, bearing against the cone in the arm. The action of the spring holding them together turns the nut, presses them apart and adjusts the legs when the point is locked. As the spring takes up all backlash the legs consequently are firm.

Calipers of the ordinary type, yet having a well constructed joint, are illustrated at Fig. 2 A. The joint is drawn together by means of a screw and the main stud is squared and fitted to one leg, thus preventing the former from turning when loosening and tightening, insuring a smooth and more uniform friction and more or less tension to suit the user. Screw thread calipers are similar to the members depicted at Fig. 1 with the exception that the points are constructed to fit the threads to be measured.

Gauges.

Regarding gauges, these are optional and will depend on how complete the equipment is to be made. For accurate work with twist drills, and when these members are constructed in the shop, a gauge such as shown at Fig. 2 B will be useful. This provides means for measuring the members in sizes from .25 to .5 inch in diameter. Each size of the drill is designated by both common fractions, also by decimals. Number drills from one to 60 are measured by a similar instrument and the size of each drill is given in decimal fractions. Gauges are also made for sheet metal and plates, standard wire, etc.

That shown at C is a screw pitch gauge and provides for measurement of a large number of different sized members. The teeth are sharp and clean cut, and can be used inside of a nut as well as on the outside of a bolt or screw. It also provides a convenient and reliable tool to use as a 60-degree centre gauge or to test the grinding of either an inside or outside threading tool.

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A machinist's pocket scale or rule should be included in every equipment. These are constructed of steel and of different lengths and thicknesses. That illustrated at D is a conventional type and is graduated in inches or millimeters. At E is depicted a form of spring dividers with solid adjusting nuts and equipped with a small handle or twirler. A spring nut may be utilized instead of the solid members.

PROPER CARE OF CHAINS.

With the rapid development of the commercial vehicle a new branch of repairing is opened to the shop and the increasing number of mechanical transports will have a stimulating effect upon the garage. The progressive owner of the repair shop is already making preparations for this line of business and there is no reason why a well equipped shop should not be able to handle the work as satisfactorily as pleasure machines.

As the majority of the motor trucks utilize chains for final drive it is an excellent idea for the repairman to brush up his knowledge of sprockets and chains. Many workmen who graduated from the ranks of bicycle repairers will discover that their experiences with the chain driven mount will be of value.

The secret of a chain drive, aside from lining up the sprockets, etc., is proper lubrication. Chains should be removed from the sprockets and washed thoroughly in gasoline or kerosene, removing every particle of dirt. A mixture of beef or mutton tallow and flake graphite is prepared in a large receptacle and the ingredients heated over a fire. The chain is then placed in the vessel and boiled. Upon removal it should be hung up to cool. The tallow and mixture will penetrate to all crevices, filling these completely, making an ideal lubricant. Chains cared for in this manner will give efficient service.

USING TINNER'S SNIPS.

The proper use of tinner's snips requires considerable skill. These tools are not only more difficult to manipulate than a file, but far more dangerous, as if handled carelessly or clumsily the pointed blades may cause a dangerous cut to say nothing of pinched fingers. In cutting sheet metal considerable strength is required as well as skill, and experts utilize a peculiar action of the palm and thumb to open the blades after each cut.

The proper way to use these instruments is to hold the tool so that the upper handle rests against the palm of the hand and the thumb bridges the handle. The fingers are placed below the lower handle and the end of the thumb bears upon this handle just above the position of the index finger. Unless one is familiar with the use of the snips, and heavy material is to be cut, the safest and easiest method is to clamp one handle in the vise, on the principle of the stock shears, and work with the other by hand.

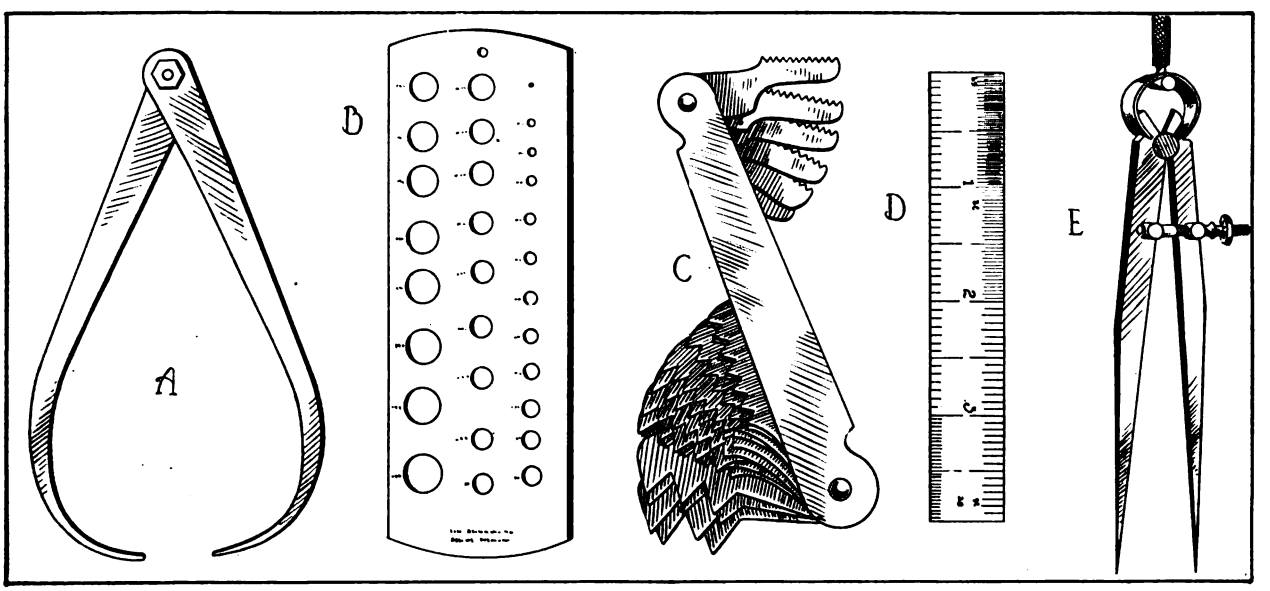


Fig. 2—Measuring Devices: A, Ordinary Form of Callpers; B, Twist Drill Gauge; C, Screw Pitch Gauge; D, Machinist's Steel Rule; E, Spring Dividers.

NOVEL ENGINE DESIGN.

A unique new type of engine, inasmuch as vapor from boiling gasoline is utilized and admitted under pressure to the cylinder, has been brought out in England, and although full particulars of the design are not at hand, sufficient details have been given out by A. R. Low, the designer, to make the motor of interest.

Briefly described, the Low engine may be said to be practically an ordinary jacketed member in which gasoline fills the jacket instead of water. The motor,

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however, is started in the usual manner by an ordinary carburetor and operated until the fuel in the jacket commences to boil and a vapor at considerable pressure is obtained. The jet of the carburetor is then shut off, so that the piston on the intake stroke supplies fresh air only to the cylinder. This is compressed in the usual manner by the up-stroke but upon the completion of the stroke a small volume of pure gasoline vapor is injected into the combustion chamber by a specially designed valve which is mechanically operated.

The mixture is exploded by a spark plug, but the special valve is so constructed and operated that while it opens quickly, its closing movement is considerably delayed, so that additional vapor continues to be injected into the cylinder. This continues even after the primamry ignition takes place. As soon as the explosion pressure commences to rise, the valve closes.

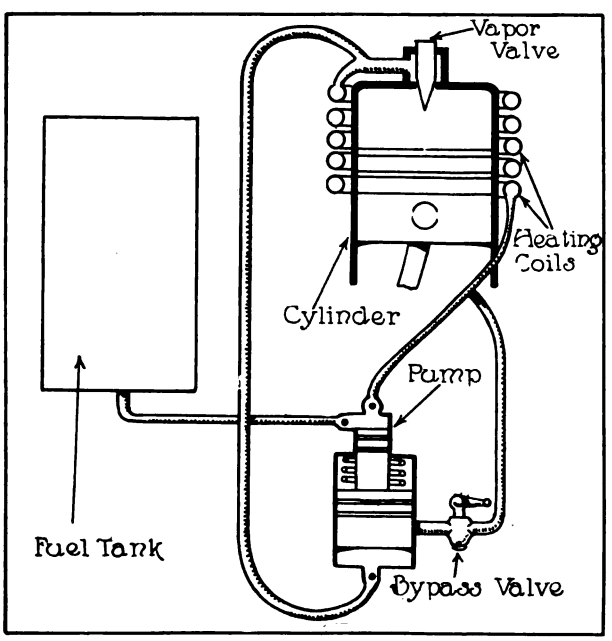


Fig. 3—New Type of Motor Utilizing Vapor from Boiling Gasoline and with Which High Compression Ratios Are Claimed.

Steady Piston Pressure.

The result is that this explosion pressure, instead of quickly resulting in a very high figure and falling off rapidly, drops away more slowly, and the pressure against the piston is more steady than with a sharp impulse. As a consequence, it is said, the torque diagram of the crankshaft of this motor is a very good one, having its peaks flattened down in a similar way to those of the indicator diagram.

The burnt gases are exhausted through a mechanical valve in the usual manner; in fact, it may be stated that the only way the Low motor differs from those of ordinary construction is that it has a third valve and a gasoline jacket instead of a water member. In some respects the Low engine follows the design of the Diesel. The spark of the former, however, instead of occurring momentarily, is purposely prolonged throughout the whole of the explosion stroke, and is supplied by a coil and storage battery, the idea being to provide as complete combustion as possible.

As the fresh air is only in compression on that stroke the compression ratio can be taken to an exceedingly high figure without introducing a liability to pre-ignition. That the engine is very efficient for its size may be gathered from the fact that a twin-cylinder motor with a two-inch bore and four-inch stroke, developed, it is said, about 18 horsepower, but the speed was not stated. The experimental engine was of the motorcycle type.

Supplying the Fuel.

The supply of fuel to the heating jacket is by means of a pump of the Worthington type, which utilizes pressure inside the jacket to force the liquid thereto exactly as a boiler uses its own pressure to supply itself with feed water. At Fig. 3 is shown a sketch of the engine and it will be noted that a throttle valve is incorporated, this controlling a form of bypass in the pump circuit, also regulating the supply of gas to the cylinder by governing the amount of gasoline fed to the jacket. In the new model being constructed it is understood that the air inlet valve will be fitted with an arrangement whereby its cut-off can be so adjusted as to balance with the gasoline vapor control, and when the motor is throttled down, the cylinder will be supplied with the same quality of mixture but a smaller amount. The new motor will have the combustion head jacketed for fuel, the balance with fins for small engines and water jacketed for larger members.

In the feed pump there is a double ended piston one end of which is considerably larger than the other, the smaller being of the direct acting plunger type drawing fluid from the supply tank and forcing it into the coil. As the pressure which is inside this coil is lowered by the volume of vapor which is injected into the cylinder, the piston pump reciprocates and maintains the supply, the throttle or bypass member taking the form of a tap substituted in a pipe which, when uncovered by the large piston, short circuits, as it were, the top and bottom coils of the vaporizer. A spring is fitted above the power piston of the pump, causing the latter to float while reciprocating up and down very rapidly, and by this means a constant and steady supply of fuel is fed to the jacket. The drawing is that of the first experimental engine and it will be noted that coils are utilized instead of a jacket.

HANDY PISTON CLAMP.

In overhauling the piston of the motor it is sometimes necessary to place the member in the vise to perform certain work. The usual method is to grip the piston between two grooved pieces of wood. While this will hold the parts securely, it leaves but a small portion of the piston accessible without changing its position. A handy clip for holding the piston may be

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made from a piece of flat .75-inch spring steel about .125 inch thick. This is bent in circular form and two ends left for gripping in the vise.

HEAT RADIATION AND PAINT.

It is generally believed that there is a great loss in efficiency from painting radiators. A series of experiments conducted by Prof. C. L. Norton of Boston upon the transmission of heat through and from painted surfaces shows that the color has little or no effect upon the radiation of heat, though the condition of the surface with respect to glossiness or dullness has quite a sensible influence. Taking the amount of heat radiated from a new pipe as 100, Prof. Norton obtains the following values for heat radiation, under similar conditions, from pipe treated as indicated:

New pipe	100
Fair condition	116
Rusty and black	119
Painted dull white	120
Painted glossy white	100
Coated with cylinder oil	116
Painted dull black	120
Painted glossy black	101

It will be noted that a dull surface, whether it be white or black, has a radiative power of 120, and a glossy surface of either color, has a corresponding value of only about 101.

FILLING HOLES IN CASTINGS.

A metal that is valuable in filling holes in castings, because of its expanding qualities when cooling, is made from nine parts lead, two parts antimony and one part bismuth.

OLD ORCHARD'S BEACH MEET.

What is expected to be the most important racing event in the East during 1912 will be the three-day meet at Old Orchard Beach, Me., July 4-6. Frank Lowry of Indianapolis, Ind., has been appointed chairman of the contest committee of the Old Orchard Automobile Association, which has decided to give approximately $6000 in prizes, in addition to cups, for the meet. Mr. Lowry has been in Detroit during the past month in an effort to interest the manufacturers of that centre in making entry. It is announced that during the meet Louis Disbrow will make an attempt to create new world's records against time in a specially constructed racing machine.

$10,000,000 TAX FOR MOTORISTS.

W. Pierrepont White in speaking on the highway situation in New York State at Albany, recently stated that if an additional $50,000,000 is to be voted for highways, motor cars will have to pay $10,000,000 in license fees. He called attention to the fact that of the $50,000,000 appropriated to construct 2915 miles, 1800 remained unconstructed and that it was proposed to build these in one year and all to serve a few selected counties. This would leave, he stated, slightly over $1,000,000 to complete highways for the remaining portions of the state, and he further averred that the constitutional provision which promised an equitable distribution has been violated. Mr. White suggested that the state should assume entire control, management and maintenance of the proposed 10,000-mile highway system and the roads should consist of main highways only. He also proposed that the state should build the roads and that these be proportioned equally which plan would create in 10 years taxable values of $750,000,000 in return for an expenditure of $100,000,000 in road construction. Even with this vast sum Mr. White stated that it would not be sufficient and that the 200,000 motor vehicles would have to be taxed $50 a machine, creating an annual fund of $10,000,000.

PLUMMER RE-ELECTED PRESIDENT.

John F. Plummer, agent for the Locomobile Company of America, was unanimously re-elected president of the Automobile Dealers' Association at a meeting of the board of directors of that organization held in New York City recently. The other officials selected were as follows: vice president, Frank Eveland; secretary and treasurer. C. P. Skinner; board of directors, M. J. Budlong, R. D. Garden, H. M. Bronner, C. M. Brown, A. L. Newton and Arthur M. Day. The addition of a number of new members was announced as well as progress noted in legislative matters in which the association is taking an active part.

WOULD FORBID AUTOMOBILE RACES.

Senator McManus of New York State has introduced a bill forbidding automobile races on roads or tracks in that commonwealth. Chairman William Schimpf of the contest board of the American Automobile Association has authorized Charles Thaddeus Terry to appear in opposition to the measure, and it is understood that Melvin A. Bender, representing the New York State Automobile Association, will join him.

CHINA'S PRESIDENT DRIVES E-M-F.

China, the youngest republic, appears to be up-to-date in all its views. Jan. 29 H. S. Honingsberg, the Studebaker Corporation's representative in Shanghai, China, delivered to President Sun Yat Sen two 30 horsepower E-M-F touring cars. Unlike the custom in the United States, these machines were purchased with private and not governmental funds. However, this is an indication of the liberal views of the new republic, since it is hardly conceivable that the deposed royal family would have dared venture forth in one of the modern inventions.

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America is more than ordinarily interested in the outcome of the Tour de France, which began under the auspices of L'Auto of Paris and the sanction of the Automobile Club de France, March 1. Six machines of American manufacture took part in the event, which was scheduled to come to a conclusion in Paris, March 20. Undoubtedly, the results will not become known on this side for a few days.

The Tour de France is entirely new, being somewhat upon the order of the so-called Glidden tour in America. While described as an endurance run, with a schedule averaging approximately 240 miles a day, the scores will be based upon the ability of the contestants to maintain a certain speed, this being calculated at 30 kilometers (18.6 miles) an hour for light cars and 25 kilometers (15.5 miles) for voiturettes. In order to prevent racing, no times were announced until the completion of the run.

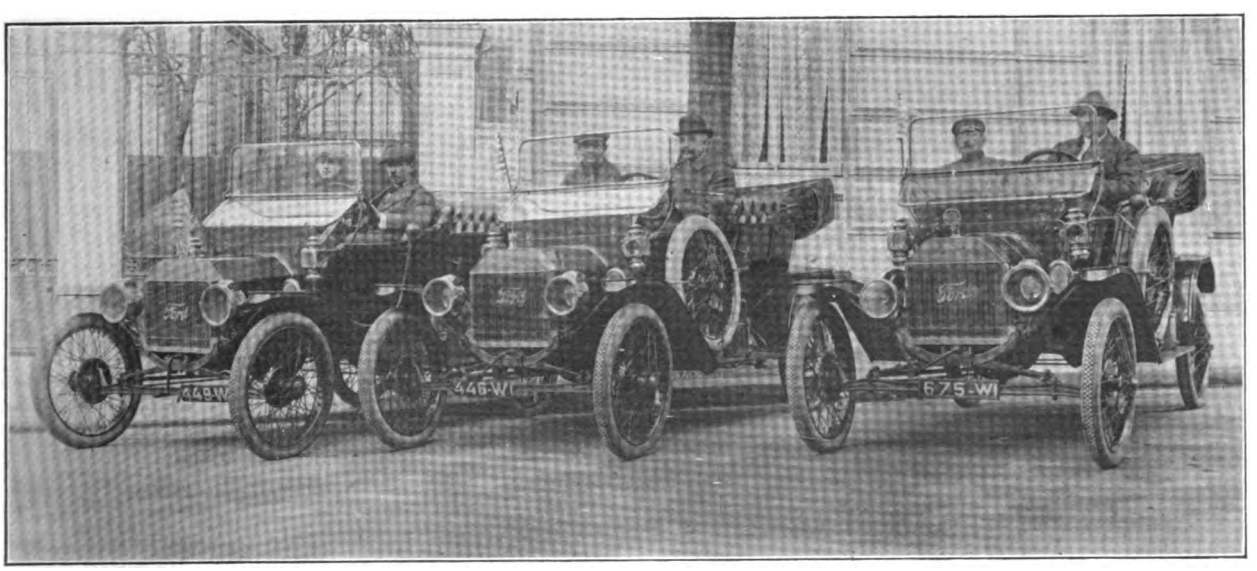
The route covered about 5000 kilometers (3105 miles), starting and ending in Paris, with night stops at Nancy, Besancon, Lyons, Grenoble, Nice, Marseilles, Montpelier, Toulouse, Bordeaux, Nantes, Le Mans, Rouen and Rheims. Five stops of 24 hours were made for the purpose of demonstrating the contesting cars, so that the event included a sales feature as well.

The competing cars were divided into two classes. Light cars included all vehicles of which the chassis price, without tires, did not exceed $1558, and voiturettes, all vehicles of which the price complete with body and tires did not exceed $890. Both classes were required to be fitted with two-seated bodies, windshields, wings, steps, lamps and headlights.

Of the 62 machines entered, three were Fords, made by the Ford Motor Company, Detroit; two were Reos, made by the Reo Motor Car Company, Lansing, Mich., and one was a Hupmobile, made by the Hupp Motor Car Company, Detroit. Accompanying illustrations show the six cars as they appeared when about to depart from Paris at the beginning of the tour. It will be noted that all except the Hupmobile were fitted with wire wheels, which are not included as standard equipment in this country.

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Discussing self-starters in a recent issue of The



The Ford Team, Comprising Three Cars, Which Took Part in the Recent Tour de France, Under the Auspices of L'Auto of Paris.

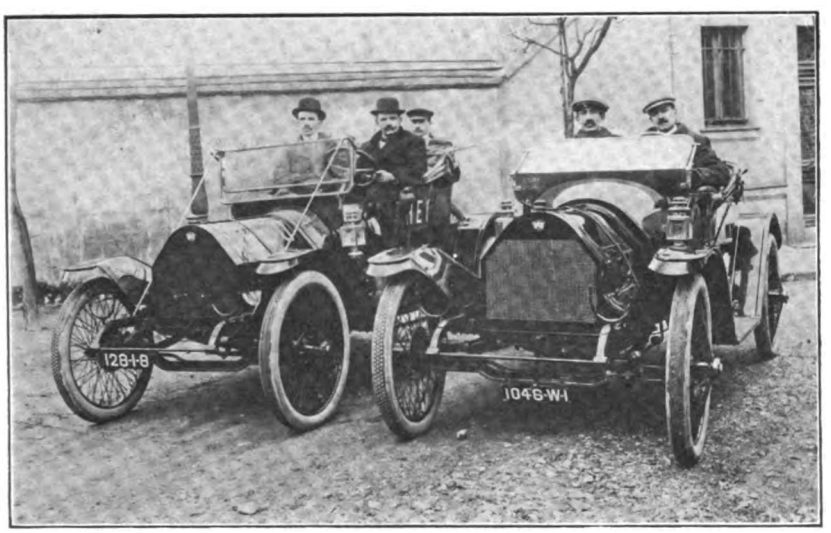
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Autocar (British) J. Dalrymple Bell brought out a number of features which will prove of interest to Americans. Quoting from his article, he says in part:

"The probable reason of the development of the self-starter in America is the difference between the trade systems of that country and this. In America it is usual for the car to be supplied complete with the usual accessories by the manufacturer, while in this country the supply of accessories is, generally speaking, a separate and distinct trade. Between the motor car manufacturer and the accessory manufacturer the self-starter has fallen to the ground.

"The self-starting systems available at present may be classified as follows: A, explosion; B, compressed air; C, electric; D, mechanical.

"When a four or a six-cylinder engine is stopped by switching off, it will, as a rule, start again within a short period by switching on the starting ignition, and to this extent these engines are self-starting. When they refuse to start in this way it is because there is



Two Reo Machines, Fitted with Wire Wheels, in Their First Foreign Contest, the Tour De France.

no explosive mixture in the cylinders, or the cylinder, the piston of which is on the firing stroke. It would appear to be obvious and simple to provide some means of insuring the presence of explosive mixture in the cylinders, and a pump for forcing it in at once suggests itself as the simplest solution of the difficulty. In fact, fundamentally, every start is brought about by one way or another causing the fluid to enter the cylinders, so that the crude starting handle might be rightly included in the first class of starters, because by its mean the engine is caused to act as a suction pump and the start is caused by the explosive mixture being drawn in and ignited by the spark.

"But when the problem of forcing the mixture of gas and air in explosive proportions into the proper cylinder, or cylinders, comes to be tackled, several cognate difficulties are encountered. First of all, whether it goes to the other cylinders or not, it must go to the proper one, and two ways of insuring this are to use a distributing valve, either automatic or driven by the engine, and a single pump, or to provide a fuel pipe for each cylinder. If a multiple-barrelled pump be used the several cylinders may be combined in a unit and operated together, but even so, six combined pumps, as would be required for a six-cylinder engine, would be somewhat clumsy.

"One of the chief objections to an ordinary distributing valve is that it must be driven by the engine, and apart from the special arrangements required it is in motion all the while the engine is running. An automatic valve is not subject to this objection.

"The solution of another problem encountered in connection with the explosion starter has in all probability kept back this form of starter more than anything else. However ingenious and perfect the arrangements for conducting the explosive mixture to the proper cylinders may be, reliable starting cannot be obtained unless the mixture is such that the proportion of gas, or vapor, and air are within the explosive limits. For instance, a mixture of gasoline vapor and air in the proportion of two volumes of vapor to 98 of air is the poorest mixture which will explode under atmospheric pressure. Again, a mixture in the proportion of five of gasoline vapor to 95 of air is the richest mixture which will explode under atmospheric pressure, and these proportions are called respectively the lower and upper explosive limits. That is to say, the mixture to be explosive in the case of gasoline vapor and air must be correct within three per cent., which is termed the explosive range.

"This range, however, is increased by increase of pressure, but to what extent has not been determined so far as I have been able to find out. This means that for the purpose of starting with the natural working fluid of the engine, gasoline and air, the mixture must be confined within narrow limits of accuracy, and as an unknown quantity in the amount and quality of the residual charge in the cylinders exists, this accuracy of mixture is all the more difficult.

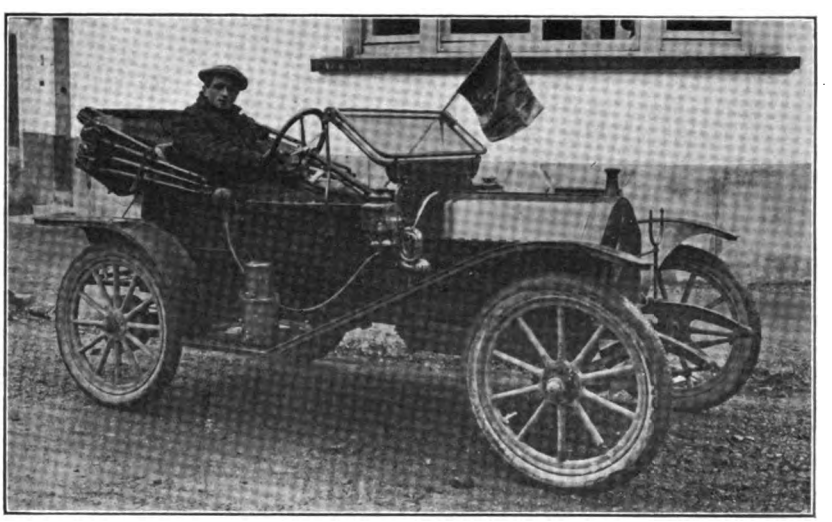
"When conditions and requirements are known to be variable, they can often be met by a corresponding variation, and in the case of the explosive mixture starter, if a mixture varying from rich to poor be pumped into the cylinders it is bound to pass through the explosive range, and it then only remains to cause an igniting spark to take place while the mixture is within that range. As it is quite easy in practise to do this, this system of pumping the mixture has been adopted in connection with the automatic distributing valve, and also with the multiple-barrelled pump previously referred to, and it is

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claimed that gasoline and air, when used in this manner, are quite reliable even in the coldest weather.

"One method of meeting the difficulty caused by the narrow explosive limits of gasoline vapor and air is to use pure oxygen instead of air. This gives powerful and certain results, but as such a charge is exceeding inflammable and the explosion exceedingly rapid, the precaution of retarding the ignition must be taken, for with the slightest degree of advance premature ignition will take place in the second cylinder to fire, and as this charge is under compression the effect is very powerful. In fact, the use of pure oxygen creates a greater explosive range than is necessary, and it is advisable that the oxygen should be diluted, or that the mixture should be such that it does not give the maximum explosive effect.

"Another method of meeting the difficulty of mixture is to use another combustible gas, with a wider explosive range, instead of gasoline vapor and air, and acetylene is a suitable gas for this purpose. The explosive range of acetylene and air mixtures extends from three to 52.5 per cent., so that with this gas it is extremely easy to obtain an explosive mixture. The chief objection to its use is that it is foreign to many cars, and it must be used in its purified and dissolved state, and therefore it is a little more expensive. It has, however, the advantage that only five to seven cubic inches are required for the start, whereas 100 to 150 cubic inches of air and gasoline vapor are required, and this means that if a hand pump be used one stroke is sufficient with acetylene, whereas six to 10 strokes would be required with gasoline. Another point is that with this moderate quantity of acetylene a cylinder of dissolved acetylene containing five cubic feet will give over 1200 starts, while a 20-cubic foot cylinder will give four times that, or nearly 5000 starts.



La Voiturette Hupmobile, as the French Term It, Representing America in L'Auto's Tour De France.

"The compressed air system seems to be second in popularity in America, but there are two cars in this country fitted with it as a standard, which have been on the British market for some little time. It is essential in most cases that this system should be fitted by the engine builders and that it should be allowed for in the design of the car. Compressed air or exhaust gas which has been stored under pressure is admitted by means of an engine driven distributing valve, to the cylinder which has its piston on the firing stroke, so that the engine is driven by air pressure until it picks up on its own explosive mixture. At first, in fact, it runs as a compressed air engine.

"The reliability of this system is quite equal to that of the explosion starter provided that the engine picks up at once, as of course it should, but it must always be borne in mind that the supply of pressure is limited, and that its replenishment requires a considerable number of engine revolutions. The pressure used varies from 40 pounds a square inch to 300. Of course, the higher the pressure the greater the storage capacity in a given space, but when the pressure falls under 100 pounds a square inch, or so, it is as a rule insufficient for starting a four-cylinder engine. With a six-cylinder engine less pressure is required, as each piston operates through one-third revolution instead of one-half and there is, therefore, no dead point.

"In putting the electric system in third place of importance, its figure of merit is brought there by consideration of its cost and weight. As it amounts to a separate and distinct power plant in itself, the engine is bound to start if turning it around will cause it to do so. It is even conceivable that the car might be moved about under electric power. This system also has the advantage of providing a source of current for electric lighting, etc.

"In considering the question of self-starters in general, my conclusion is—and I write from experience gained from several years of experimental work in connection with them—that the explosion starter is for general use the best system. It is to the internal combustion engine what 'live steam' is to the steam engine.

"If a really elaborate and absolutely certain system be required, and if the expense be a secondary consideration, then the electric system stands alone. So far as reliability is concerned, the compressed air and explosion systems stand together. So far as simplicity and low cost are concerned, the explosion system stands alone."

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The Canton du Valais, Switzerland, has authorized the opening of the road which connects Martigny and Chamonix to automobile traffic. This will permit tourists to enter this portion of Switzerland without being obliged to take the route by way of Geneva or Aix-les-

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Bains. Regulations will date from June 1, 1912, and will be framed with regard to the time of day when cars can use the road. Inasmuch as its width at present will not permit vehicles to pass each other, cars will be driven from Martigny to Chamonix in the forenoon and in the opposite direction in the afternoon.

★

British motoring publications have been demanding for some time that racing cars be rated by classes based upon the cubic capacity of the cylinders, and it would appear that the Royal Automobile Club has acceeded to this demand in announcing a new rating formula for 1912. This will apply to all events held on the Brooklands track in the future, and should give the public better opportunity to compare the results with those made on American tracks.

The new rating does not coincide with that in vogue in the United States, under the jurisdiction of the contest board of the American Automobile Association, but it does provide for taking the stroke into consideration. Nine classes are provided, the maximum cylinder capacity in each being as follows: A, 100; B, 125; C, 150; D, 175; E, 235; F, 305; G, 475; H, 850; J, over 850. The American ratings are as follows: Class 1B, 160 and under; 2B, 161-230; 3B, 231-300; 4B, 301-450; 5B, 451-600; 6B, 601-750.

In the matter of minimum weight the British rules call for the following: A, 1400; B, 1500; C, 1600; D, 1800; E, 2000; F, 2250; G, 2500; H, 2700; J, 3000. The American rules provide: Class 1B, 900; 2B, 1200; 3B, 1500; 4B, 1800; 5B, 2100; 6B, 2400.

Of course the adoption of new rules creates a new record classification, and the present British speed records in miles an hour are:

	Car	Mark	Speed
Class B	Lion Peugeot	Half-mile	72.333
Class D	Singer	Half-mile	90.040
Class D	Austin	Kilometer	93.790
Class E	Vauxhall	Half-mile	100.083
Class E	Straker-Squire	Kilometer	96.670
Class F	Vauxhall	Half-mile	97.670
Class G	Benz	Half-mile	113.759
Class G	Pobble	Kilometer	86.043
Class G	Sunbeam	11 Hours	75.720
Class H	Napier	Half-mile	94.132
Class H	Thames	50 Miles	91.320
Class J	Benz	Half-mile	127.877

★

Although plans for a Prince Henry tour in Germany this year have failed to mature, the Imperial Automobile Club, with headquarters at Berlin, is arranging an international reliability trial for small cars, for July 1-7. The route will lead from Berlin to Dresden in five daily stages, including a detour from Breslau to Glatz and return, July 5. The average distance to be covered each day will be 187 miles, the night stops being at Stettin, Posen, Breslau (two) and Dresden.

It is anticipated that American manufacturers will embrace the opportunity to demonstrate their product in this event. Following the conclusion of the run an exhibition of prize winning vehicles and the distribution of awards will take place at Dresden. This is expected to afford a chance for makers and representatives to call attention to their cars in a manner calculated to establish a demand therefor.

The competition is open to all vehicles with four wheels and internal combustion motors of not less than four or more than eight horsepower. They must be touring cars complying with the detailed regulations which may be obtained from the Imperial Automobile Club, Berlin.

LITTLE GLIDDEN BECOMES IOWA TOUR.

The Iowa State Automobile Association underwent a reorganization during the recent show in Des Moines, and steps will be taken to increase the membership materially during the coming year. H. Leslie Smith of Chicago, an organizer of some note, has been engaged as secretary-treasurer and will receive compensation on the percentage basis. The endurance run formerly conducted by the association under the name of the Little Glidden will be known in the future as the Iowa tour. President W. E. Moyer has appointed a committee to arrange the details for this annual event and to secure a suitable trophy to cost between $1000 and $1500.

BAR HARBOR'S MOTOR WAR ENDS.

By a vote of 469 to 193, the town of Eden, Me., in which is located Bar Harbor and Mt. Desert Isle, has adopted the act passed by the last Maine Legislature granting permission for automobiles to use the road leading from the bridge at Mount Desert Narrows in Trenton to a point in Bar Harbor not more than half a mile from the Bar Harbor postoffice. This ends the war against motor cars which has been carried on by the people of Bar Harbor since 1903, when they petitioned the Legislature for an act prohibiting such use of the highways in the town of Eden. The constitutionality of this act was determined by the supreme court of Maine in 1909, but since that time public opinion has changed decidedly.

NO AMENDMENTS IN NEW YORK.

It is announced from an apparently authoritative source that the New York Legislature will make no change in the so-called Callan automobile law during the present session. Several amendments have been introduced and the organized motorists in that commonwealth have been exceedingly busy at hearings before the various committees. It is claimed, however, that the leaders have come to the conclusion that it would be wiser to give the Callan law another year's trial before making change.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ **ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.**

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

	"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA" 2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
3½-in. Auto Clock.....	28.00	30.00	45.00	Only made in
3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—**Add $3.00 to above Price Lists.** (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

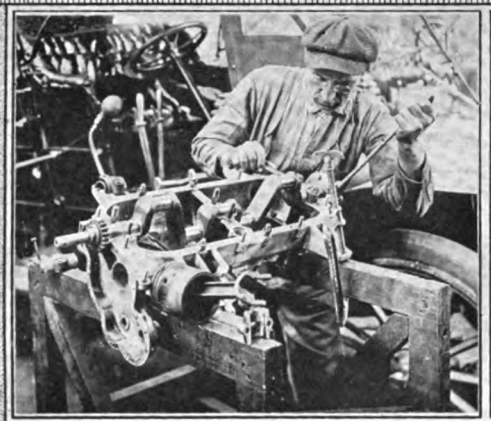
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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

ELIMINATING TAPPET NOISE.

There is a growing tendency to enclose the valve tappets and springs and this practise is not confined alone to the high priced automobile. This not only makes for a quiet running motor, but the life of the mechanism is lengthened considerably by being protected from the dust and dirt of the road which is attracted by the oil covered members.

While many modern motors are designed so that a removable plate may be fitted there are numerous

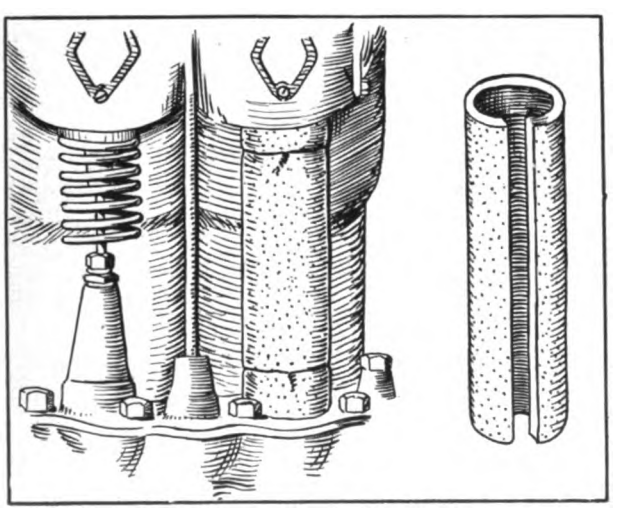


Fig. 1—Suggestion for Quieting Noisy Action of Valve Tappets.

old engines which are giving good service although the tappets are more or less noisy. At Fig. 1 is presented a suggestion for eliminating noise as well as providing protection from foreign elements.

It consists of a piece of rubber tubing fitted around the tappet and valve spring and when properly attached will reduce noisy action of the members to a minimum. With a motor such as depicted in the drawing it is an easy matter to fit the device. The tubing should be larger than the diameter of the valve spring and is cut as shown in the sketch. It is then wired or taped so the edges are drawn together tightly.

In fitting the hose, should the valve springs be larger or the same in diameter as the base of the tappet housing, this and the upper seat of the spring may be enlarged with a washer made from a smaller tubing, and a hose of greater inside dimension employed to cover the extensions. In fitting these devices care should be taken to use a heavy grade of piping with its inside diameter large enough to allow the spring to move freely and without coming in contact with the walls of the tubing.

REMEDYING LEAKY VALVE TAPPETS.

It is very unpleasant after lifting the hood to make a minor adjustment to the motor to discover that the latter is literally covered with dirty oil which has worked past the valve tappet guides and the tappets. It is even more disagreeable if the operator be not equipped with an old coat or arm protectors in the failure of which good clothes often are spoiled.

Two conditions are responsible for the presence of dirty lubricant, and these are more common with old motors or those which have been in service for some time without attention having been given to the valve operating mechanism. When a motor is new and the rings and pistons are fitted properly there is little compression in the crankcase of the four-cycle type. In time the rings wear, especially if the lubrication system has not performed its function properly or the operator has been careless as to the quantity and quality of oil.

When these conditions exist the compression on the up-stroke of the piston leaks past the rings and pressure is created in the crankcase, the amount depending upon the fit of the rings, etc. It is obvious that even with a small amount being forced into the crankcase at every stroke of the piston, it takes but a short time for the pressure to rise and some of this must escape. If the lower half of the crankcase be fitted snugly, the oil will find its way where the re-

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sistance is the least and this may be between the valve guides and the tappets if worn, or around the end bearings of the crankshaft.

Fitting of Breather Pipes.

In modern motors provision is made for the crankcase compression by fitting breathers or standpipes. These consist of open pipes leading into the crankcase, extending vertically and being several inches in height. The top of these members, and usually more than one is fitted, is covered with a fine mesh screen to keep out foreign elements. Not only do the breathers relieve excess compression in the crankcase but they are utilized in replenishing the supply of lubricant in the crankcase and in introducing kerosene when this requires cleaning.

When the valve tappet guides and tappets are worn, and no method incorporated for relieving the compression in the crankcase, the lubricant will be forced out and it is impossible to keep the valve side of the motor clean. Even the fitting of breathers will not wholly eliminate the trouble, nor will cutting down the supply of lubricant effect a cure.

New Members Expensive.

The proper method is to replace the worn members with new parts and with a four-cylinder motor this means eight valve tappet guides and a like number of tappets, incurring considerable expense, the amount depending upon the design. The worn parts could be removed and new guides turned out, but the cost of machining and fitting in some cases probably would not warrant the expenditure.

Leaky members may be cured or conditions bettered by relieving the crankcase compression with breathers if the motor be not thus equipped. At Fig. 2 D is shown an inexpensive breather applicable to a motor, the design of which will not permit the use of a vertical member. That referred to consists of two pieces of brass piping having both ends threaded, an elbow and a cup shaped member. These may be procured at any wholesale plumbing shop and are not expensive. The inside diameter of the pipes should not be less than .375 inch, this depending upon the size of the motor, etc.

A hole is drilled in the crankcase and tapped, and the parts assembled as shown. The cup shaped member should be fitted with a screen and this may be soldered. It should screw up snugly but fit so that it may be removed easily when desired. The number of breathers will depend upon the motor. Some makers fit one large member while instances of four of these devices are noted.

Supplying Grooved Members.

At Fig. 2 is depicted several methods of remedying leaky valve tappet guides and tappets. That at A consists of cutting vertical grooves in the tappet. The objects of these are to provide a passage for the oil that works up to return to the crankcase. At B is shown a circumferential groove, this being about .125 inch deep. Connecting with this are two grooves, one on either side, and these lead to the bottom of the tappet. Any oil working up will gather in the larger recess and find its way back into the crankcase. At C is outlined a method of cutting two grooves in the guide bushing and it will be noted that the top of this member is cup shaped. This gathers the superfluous lubricant which runs back into the crankcase through the two grooves in the bushing. This repair will appeal to the average motorist as the bushing is easier to cut than the tappet which is hardened and will require drawing of the temper and rehardening.

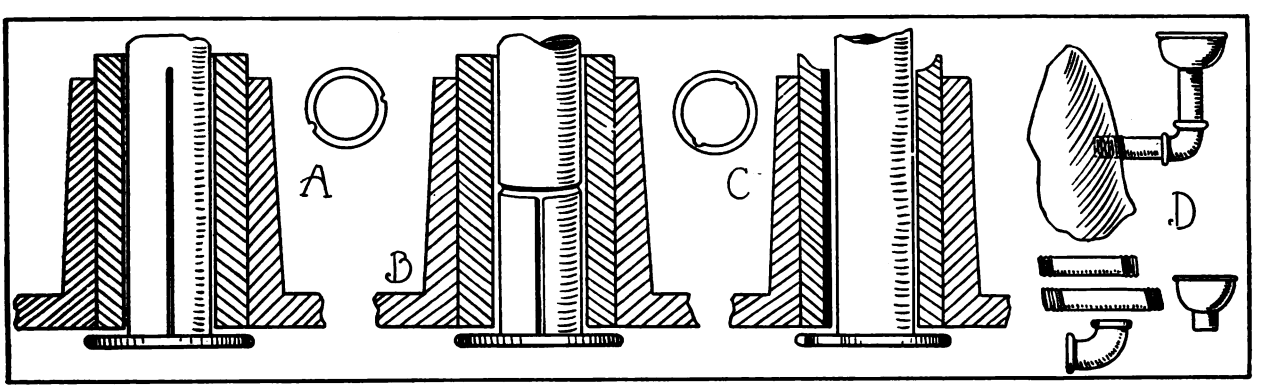


Fig. 2—Remedying Leaky Valve Tappets: A, Cutting Grooves in Tappet to Allow Oil to Return to Crankcase; B, Circumferential Recess and Grooves; C, Cupping Valve Guide Bushing and Grooving Sides; D, Home Made Breather Adaptable Where Vertical Member Cannot Be Fitted.

ANTI-FREEZING SOLUTION HINTS.

With the approach of April the cooling system of the motor car should be given consideration. Those who have employed an anti-freezing solution of sufficient strength to take care of low temperatures will discover that the motors on mild days show signs of heating, especially if operated with a retarded spark or allowed to run idle.

This does not indicate that the cooling system is at fault. It must be remembered that denatured alcohol boils at a temperature of about 172 degrees Fahrenheit and that even when blended with water, will heat more easily than the latter alone. Many

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motorists are still employing a solution having 25 per cent. alcohol, but this is not necessary as it is to be doubted if the thermometer will register many degrees below the freezing point from now on.

Five per cent. of alcohol and 95 per cent. water will not freeze with temperatures higher than 25 degrees above zero Fahrenheit, and a solution of this strength will not unduly overheat the motor even when the thermometer registers well above the freezing point. If the car be exposed to the cold it is well to employ a solution of the above strength until well into April, as freezing weather will prevail at night.

Those who have made it a practise to cover part of the radiator should remove the covering on mild days or dispense with it entirely. The fan belt should be replaced to prevent the water in the cooling system from becoming overheated. If the old anti-freezing solution has been maintained at its full strength water should be added until the hydrometer shows but five per cent. alcohol. If the solution is dirty, it is an excellent plan to throw it away and use new. The radiator should be thoroughly cleansed before using the new mixture. This may be accomplished by making a saturated solution of sal soda or common washing soda, afterwards flushing out the cooler with clean water. The motor should be run during the operation to allow the fluid to circulate freely, and the water should be changed several times.

HOME MADE WORK BENCH.

Many owners garage their machines upon the premises and the average building is constructed to house one automobile and leave room enough to work around the machine. There is more or less minor work necessary, even if the owner does not attend to his own repairs.

Under these conditions and even where more extensive work is done the garage should include a work bench fitted with a vise. This combination will lighten labors wonderfully as well as facilitate the work. In addition the tools are kept in their proper place, being handy when needed and economy is effected as their cutting edges are not damaged.

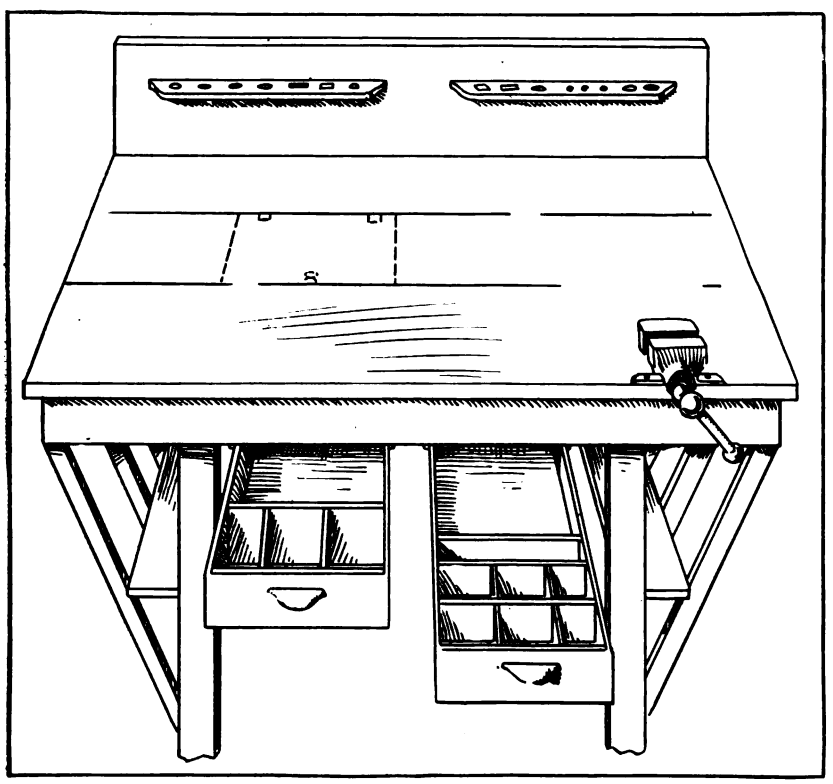


Fig. 3—Plan of Home Made Work Bench Which Provides for Shelves and Drawers, a Valuable Addition to the Equipment of the Private Garage.

A substantial work bench may be constructed at little expense if one can handle a saw, hammer and trysquare, and the design may be elaborate or simple, according to the tastes of the motorist. At Fig. 3 is presented a bench which will answer all requirements. It will be noted that provision is made for drawers and that in addition to the bench proper a lower shelf is included.

The dimensions of the design illustrated provide for a bench five feet in length, two in width and about two feet 10 inches high. The latter dimension may be increased or decreased according to the height of the user. It is not a good plan to build the bench so low that one will have to bend over in working. The height given is about the average.

The lower shelf is approximately three feet long and two wide. The side members are about nine inches wide and two feet long. It will be noted that the bench proper is fitted at the back with a vertical extension and that provision is made for the tools. Two strips are made of wood and these bored to take screw drivers, files, pliers, scrapers, etc. If one wishes to lock up the tools a section of the bench may be cut out and hinges and a lock fitted, the tool racks being attached on the inside, as outlined in the drawing.

The lumber used may be planed or unfinished stock, according to tastes of the owner. The planed material costs slightly more, but presents a neater appearance. The legs of the bench should be constructed of square joists and the bench proper of material at least two inches thick. The latter should be free from knots, and the planks nailed securely to prevent warping. The drawers may be made of whitewood, but they should be sturdy as in time con-

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siderable heavy material will be placed in them.

The trays should be divided into several compartments in which the nuts, bolts, cotter pins, etc., should be separated. It is surprising to note the number of motorists and even repairmen, who jumble these parts together and when a nut or bolt is wanted, lose considerable time in searching for the desired article.

In the overhaul work the bench will prove useful for the various small parts may be stored on the lower shelves while the ample size of the bench proper will accommodate the cylinders and other parts removed for cleaning and attention.

A TIRE CHAIN HINT.

In the spring of the year when the frost is coming out of the ground one is apt to encounter mudholes, especially in the country. Even with the usual tire chains the motorist is liable to have the rear wheels sink deep in the mire and the car refuse to budge although the wheels spin. The following kink is suggested by an automobilist whose work carries him over the country roads throughout the year: If the wheels spin and become buried in the mud, remove the chains and take one member and wrap it around the tire as you would a blow-out patch. Treat the other wheel in a similar manner, and upon applying power with the low speed gear in mesh, the machine will jump out of the hole. The bunched up chain provides traction not possible with the member fitted in the usual manner.

TIGHTENING HUB CAPS.

Occasionally hub caps are lost through carelessness in replacing these members after lubricant has been applied. While they should be set up snugly, undue force should not be used as the threads of the brass member may become stripped. An excellent plan is to screw the caps up tightly then tap the wrench a light blow with the hammer. Sometimes too much lubricant is utilized and when tightening up the cap the grease gives one the impression the cap is snug.

DOUBLE CURING OF TIRES.

"Although the term 'double curing of tires' is mystifying to the average motorist, it is perfectly simple," says L. C. Rockhill of the Goodyear Tire & Rubber Company, Akron, O. "The Goodyear No-rim-cut tire passes through a long process between the time it leaves the factories until ready for shipment. Before it is cured the rubber is soft and plastic. It becomes more so when subjected to the steam heat of the curing process.

"The first step is the tire mold. This is continued just long enough to give the tire its shape and to insure that the layer of fabric and the gum of the carcass have been cemented thoroughly. Then the shoe is taken out of the mold and inspected carefully. This mid-cure examination makes it possible to detect 'duck pinches,' unsuspected accidental folds in the fabric, or any other imperfection that might creep in.

"The surface of the shoe is then roughened and the heavy rubber tread attached. When this is in position an air bag is placed inside the carcass and the tire wrapped firmly in a long strip of damp muslin. Then the air bag is inflated so that the tire, in the final cure, will take exactly the shape it will have when in use. By this method the possibility of unbalanced strains is eliminated."

CARE OF MAGNETO PLUGS.

Owing to the intense spark provided by the magneto the plugs should be removed occasionally and examined for satisfactory results. Unlike the ordinary plug, current for which is furnished by a battery, the magneto plug operates best with a small gap. This should be about .015625 inch, but it may be increased in time by the action of the heat. Sometimes erratic running of the motor at low speeds is due to irregular spark plug gaps. They should be uniform.

OVERLAND BOWLERS WIN HONORS.

The Overland bowling team, comprised of members of the Willys-Overland Company, Toledo, O., not only won the championship of Toledo but annexed seven records. The quintette broke all previous records and in three games bowled over 3100 pins, breaking the old record of 2962, made in 1909. Frank Seibert, a member of the five, won the individual championship of the city, defeating William Elwert, who has held the championship of the state for two years. By defeating all Toledo teams the Overland five won the right to enter the National Bowling Tournament which will be held in the International Amphitheatre, Chicago. Among the records made by the champions are the following: Team string, 1111 pins; three-string team total, 3100; high team average; high three-string individual total 694 by Frank Seibert, who also captured the individual championship with an average of 201 for 54 games. The members of the team which will represent Toledo at Chicago consist of Manager G. H. Caine, Frank Seibert, A. D. Root, W. Mattison, James Daly, C. Seibert, J. E. Carey and H. Leary.

INTER-STATE PUBLICATION.

The Inter-State Automobile Company, Muncie, Ind., is issuing a publication devoted to its interests named "The Inter-State Steering Wheel." It teems with incidents of interest to the motorist and contains several special articles, including a description of the electric lighting system utilized on these cars.

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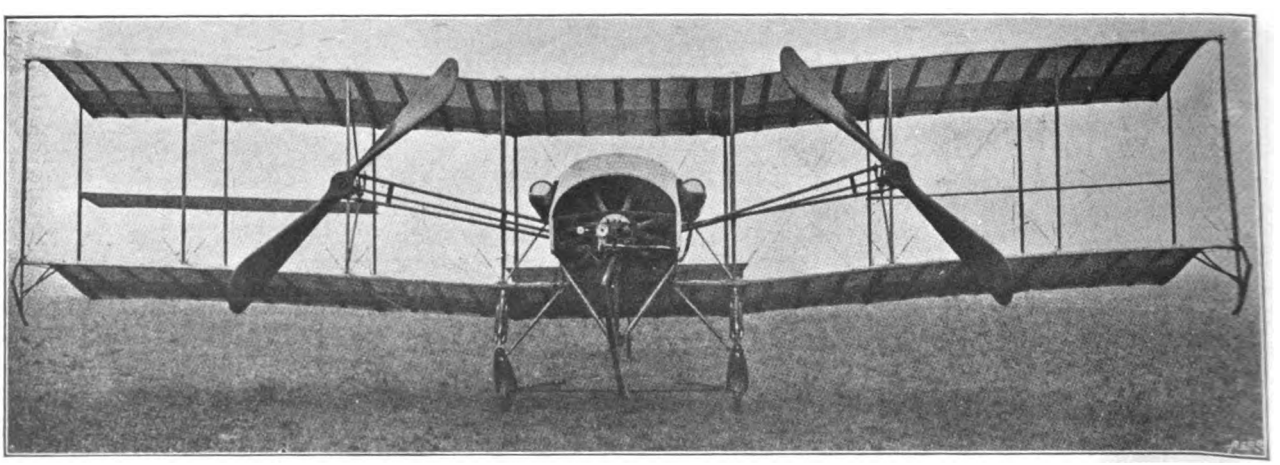
The Viking I, a new British biplane from the designs of H. Barber and constructed by the Aeronautical Syndicate, Ltd., is illustrated herewith. The machine has been flown successfully, and is regarded as a satisfactory example of the latest type of biplane produced in Great Britain. It has a number of individual features, although the arrangement of the twin propellers is copied from the Wright biplane, made by the Wright Company in this country. There is this difference, however—in the Wright the propellers are located at the rear of the trailing edge of the main planes, while in the Viking I they are immediately in front of the leading edge.

A careful examination of the photograph will show that each of the main planes may be regarded as consisting of three portions, the middle one, forming part of the main cellule, being horizontal, while the others are given a decided dihedral angle and a slight curvature. The tail is of the non-lifting type, while the elevator flap is made removable by withdrawing a single long wire bolt, and when this has been done each half of the fixed tail plane withdraws from the fuselage in exactly the same manner as the main plane of the ordinary monoplane. These fixed planes have no angle of incidence, but are cambered both top and bottom so as to be approximately of stream-line form.

The two propellers are driven by a 50 horsepower Gnome engine, through a plain and crossed chain, respectively. The landing chassis is of particular interest. Two wheels, united by a wooden axle universally jointed at each end, are carried each in a stout steel beam universally jointed to a triangulated upright, which descends from the main cellule. For up-and-down motion, the wheel beam rocks on a long tubular bearing. Three rubber buffers are disposed one behind the other, in order to reduce head resistance. In addition to this wheelbase, four skids are employed, one for the tail, one at the extreme front below the engine mounting, and one at either end of the wing tips.

While students of aviation are inclined to agree with the Aero Club of America that the most important development in the field of aeronautics during 1911 was the perfection of the machine designed to start from and alight on either land or water, there appears to be decided difference of opinion as to the proper name to apply to it. Previous to the original success of Glenn H. Curtiss in this particular field of endeavor, this type was termed an hydroplane, but inasmuch as this name had been used for some time by certain types of boats it was felt that it could not be continued for the newer craft.

Curtiss called his machine a triad, but this did not appeal to the public. In France it was termed a



Viking I, the New Biplane Constructed by the Aeronautical Syndicate, Ltd., of Great Britain, Employing Wright Type of Twin Propellers.

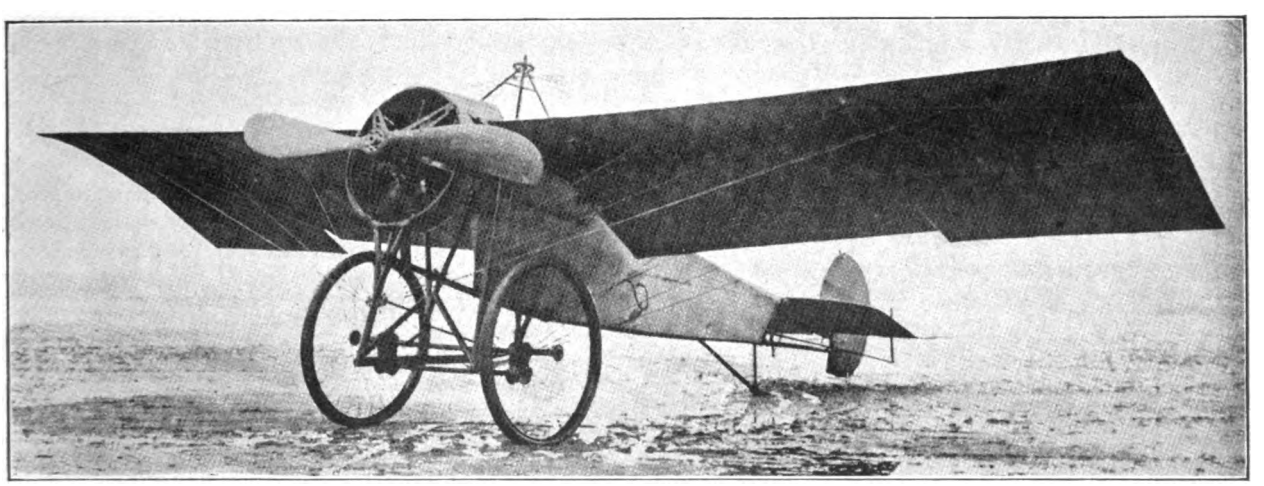
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canard. England called it a water bird. Very soon the old term "hydroplane" was lengthened a trifle and the name became "hydro-aeroplane," but this has a hyphen in its composition and simplicity of nomenclature does not permit of the use of a hyphen when it is possible to dispense with it. The Aero Club of America, in awarding the Robert J. Collier trophy to Glenn H. Curtiss for his successful development of the craft, appears to have settled definitely the naming of the machine, in the following report of the committee, which has been accepted:

Having been appointed a committee of three to determine the winner for the year 1911 of the Aero Club of America trophy, presented by Mr. Robert J. Collier, we have met and beg hereby formally to notify you that in our opinion the trophy for the year 1911 should be awarded to Glenn H. Curtiss for his successful development and demonstration of the hydraeroplane.

(Signed) JAMES A. BLAIR, JR.,
HENRY A. WISE WOOD,
W. REDMOND CROSS.

As the Aero Club of America is the highest authority in aviation matters in America, it would appear that the term "hydraeroplane" is to replace all previous names suggested by an interested public.



Latest Vendome Military Monoplane, Possessing Original and Interesting Features, Constructed for French Army.

Raoul Vendome of France appears to be devoting himself entirely to the construction of military aeroplanes. His latest product is the military monoplane shown in an accompanying illustration. The principle feature of construction is the provision for taking the machine apart, easily and quickly.

The length is 22 feet nine inches, span 27 feet, chord six feet eight inches. When folded it will take up a space of six feet eight inches by 16 feet six inches by 10 feet. The total supporting surface is 182 square feet and the weight 440 pounds. The engine is a 50 horsepower Gnome.

After landing, the pilot by turning a small hand wheel mounted at the top of the four converging legs of the mast, can slacken off all the bracing wires of the wings without disarranging them in any manner. There are then two bolts to be loosened and two cotter pins to take out, in order to detach the upper wires. A third cotter pin loosens the lower front wires, and a fourth the rear main plane wires. The planes can then be taken off immediately. Unfastening a joint of the fuselage back of the tail skid is accomplished by removing one security bolt. All the back portion of the fuselage can be folded on its hinges.

Particular attention should be called to the landing wheels, which are three feet 10 inches in diameter. The underlying idea of this design is that on very uneven land the running wheels are liable to become caught in the irregularities of the soil, and the machine may be overturned. Vendome considers that front skids not only do not prevent capsizing but frequently cause it by digging into the ground. Hence, the large wheels.

It develops that the Aero Club of Switzerland mailed its challenge for the Gordon-Bennett cup before March 1, the date on which opportunity for challenging expired, and this means that six nations are eligible to compete for this premier air prize. Great Britain, France, Belgium and Holland are the other challengers. The cup is now held for America by Charles Terres Weymann.

While none of the competing nations has selected its team, or made any steps to do so, there is much speculation as to the men and machines which will be seen in this event. Claude Grahame-White has announced his intention of attempting to make the British team in a monoplane of his own construction, modelled somewhat after the Nieuport, which he flew with success in this country last year. It will be fitted with a 100 horsepower Gnome engine, as was the Bleriot monoplane, with which he secured the cup in 1910.

Gustave Hamel, who flies a Bleriot, is the second man to apply for permission to represent Great Britain. He flew a Bleriot in the third race at East-

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church, England, last year. At present, it looks very much as if Alec Ogilvie, who has represented his country in two previous international races, flying a Wright biplane, would be the third British contestant.

Two names are most frequently mentioned in France, and these are Jules Vendrines with his Deperdussin monoplane, and Leon Bathiat and his Sommer monoplane. Of course, there are a large number of men and machines in France who may be looked upon as eligible for the honor, and it is probable that an elimination race will be held to pick the team as in past years.

Each country is entitled to three representatives. Victor Jonckheere of Belgium is at present in this country, accompanied by his Bleriot monoplane. While there are a number of better known aviators in Belgium, Jonckheere only recently having secured his license, some speculation is being made as to whether or not he may be selected as one of the Belgian team.

Easily the best known aviator in Switzerland is Edmond Audemars, who has flown in America on several occasions. His mount on his last visit here was a Santos Dumont Demoiselle, which hardly measures up to international racing proportions. If selected, he undoubtedly will secure a French machine of late design.

Weymann will have the honor of representing America without further question. He flew a Nieuport monoplane in winning the third race last year, and probably will be at the wheel of a machine of that make again this year. Several American aviators are expected to enter the list, and it is anticipated there will be no difficulty in holding an elimination event for the purpose of selecting this year's team. When it comes to machines, there seems to be a lack of American made aeroplanes which can be classed as having demonstrated sufficient speed to win the cup. It would appear that some American constructor had a splendid opportunity to cover himself with glory by bringing out a machine which will insure the retention of the cup.

Following extensive experimentation with the first Curtiss hydraeroplane purchased by the Russian government and a tour of France for the purpose of investigating the types manufactured in that country, the Russian naval commission has cabled from Paris an order for three more Curtiss machines, made by the Curtiss Aeroplane Company, Hammondsport, N. Y. The new hydraeroplanes will be equipped with 75 horsepower Curtiss engines, instead of 50, as utilized on the first.

Two of the new Russian machines will have a spread of 35 feet six inches, while the third will be constructed for greater speed and with a spread of 33 feet one inch. All three will be equipped with the dual system of control, and will be of the passenger carrying, single pontoon biplane type. Acceptance trials are to be held in France.

Although it has been announced that the fourth race for the international cup undoubtedly would be held some time in September or October, no definite date has been set. The Aero Club of America has until April 1 in which to arrive at a definite decision, both as to place and date.

The Aero Club of Illinois appears to be taking it for granted that it can have the meet, and there seems to be no other active candidate for the honor. An effort is being made to combine this meet with the annual Chicago yachting carnival, which has been set for the week of Aug. 10.

Chicago has decided that the Skokie golf course would prove a satisfactory flying field, although this must be passed upon officially by representatives of the Aero Club of America before acceptance. It is proposed to hold the international race on the first day of the meet, to be followed by six days of contests and cross country flying.

P. E. Taft of Springfield, Mass., and Fred Kingsbury of Hartford, Conn., have constructed a hydraeroplane with which they expect to make flights from the Connecticut river during the coming spring. The first tests will be made immediately after the high water goes out early in May.

W. Starling Burgess of the Burgess Co. & Curtis, Marblehead, Mass., has begun a new series of tests with the Burgess-Curtis hydraeroplane at Marblehead bay. Government officials are expected to arrive at the plant in the near future to witness tests of the new aeroplanes, both biplane and monoplane designs, now being constructed upon order from the War and Navy Departments.

George E. Holt, Nels Olesen, Frank Rodgers, Roland Middleton, Charles Hoeflich and Henry Snyder, known as the McLaughlin aviators, have left New York City for South America, where they will give a series of exhibition flights in Brazil, Venezuela, Chili and Peru, under the management of Peter F. McLaughlin.

Henri Selmet, a French aviator, finding himself in London, England, and desiring to visit Paris on business, early in the month, flew a monoplane between the two cities, a distance of 22 miles in 2:57:00. This was in less than half the time that would have been required in travelling by the fastest land and water transportation available between these two points.

Brig.-Gen. James Allen, U. S. A., has outlined his plans of organization for a complete aviation corps of the United States army, composed of 24 aeroplanes, three majors, 54 captains and lieutenants and three surgeons. His idea is to have six companies, each with four aeroplanes, composed of nine officers and 12 enlisted men, besides a property sergeant, clerk, cook and assistant cook. The six companies would be divided into three battalions, each battalion under a major and having its own surgeon.

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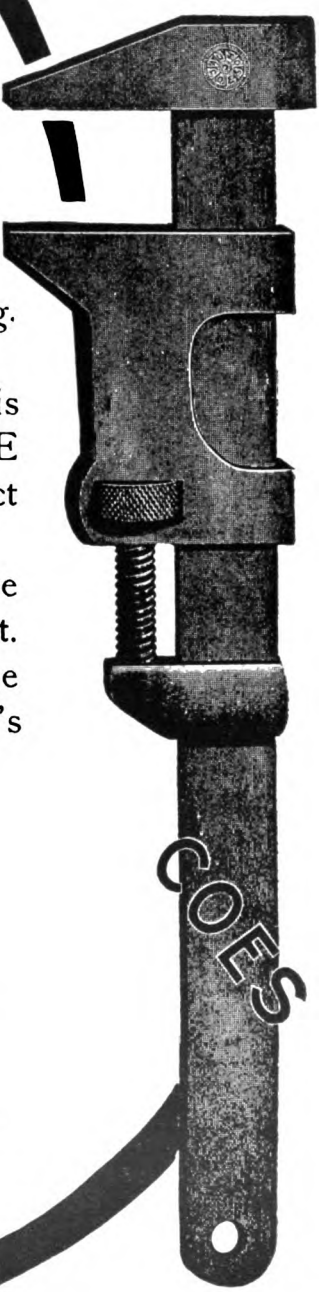
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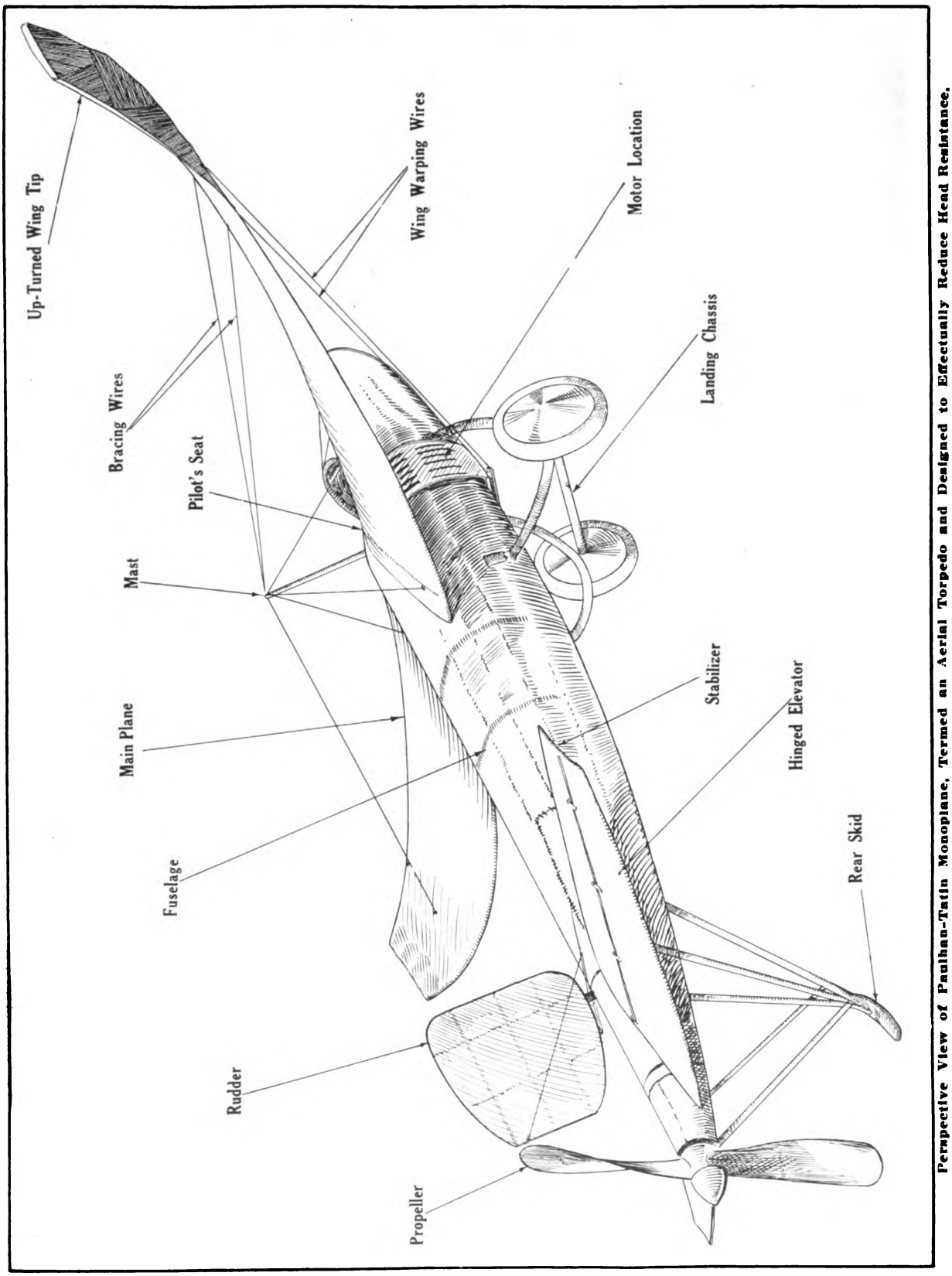


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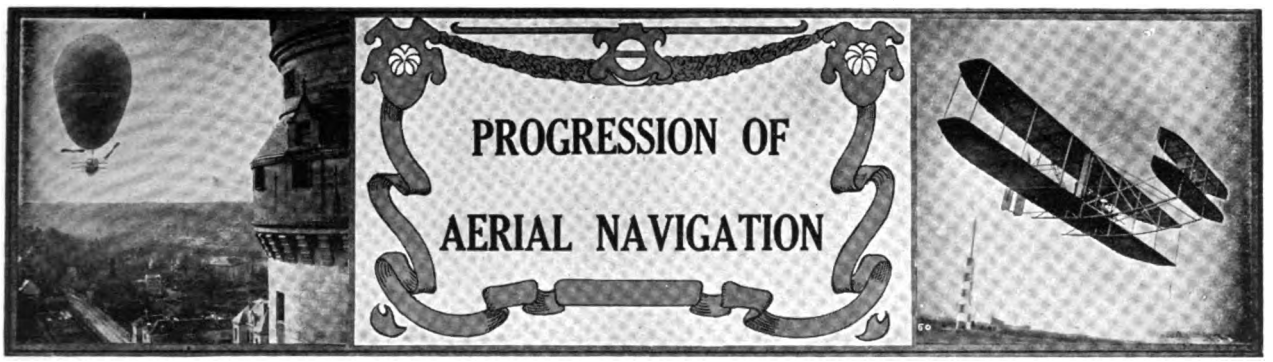
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Perspective View of Paulhan-Tatin Monoplane, Termed an Aerial Torpedo and Designed to Effectually Reduce Head Resistance.

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PAULHAN-TATIN AERIAL TORPEDO.

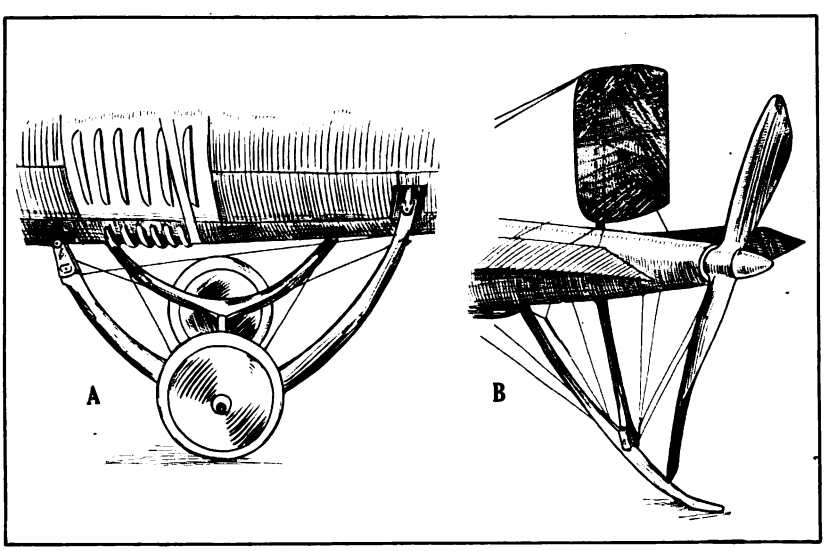
Victor Tatin of France has been experimenting with mechanical flight over 33 years. In 1879, at Chalais-Mendon, he flew a model, driven by compressed air, which bore some resemblance to the present Paulhan-Tatin monoplane, which is called by the makers an aerial torpedo. The model of 1879 was a monoplane in plan form, with a wide spreading tail and two four-bladed propellers disposed immediately in front of the leading edge of the main plane.

It will be noted, by examination of the accompanying drawings, that the chief change in design is in the location of the propeller at the rear. The main plane has been altered slightly, having upturned wing tips. The form of the tail has been changed but little and the addition of the rudder is the result of more extensive study. In the main, however, the present day successful machine expresses practically all of the novel ideas which had their beginning in the brain of M. Tatin long before the problem of aerial flight had been solved.

Associated with M. Tatin in the production of this very original design is Louis Paulhan, well known as a pioneer aerial pilot and a designer and constructor of some note. It seems probable that M. Paulhan was of material assistance in working out the plans conceived by M. Tatin, and despite the fact that their product was originally regarded much in the nature of a freak, it has developed a speed of 88 miles an hour over a measured course in the hands of Louis Gaudart.

The construction is the result of a sincere attempt on the part of the designers to secure speed and stability by reducing head resistance so far as possible. The result is a stream-line body, in which the fabric covering extends from one end to the other, being supported on wooden forms applied over the fuselage proper. The propeller location is a part of the same general scheme, it being claimed for this that the screw revolves in the region of air disturbance that follows the machine and therefore is enabled to work with greater efficiency. It is said that M. Tatin began to experiment with the propeller in the rear something like 20 years ago.

In the immediate front is the wind cutting head, back of which is the pilot's cockpit, with a seat so low that only the head of the operator extends above the machine. In order to still further eliminate head resistance, an effort has been made to locate as many organs as possible in the interior of the fuselage.

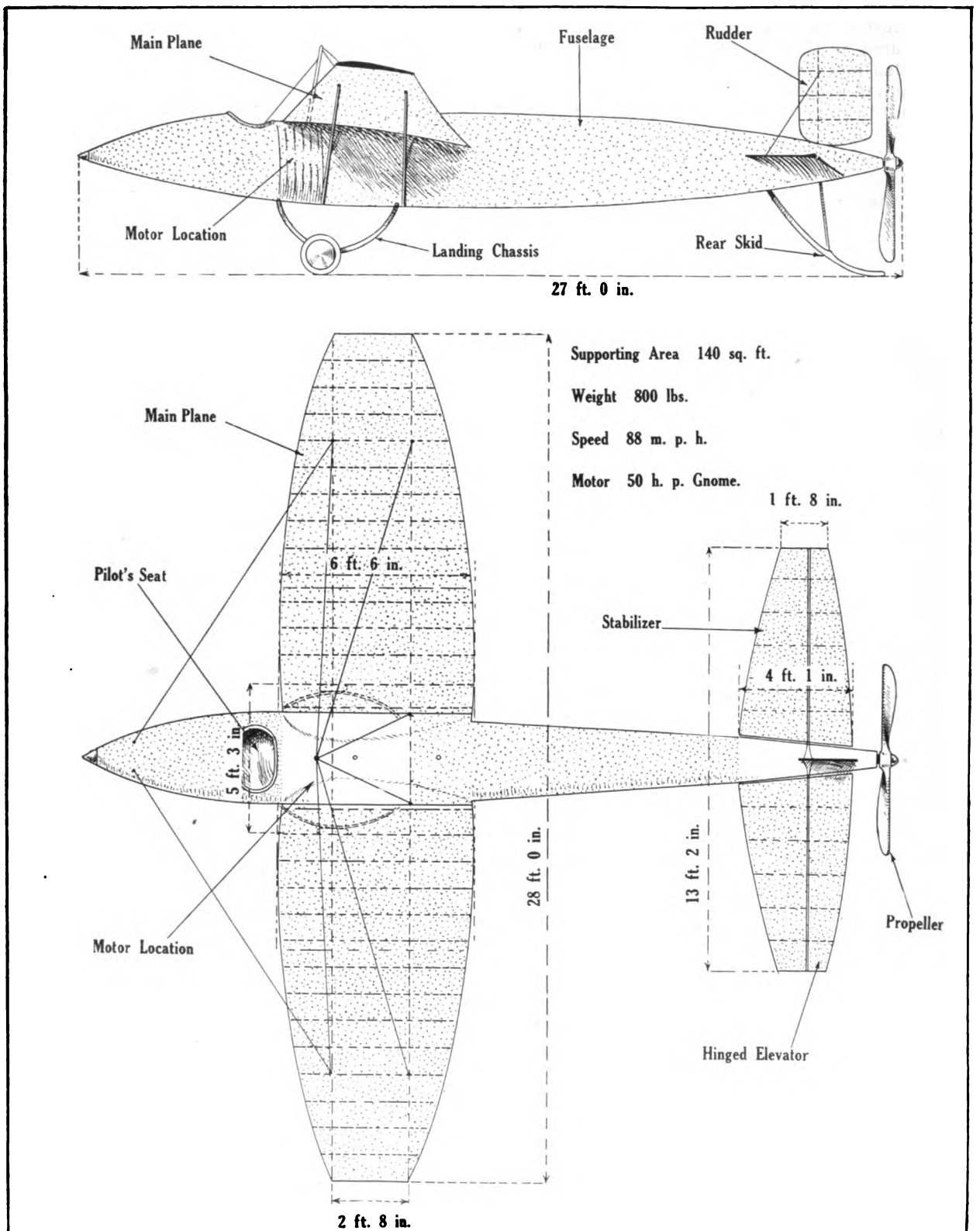


Some Constructional Details of Paulhan-Tatin Aerial Torpedo: A, Landing Chassis and Motor Location; B, Tail Formation and Radiator Mounting.

Thus, the motor, a 50 horsepower revolving Gnome, is located directly behind the driver, and is completely enclosed, the covering at this point being supplied with slight ventilator openings for the purpose of admitting sufficient air to cool the engine. The shock absorbing section of the landing chassis also is disposed inside.

The fuselage proper is of the ordinary box girder section. This is later made duo-decagonal by a series of light wooden forms, over which the fabric is stretched. From a point beside the pilot's cockpit the

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Plan View and Elevation of Paulhan-Tatin Monoplane, Showing Detailed Dimensions and Principal Features of Design.

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outside form tapers gradually to the propeller and beyond that to the tip of the metal boss, which holds this securely in place.

In plan form the main plane may be represented by an ellipse with its tips cut away by lines parallel to its minor axis. In front elevation, it has the appearance of an ellipse which has been cut by a line parallel to and below the major axis. Very little camber and very little angle of incidence are evident in the wings, which are upturned at the tips in order to provide the machine with a modicum of natural stability. These offer practically the only method of obtaining lateral balance, although a slight wing warping effect is gained by operating flat steel bands proceeding from the base of the fuselage. Two of these steel ribbons on each side serve alone to support the central body in flight, and it is the rear member of this pair which is used for such wing warping as is held necessary.

The tail is monoplane in design, being almost identical with the main plane, except for the upturned tips. The forward portion is the stabilizer, and this is flat. Behind it is hinged the elevator, a pair of simple flaps operated by cables running to a crank arranged in the interior of the fuselage. Mounted vertically above this surface is the rudder, balanced and approximately rectangular in shape.

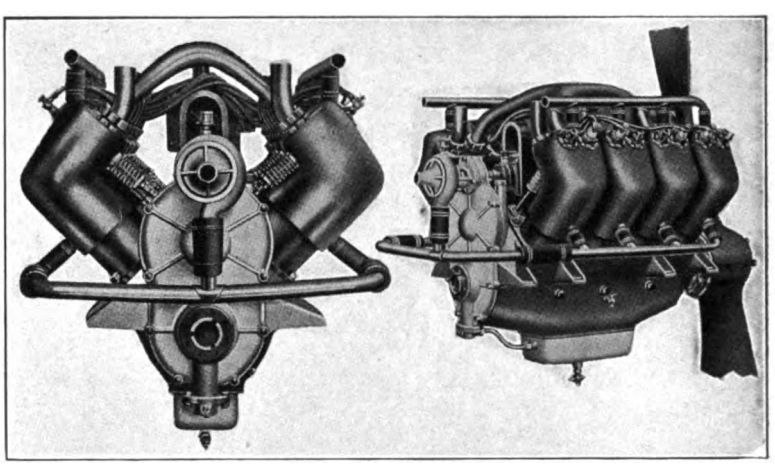
The propeller is a Regy Freres of eight-foot pitch, which is protected against contact with the ground by a high skid, properly guyed by wires. A simple tube is utilized in conveying power from the engine this being supported at intervals throughout its length by six ball bearings, each of these being strung into place by steel wires. Strength and simplicity mark the landing chassis, which possesses the advantage of offering litle resistance to forward advance. The common axle connecting the two pneumatic tired wheels, is attached to two arcs of hickory. At their forward extremity these arcs are hinged to the fuselage, and at their rear end they are united by a strong piece of wood, which is in turn strapped by means of a cotton covered rubber cord to a reinforced cross member of the lattice girder body. In this manner the shock absorbing device is arranged in the interior of the fuselage. The cross bracing consists of six wires or light rods, which are passed through the arcs and tightened by means of nuts and lock nuts on the outside. The wheels are fitted with spun steel discs.

THE FRONTIER AERO MOTOR.

A number of satisfactory aerial motors has been brought out in this country, and among these is a new V engine of eight cylinders, which was shown for the first time at the recent Boston automobile show. This is the product of the Frontier Iron Works, Buffalo, N. Y., and is depicted herewith in end and side views.

The unit is a four-cycle, eight-cylinder, V type engine with water-cooled cylinders. These members are cast separately of a special strong metal which insures strength and long wearing qualities. They are furnished with either iron or copper water jackets, the latter being put on by the electrolytic process. The eight cylinders are bolted to a base of unique and original design, combining strength, lightness and compactness. The base is a single casting of special aluminum alloy with webs to receive the bearings.

The camshaft works in a chamber cast integrally with the base and is supported and run in imported annular ball bearings, as is also the crankshaft. With this construction, it is claimed, that friction is reduced to a minimum. The crank and camshafts, cams, gears, valve stems, connecting and pushrods, are made from Krupp's 3.5 per cent. chrome nickel steel, heat treated, and hardened and ground by special machinery. Crankshafts, connecting rods and piston pins are hollow.



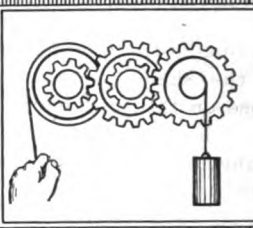
New Frontier Eight-Cylinder, V Type Motor: At Left, End View; at Right, Side View with Propeller.

Lubrication is supplied by a bronze pump, geared from the crankshaft and connected to an oil tank located in the base, from which the oil is forced through the crankshaft up through the connecting rods to the piston pins, thence to the cylinder walls, the surplus returning to the tank, in which is located a strainer. The cooling system is provided by means of a circulating pump, forcing the water through the cylinders and radiator.

The valves are of such diameter as to insure the rapid and efficient receiving and discharging of gases. The intake and water manifolds are copper, designed to give an equal supply to each cylinder. The exhaust manifolds are seamless steel tubing, formed to comply with the openings in the cylinders. The motor is equipped with the firm's own distinctive standard float feed carburetor and ignition is by Bosch magneto.

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RECENT MOTOR VEHICLE PATENTS



Automatic Fuel Vending Machine.

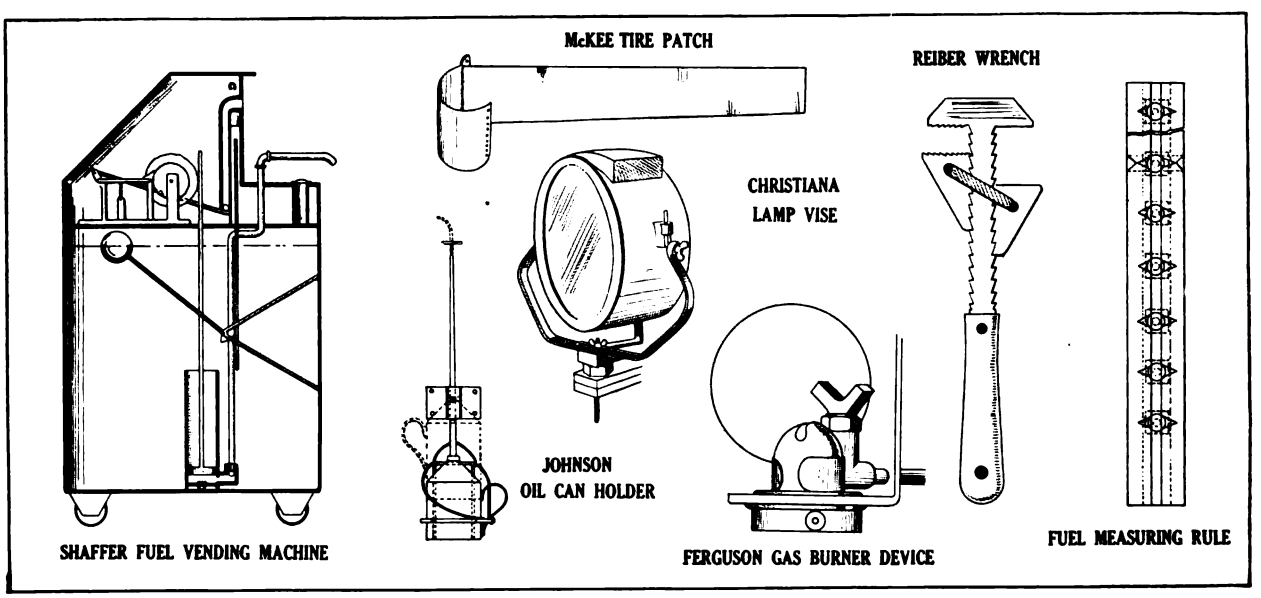
An automatic gasoline vending machine of the coin-in-the-slot type is the invention of Randolph Shaffer, Albany, Ga., to whom a patent has been issued. The exterior of the fuel container is similar in appearance to that of the usual oil tank and is mounted upon wheels so that it may be moved readily, although means are provided for fastening the device securely. A slot for the insertion of a coin is placed near the top of the vessel and the passage leads to an arm or lever which is connected with another member suitably equipped with a pawl in mesh with a ratchet wheel. The latter is connected with a larger wheel provided with teeth and these are in mesh with a vertical rod which extends downwards to a piston operating in a cylinder in the fuel chamber proper. When a coin is inserted in the slot, the pawl is released and the piston in the chamber descends, forcing a predetermined amount of gasoline through a pipe connected to the piston chamber, upward and out through a suitable nozzle located on the exterior of the vessel. An ingenious arrangement is provided for closing the coin slot when the fuel is exhausted or has reached a certain point. A vertical rod is fitted and this extends upward and into a passage to the coin slot. In conjunction with the rod is a pivotally mounted arm carrying a ball which acts as a float. When the gasoline falls to a predetermined level, the float lever actuates the device in mesh with the toothed rod, and the latter rises, closing the opening into which the coin is inserted, thus preventing loss of the coin as well as signalling that the fuel has become exhausted.

McKee Pneumatic Tire Patch.

Clarke W. McKee of San Diego, Cal., has been granted a patent for a blow-out patch with which it is claimed that creeping is eliminated. It is constructed of a band of non-elastic material tapered toward one end and of sufficient length to wrap the tire one or more times. The smaller end is tapered while the larger extremity is made of heavier material and provided with a short flap with eye holes for lacing when the device is attached to the shoe. It is claimed that the patch will remain as attached if properly fitted.

Reiber Wrench.

A wrench having adjustable features, also providing means for two different sized openings of the jaws at the same time, has been patented by John Reiber, Huntington, Ore. The shank of the tool is



Some Recent Ideas of Inventors Working on Automobile Parts, Accessories and Appliances, Including an Automatic Fuel Vending Machine of the Nickel-in-the-Slot Type.

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fitted with double stationary jaws, these projecting from opposite sides thereof at one end. The sides of the shank are fitted with a series of teeth, these extending to the handle. A movable jaw on either side of the shank is fitted with teeth corresponding to those on the stationary member and these mesh. The movable jaws are connected by links having pivotal connections and the latter provide an independent movement of each member permitting a step-by-step adjustment. A release is effected by a simultaneous pressure on the movable jaws in the direction of the stationary members.

Gasoline Measuring Rule.

A fuel measuring rule which presents practical features has been patented by Frank M. Edmonds and Russell J. Goodnow, Boston, Edmonds being assignor to Goodnow. It consists of a rod having a number of pointers mounted thereon and these indicators are movable the entire length of the device. Another member is so fitted that it may be slid up or down without interfering with the other indicators. If a fuel tank is to be measured, a gallon or any part of this measure, is poured into the container and the rule inserted, the height of the fluid noted, and the lower indicator set. This operation is continued until the tank is full and the measurements desired obtained. The rule may be calibrated to secure any measurement and the loose sliding member employed to ascertain quantities between the markings.

Christiana Lamp Vise.

A device for holding automobile headlights is the subject of a patent granted to Elmer V. Christiana, Kingston, N. Y. It comprises a base for attachment, and a pair of laterally adjustable oppositely arranged arms mounted upon the base. The lower ends of these members are flat and slotted to fit a bolt or stud having a wing nut for locking the parts securely. An L shaped bracket is also incorporated and held by similar means. The ends of the brackets are provided with means for holding the lamps also wing nuts for clamping the attachment securely.

Ferguson Gas Burner Attachment.

A device for converting oil lamps into acetylene or gas burners has been patented by John Ferguson, New York City. It comprises a spring clip consisting of separable spring jaws to embrace the flame guard of an oil burner. An elbow pipe is fitted securely to the clip, one end of the former being upright and containing means for attaching an acetylene burner. Leading from the elbow is a gas conduit or pipe, this extending through the side of the lamp for means of attaching the tube connecting with the gas container.

Johnson Oil Can Holder.

A patent has been granted Isaac R. Johnson, Milwaukee, Wis., for an oil can holder. It comprises a back brace, part of which is securely fastened to the place of location. To the ends of the rectangular brace is attached a hoop member and a guide rail is incorporated between these parts. A backbone extends from the back brace and the former is fitted with a can nozzle retaining loop, also a bracket for securing the oil can.

CHARLES LEWIS DIES SUDDENLY.

Charles Lewis, one of the pioneers of the manufacturing industry of Jackson, Mich., died suddenly in that city recently. He was at the head of a number of extensive manufacturing companies being one of the founders of the Jackson Land and Improvement Company which purchased large tracts of land and utilized the profits accrued in erecting factories. In 1898 he became interested in the automobile industry and later became associated with George A. Matthews, and the Jackson Automobile Company was the result of this combination. The company soon outgrew its quarters, erecting a larger plant, and became the leading industry of Jackson. Later the plant of the Clark Motor Company was absorbed. Mr. Lewis retired from the Jackson Automobile Company two or three years ago and last fall consolidated several companies making automobile axles. Mr. Lewis was active in municipal affairs and a director in several organizations.

SELLS MANY HUPMOBILES.

A sale involving 123 automobiles has been consummated by the Richardson-Neighbors Company, Pittsburg, Penn., agent for the Hupmobile, made by the Hupp Motor Car Company, Detroit. The business of the company had assumed such proportions that it was found impossible to give proper attention to buyers from counties surrounding Allegheny and it was decided to appoint sub-agents. These were selected at the automobile show in Pittsburg and they purchased 123 cars. Four represent Pennsylvania, two are in West Virginia and one in Ohio.

ONTARIO WOULD TAX AUTOMOBILES.

The Legislature in Ontario is considering a bill to tax motor vehicles on the basis of 25 cents a horsepower on cars of 20 horsepower or under, 25 cents for every 10 horsepower above that figure to 40 horsepower, and $1 a horsepower above 40. Another bill provides for an appropriation of $5,000,000 for good roads, it being argued that this will aid materially in bringing tourists to Ontario.

BIRMINGHAM DEALERS ORGANIZE.

Permanent organization of the Birmingham Automobile Dealers' Association, Birmingham, Ala., has been brought about with the following officers: President, Judge Dan A. Greene; vice president, Hubert A. Drennen; treasurer, Leo Loeb; secretary, E. W. Brownell. Among other things, the new association will make an endeavor to have Birmingham included on the itinerary of the 1912 national tour.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER

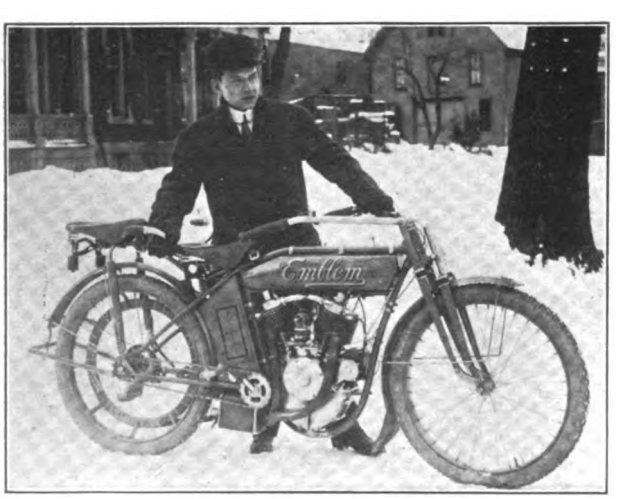


Plans for Coming Season.

The first few warm days have had a wonderfully stimulating effect upon the riders and from now on the club rooms will begin to teem with plans for the riding season. Of course there will be club runs and contests of various sorts, but if the information at hand is any indication, there is to be even more touring this year than last. Perhaps there will be opportunity to interest the boys in one of those new side car attachments as well.

In any event, a great many riders have been studying the touring maps very industriously during the past few months and there are several reports of long distance tours in prospect. And here is a hint for the clubs. Instead of letting one or two of the boys go off on a vacation by themselves it would prove just the thing for a fairly good representation of the club to go along and make the affair even more jolly. The expense could be shared, and thus made lighter, and in many ways it would help to create interest in the organization.

Of course it is taken for granted that the riders belong to the Federation of American Motorcyclists, and if they do they are bound to find that the officials of that organization have been busy in their interests throughout the winter months. For one thing, there is a string of registered repair shops scattered all over the country, and in each case the proprietor is willing to put up the machines over night or for a day without charge. Secretary G. B. Gibson, Westboro, Mass., expects to send out a list of these shops, corrected right up to the minute, within a few days, and there will be no reason for not finding a friendly welcome along the touring line.



A. C. Moore, Cortland, N. Y., Local Emblem Agent and Club Captain.

Club Captain Rides Emblem.

A. C. Moore, one of the club's most energetic members, has been elected captain of the Cortland Motorcycle Club, Cortland, N. Y. Moore is shown in an accompanying illustration out on a demonstration trip with plenty of snow on the ground and the thermometer near zero. He is Cortland county agent for the Emblem, made by the Emblem Manufacturing Company, Angola, N. Y., and has proved a very efficient business man as well as popular leader in club affairs. He is busy just now in stimulating interest in a race meet to be held by the club, Memorial Day.

Fill Out the Cards.

Secretary G. B. Gibson of the Federation of American Motorcyclists, whose address is at Westboro, Mass., has been sending out return post cards in an effort to locate the president and secretary of all motorcycle clubs. Dr. Gibson needs this information to bring his files up-to-date, and those who have received the cards are earnestly requested to supply him with the necessary data without delay.

Merkel Man Becomes an Indian.

It will prove something of a surprise to learn that Edward Buffum, who has been connected with the manufacture of the Merkel for so many years, has resigned his position with the Miami Cycle & Manufacturing Company, Middletown, O., to join the sales staff of the Hendee Manufacturing Company, Springfield, Mass., maker of the Indian. Mr. Buffum will be one of Sales Manager F. J. Weschler's chief lieutenants, and it is anticipated that his wide knowledge of men and affairs in the motorcycling world will prove of decided value to the Hendee company.

Cleveland Wants National Assembly.

That the Cleveland Motorcycle Club is in earnest in its effort to secure the national assembly of the Federation of American Motorcyclists for Cleveland,

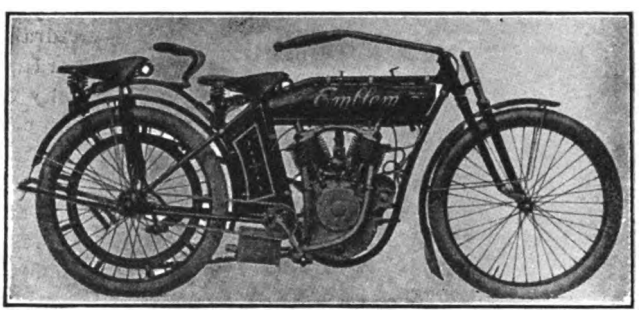
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OUT IN GAYLORD, KANSAS

There is a young man less fortunate than his fellows in that he has but one arm. However, this young man–Mr Ernest Sonnenberg–is better off than many because he knows how to enjoy life. Mr. Sonnenberg rides a motorcycle and spends most of his time in the saddle–good weather and bad–often covering roads that his two-armed brethren fight shy of. Yes, Friends, Mr. Sonnenberg rides a

STURDY EMBLEM MOTORCYCLE

and there is a mighty good reason for his choice. Physically handicapped he must have a machine that always can be relied on to do its full work and more Not only this but the machine must be mechanically perfect and easy to handle in all conditions of traffic. The EMBLEM certainly fills the bill as witness this entirely unsolicited letter from Mr. Sonnenberg. In fact we were not acquainted with Mr. Sonnenberg until we received his letter. He says:



" . . . . As regards the Emblem Motorcycle with special control purchased from your dealers, Stephenson & Campbell of Gaylord, Kan., will say that I have owned three different motorcycles and I find the Emblem to be the most powerful, speediest, and moreover, the easiest to handle on the road, as it never skids on the sharpest turns".

Ernest R. Sonnenberg.
Signed

THERE'S A REASON FOR EMBLEM POPULARITY—"They Are Different Because They Are Better". Have we an Agent in your town?

EMBLEM MANUFACTURING COMPANY
(Member M. M. A.) Dept. D,

ANGOLA ERIE COUNTY NEW YORK

O., is made manifest by the fact that the necessary fund of $5000 already is in sight. The club is going to send a delegation of riders to Buffalo, N. Y., during the meeting of the Motorcycle Manufacturers' Association, April 10, in an attempt to obtain the cooperation of that body.

New Official Repair Shops.

The following additions to the list of official repair shops have been made within the past few weeks: Girard Cycle Company, 140 North 14th street, Lincoln, Neb.; Motorcycle Shop, 124 Pearl street, Trenton, N. J.; Pinaire Bicycle Company, 917 East Douglass street, Wichita, Kan.; The Motoraid, 11 Jay street, Sacramento, Cal.; Motor Shop, Seventh and Main streets, Grand Junction, Col.; Hyatt W. Norton, East Bloomfield, N. J.; Hall Garage, Fort Collins, Col.; Charles F. Clements, 6004 Houston street, Pittsburg, Penn.; Kroeson & Plock, 506 North Main street, Streator, Ill.; Trieber Bros., 105 Grove street, Elgin, Ill.; Pierce Motorcycle & Supply Company, 703 Pike street, Seattle, Wash.; Miles & Schofield, 300 Fourth street, Olympia, Wash.; Fred Leves, 314 East Fourth street, Olympia, Wash.; W. G. Ashley, 313 Columbia street, Olympia, Wash.; Watt Shipp, 223 Commercial street, Salem, Ore.; S. P. Hunsaker, 220 West Third street, Pomona, Cal.; Frank Walling, East end, state road, Oneonta, N. Y.; A. B. Crosby, Aurora, Ill.; Twin City Motorcycle Shop, Colfax avenue and West Main street, Benton Harbor, Mich.; Greyhound Motor Company, 1443 Niagara street, Buffalo, N. Y.; Randall Manufacturing Company, 28 South Charles street, Baltimore, Md.

An Underslung Motorcycle.

A new machine called the Militaire has made its appearance in Cleveland, O. Among other things it has an underslung frame, thus bringing the centre of gravity very low and making for comfort and stability, according to the maker, the Militaire Company, 304 Columbia building. The new vehicle is presented in an accompanying illustration.

The elimination of the upper cross bar, characteristic of the diamond frame, permits of a bucket seat with back, which is suspended on a cantilever

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

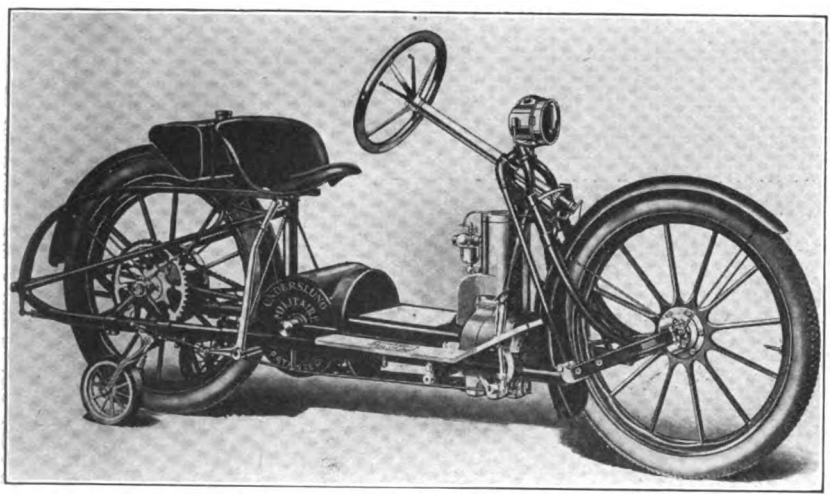
Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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mechanism. The machine also has a steering wheel and column with spark and gas control. Another novel feature is the use of a friction drive, thus eliminating all gears and permitting of wide range in speed changes. Foot controls are provided for clutch, brake and speed changing. In addition idler wheels are utilized to preserve the equilibrium of the machine while standing, running at low speed or in sand. The wood road wheels have staggered spokes.



The Militaire, a Novel Two-Wheel Mount, Produced by Cleveland Concern.

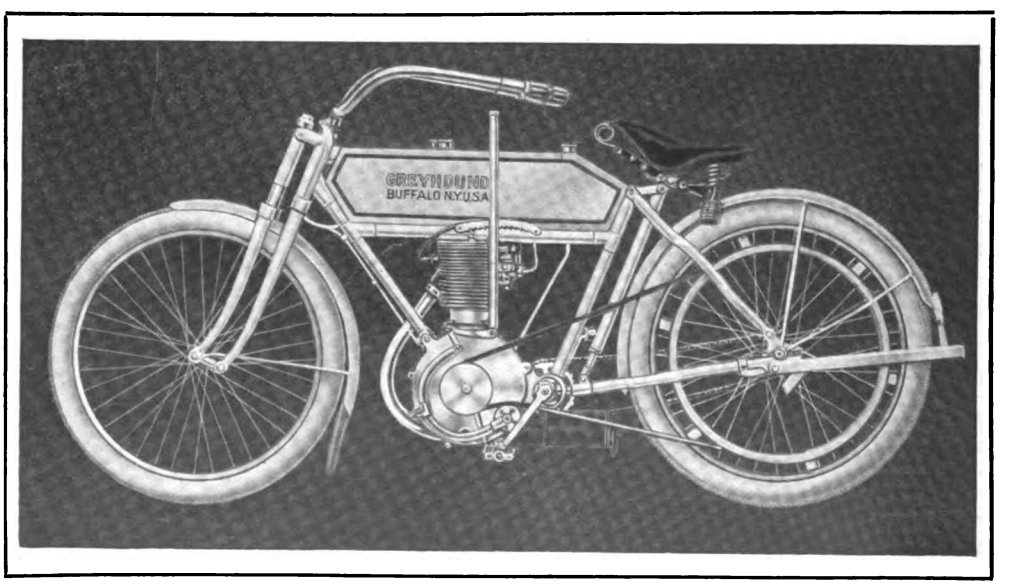
The 1912 Greyhound.

The Greyhound Motor Company, Buffalo, N. Y., has found it necessaray to make a few radical changes in its product for the 1912 season. One of the most important features of this mount is the new Greyhound shock absorber, designed to dispose of the shock problem effectively and permanently. This, together with the cushion fork and 56-inch wheel is expected to insure stability and comfort to the rider.

The motor has a bore of 3.25 inches and stroke of 3.6875, bringing it to the limit of 30.50 inches, and is rated at 4.5 horsepower. The offset cylinder is placed slightly ahead of the main bearing, which is held to reduce greatly the amount of wear on the cylinder wall and the thrust of the rod on the main bearings. It is equipped with an automatic inlet valve, Breeze or Heitger carburetor, at the purchaser's option, and jump spark ignition is furnished as standard.

Lubrication is by gravity feed from a combination tank mounted in the upper panel of the frame. A sight feed glass is located just below the tank, while in the crankcase an oil window is placed where the level may be noted at all times. The oil is fed through the right crank bearing, from which it drains to a well beneath, afterward proceeding by a path, especially contrived, to the other bearing points, both centrifugal force and splash being utilized to lubricate the various bearings.

Enclosed flywheels, weighing 24 pounds and having the weight chiefly in the rims, make for easy starting and smooth running. The standard transmission equipment is a flat belt with hand operated idler. Double grip control is employed, with the connecting cables neatly passed through the handle bar tubes and frame head. Long handle bars, liberal mudguards and low saddle position add materially to the appearance of the new model, which is shown in an accompanying illustration.



The 1912 Greyhound 4.5 Horsepower Single with Interesting Shock Absorbing Device.

De Rosier Seriously Injured.

Motorcyclists generally will be extremely sorry to learn that Jacob De Rosier, the man who has made more world's records than any other rider, undoubtedly never will ride again. At present De Rosier is in a hospital in Los Angeles, Cal., with both knees broken and other severe injuries.

The accident occurred in a match race between

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De Rosier and Charles Balke, both on Excelsiors, at the Los Angeles stadium, March 10. It was a two-mile event and Balke had secured the first heat. They were riding neck and neck when De Rosier attempted to pass Balke. The latter apparently lost control of his machine and rolled in front of his opponent, who was thrown several feet. For some unknown reason Balke was uninjured.

The accompanying illustration was taken less than an hour before the accident occurred and shows De Rosier at the height of his career as a motorcycle rider. He had expected to take part in the British Tourist Trophy event this summer, riding a foreign machine. Until recently his favorite mount was an Indian, and most of his records were made with a machine of that make. He has covered distances in less time than with his Excelsior, but some of these have not been accepted as official.

The summary of the meet in which the accident occurred follows:

Six miles, free-for-all—First, Ward, Indian; second, De Rosier, Excelsior; third, Balke, Excelsior; time 4:06.6.

Two miles, Class B—First, W. Samuelson, Indian; second, Humiston, Indian; third, Finkelstein, Indian; time, 1:28.

Three miles, Class B—First, W. Samuelson, Indian; second, Kittle, Merkel; third, Albright, Indian; time, 2:08.4.

Four miles, Class B—First, W. Samuelson, Indian; second, Kittle, Merkel; third, Albright, Indian; time, 3:02.4.

Two miles, Class A—First, Balke, Excelsior; second, De Rosier, Excelsior; third, Wolters, Excelsior; time, 1:23.8.

Two miles, match—First, Balke, Excelsior; second, De Rosier, Excelsior; time, 1:22.

Six miles, open—First, Ward, Indian; second, De Rosier, Excelsior; third, Balke, Excelsior; time, 4:06.6.

Two miles, match—Called off on account of accident.

Club Notes, Here and There.

The following clubs are considering the matter of affiliating with the national body: Motorcycle Touring Club of Maryland, Baltimore, Md.; Washington Motorcycle Club, Washington, D. C.; Black Hills Motorcycle Club, Deadwood, S. D.

These have affiliated with the F. A. M. recently: Temple Motorcycle Club, Temple, Tex., No. 229, C. J. Mitchell secretary, 20 members; Middleboro Motorcycle Club, Middleboro, Mass., 230, L. W. Bryant, 64 Forest street, 18 members; Ithaca Motorcycle Club, Ithaca, N. Y., 231, L. C. Morris, 300 East State street, 17 members; Olympia Motorcycle Club, Olympia, Wash., 233, M. D. Drake, Pioneer Iron Works, 17 members.

George C. Ladd, box 7, Vineland, N. J., circulation manager for the Evening Journal, has 30 local riders ready to form a club in the near future. All they want is a few more prospects.

Satisfactory progress in club promotion work is being done by the following: H. L. Jennison, Farnsworth, Kan.; Charles W. Von Parmalee, 408 Breckenridge street, Helena, Mont.; W. P. Smallwood, Culebra, Canal Zone; L. A. Wetmore, 514 Fairchild avenue, Kent, O.



Jacob De Rosier and His Excelsior, One Hour Before His Unfortunate Accident.

James A. Trent, Knoxville, Tenn., is taking a little time from his work as an advertising and printing expert to outline the policy for one of the liveliest F. A. M. clubs in the South.

W. E. Simons, box 171, Salem, Ore., reports that motorcycle interest is running high and that business is on the boom. There are between 40 and 50 riders in Salem and Mr. Simons will not be happy until he gets them organized into a club.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head, as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON

298 Blackstone St., Cor. Prairie Ave. Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY Boston, Mass.

Branches: 49 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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Greenwood, S. C., has 30 riders and T. S. Chipley of that city is busily engaged as club organizer.

F. A. M. interests will be well looked after in Fort Recovery, O., where Henry Z. Fox is registering his repair shop and organizing a local club.

E. Ellsworth Alexander is promoting a club in Red Bank, N. J.

Carl A. Vogel of Albany, Ind., reports that he expects to have an affiliated club in existence in that town in the near future.

Taylor On Lake Erie.

Although spring has asserted itself in many places there is still plenty of snow in and about Angola, N. Y., where the Emblem mounts are made by the Emblem Manufacturing Company. An accompanying illustration shows L. S. Taylor, best known as an Em-



L. S. Taylor Taking a Spin on His Emblem, St. Patrick's Day.

blem racing rider, out for a ride in the snow on Lake Erie, St. Patrick's Day, March 17. During a large portion of the winter the surface of the lake has been covered with snow from two to four feet deep, and this has become a favorite speedway for the Emblem testers. Taylor has been spending the past few weeks at the factory, where they are extremely busy, a night shift having been placed at work recently in order to catch up with the orders which have been coming in since the new models made their appearance.

Harleys by the Carload.

Within a week W. J. Walker of Danvers, Mass., has placed an order with the Harley-Davidson Motor Company, Milwaukee, Wis., for a carload of Harley-Davidson machines needed in his territory. The same day a similar order was received from Weaver-Ebling, New York City, and yet another from the Appeal Manufacturing Company, Los Angeles, Cal.

Stadium Changes Hands.

P. L. Young, one of the best known racing promotors on the Pacific Coast, has purchased the interests of Jack Prince in the new stadium at Los Angeles, Cal., and will manage the track in the future.

DATING TIRES UNNECESSARY.

Recently, a bill was introduced into the New York State Legislature seeking to compel tire makers to date their product. Present information seems to indicate that the proposed law will meet with determined opposition in the Senate, although it has been passed by the lower branch. J. C. Matlick of the Ajax-Grieb Rubber Company, Trenton, N. J., maker of the Ajax tires thus express himself on the subject.

"The bill does not meet the approval of the manufacturer, because it imposes an unnecessary restriction on the trade, and furthermore creates a false impression in the minds of dealers and consumers. The average tire is not any less valuable because of six months' or a year's seasoning, and very likely is the better for it. Yet, the consumer looking at the date is bound to say: 'I don't want an old tire. Give me a fresh new one.'

"And the dealer, if he tries to say a tire is no worse for being a few months old, probably will have his statements accredited to self-interest. He will not want to carry stock if it must be dated and so the burden will come back on the makers.

"If this bill becomes law, it would make a complex and difficult situation. It is not needed. It does not serve the public interest, so far as I can see. The Motor & Accessory Manufacturers have canvassed the tire makers and finds a determined opposition to this measure."

SYRACUSE CLUB AND GOOD ROADS.

The Syracuse Automobile Club, Syracuse, N. Y., which is credited with 75 per cent. of the 90 miles of good roads in Onondaga county, is making preparations for an active campaign this year. The organization is co-operating with the Chamber of Commerce, although it is said the latter is working for good roads in the city while the motor club is promoting the construction of highways in the country. Among the accomplishments of the club was the building of an underpass in place of the grade crossing at Camillus, which will be constructed this year, and many miles of roads formerly of poor quality. Through efforts of the organization an eight-mile stretch connecting Marcellus and Marietta will be constructed shortly.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

The Fairchild Electric Vehicle Company, Brooklyn, N. Y.; capital, $50,000; incorporators, Frank K. Fairchild, Marcus A. Fairchild, Arthur E. King.

The J. H. Kinney Company, Indianapolis, Ind.; capital, $10,000; incorporators, J. H. Kinney, H. L. Whipple, G. E. Snyder.

The Clifford Auto Company, Monticello, Ind.; capital, $15,000; incorporators, T. W. O'Connor, M. Clifford, E. J. Sexton.

Bristol Automobile Company, Waterbury, Conn.; capital not given; president, E. H. Bristol; treasurer, B. H. Bristol; secretary, B. B. Bristol.

Motor Car Specialty Company, Fort Worth, Tex.; capital, $5000; incorporators, E. E. Hose, F. H. High, R. R. Gilliland.

Elkins Automobile Company, Elkins, W. Va.; capital, $5000; incorporators, Thomas Donohoe, G. W. Adamson, E. O. King, E. D. Talbot, W. C. Poston, S. B. Hoffner, S. O. Billings.

The Wollaston Center Garage Company, Quincy, Mass.; capital, $25,000; incorporators, Albert C. Winsloe, Mabel McQuade, Charles C. Beatey.

The Jackson Petroleum Motor Company, Augusta, Me.; capital, $500,000; incorporators, E. M. Leavitt and others.

The Turnbull Auto Company, Willimantic, Conn.; capital, $25,000; incorporators, David A. Turnbull, Frederic J. Wood, William M. Turnbull, Alice Turnbull, Elizabeth G. Turnbull.

Excelsior Specialty Company, Jersey City, N. J.; capital, $30,000; incorporators, Ferdinand Thomassin, Frederick Lockwood, Albert Higson, Gustav H. Martens, Charles S. Goodfellow.

Harry F. Grant Company, Boston; capital, $50,000; incorporators, Harry F. Grant, Hugh Miller, William E. McKee.

Salem Automobile Service Company, Salem, N. J.; capital, $25,000; incorporators, George D. Jacquette, Ashton Lawrence, Clare E. Jacquette, William E. Allen.

Central Auto Supply Company, Indiana Harbor, Ind.; increase of capital stock to $600.

Stoddard-Dayton Motor Company, Hartford, Conn.; capital, $5000; incorporators not given.

Waterbury Automobile Company, Waterbury, Conn.; capital not given; president, Jennie S. Williams; treasurer, John T. Williams.

Bryant Sales Company, New York City; capital, $15,000; incorporators, William B. Haggerty, Frank P. Mansfield, 127 Duane street; Mary E. Wilson.

The Tire Trading Company, Wilmington, Del.; capital, $50,000; incorporators not given.

Monroe Garage Company, Monroe, N. Y.; capital, $3000; incorporators, William S. Jessup, Harriet S. Jessup, William F. Griffin.

Springfield Auto Sales Company, Springfield, Mass.; capital, $35,000; incorporators, B. W. Ogg, F. T. Keisaker, L. S. Winegar.

Empire Automobile Company, Indianapolis, Ind.; capital, $100,000; incorporators, Cecil E. Gibson, A. Waldheim, David May, David Sommers, Charles B. Sommers.

Owens Wagon & Automobile Works, Charlotte, N. C.; capital, $50,000; incorporators not given.

Storm Motor Car Company, Wilmington, Del.; capital, $10,000; incorporators, Jules P. Storm, Charles M. Storm, W. I. N. Lofland.

Detroit Auto Training School, Detroit; capital, $5000; incorporators, Gaylord C. Brunner and others.

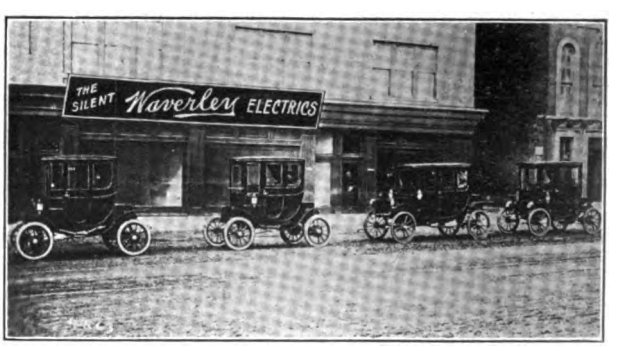
GARAGE AND DEALER.

Camp Bros., New Berlin, N. Y., are constructing a new garage. It will be of fire proof material, 60 by 90 feet, and will contain all modern conveniences to care for automobiles and repair work. G. E. Warner of the Post Garage, Catskill, will be head mechanic.

The Seymour Auto Company, Seymour, Conn., announces the opening of its automobile department in which modern conveniences have been installed for repairing motor cars.

Fred S. Willard and O. M. Decker, Utica, N. Y., have formed a partnership under the firm name of the Genesee Auto Sales Company and will conduct a general automobile business at 364 Genesee street. Both are experienced mechanics.

William Klokau, Davenport, Ia., who conducts a garage on 16th street and Fourth avenue, will construct a



Fleet of Waverley Electrics, Recently Shipped by the Waverley Company, Indianapolis, Ind., to Its Philadelphia Representative.

three-story brick building on the same premises. It will be modern in every particular.

The William J. Hawley Automobile Company, Canandaigua, N. Y., has purchased the Seaman Garage in Phenix street and will utilize the new quarters for repairing and storing. The new company is headed by Edson T. Case. William J. Hawley is manager.

Pray Brothers, Fort Dodge, Ia., is at the head of a company which has been formed to erect a new building in which will be installed modern machinery including an apparatus for welding automobile parts by the oxy-acetylene process.

Baumgardner & Kibby, Toledo, O., distributor for the Marathon, Detroiter and Cass cars, announces its removal into new quarters at 911 Jefferson avenue. A number of sub-agencies have been appointed and others will be made.

The Selden-Maxwell Auto Company, St. Joseph, Mo., announces the opening of new salesrooms at 910 Frederick avenue. The concern handles the Selden and Max-

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well pleasure cars and the Sampson trucks as well.

R. L. Kampf has succeeded Kampf & Markland at Armington, Ill., as representative of the Cole, made by the Cole Motor Car Company, Indianapolis, Ind.

The Perry Motor Supply Company, Hartford, Conn., wholesale and retail dealer in motor car supplies, has opened a new store at 102 Allyn street.

The American-Cole Motor Company, Syracuse, N. Y., agent for the Cole and American cars, has moved into a new garage and salesrooms at 215 James street.

The Morris Motor Car Company, Waterloo, La., is erecting a two-story brick garage on East Fifth street. The structure will cost in the neighborhood of $12,000 and will provide a salesroom 30 by 48 feet which will be located on the ground floor. The upper floor will be utilized for a repair shop and storage.

Albert H. and John F. Lohrman, Cincinnati, O., have formed the Cole Motor Sales Company and will distribute the Cole in that city and surrounding territory. The salesroom will be located at Peebles Corner.

The White Motors Company, New Haven, Conn., of which W. A. Rutz is manager, has made application for an increase in capital stock from $5000 to $20,000, this step being necessary owing to the increase in business.

Peter C. Rutan, a well known automobile dealer of Port Jervis, N. Y., has purchased properties on Ball street, and will erect a two-story concrete garage, 25 by 100 feet, which will be an addition to the present building.

The P. N. Montague Garage was opened recently in Charlotte, N. C. The structure is 110 by 180 feet, located on Main street, and is equipped with modern conveniences for the care and maintenance of motor cars.

Fred Seegar, Marion, Ind., has established a garage at 10th and South Washington streets, and will conduct a general storage and repair business.

Stahl & Stone, Topeka, Kan., agent for the Cole line, are occupying new quarters at 621 Quincy street.

George D. Jarvis, Burlington, Vt., is erecting a two-story garage of fire proof material on South Winooski avenue. The structure will be 56 by 130 feet and will be known as Jarvis' Palace Garage. The garage proper will be at the rear and will be fitted with modern equipment throughout.

The New Bedford Auto Selling & Supply Company, New Bedford, Mass, is occupying new quarters in the Coffin building, Spring and Pine streets. The concern is agent for the White line, made by the White Company, Cleveland, O.

The Means Auto Company, Des Moines, Ia., is occupying new quarters on 12th street, the change being necessary owing to a rapidly increasing business.

Holloway & Naville have succeeded Bryant & Holloway at Lafayette, Ind, Clarence Naville having acquired the interests of E. L. Bryant. The garage is located at 210 Columbia avenue.

Charles Schuster, for two years sales manager for the Cadillac in Cincinnati, O., has resigned to accept a similar position with the Cole Motor Sales Company of that city.

Joseph W. Rice, Gloucester, Mass., is erecting a new garage which will provide accommodation for a large number of machines.

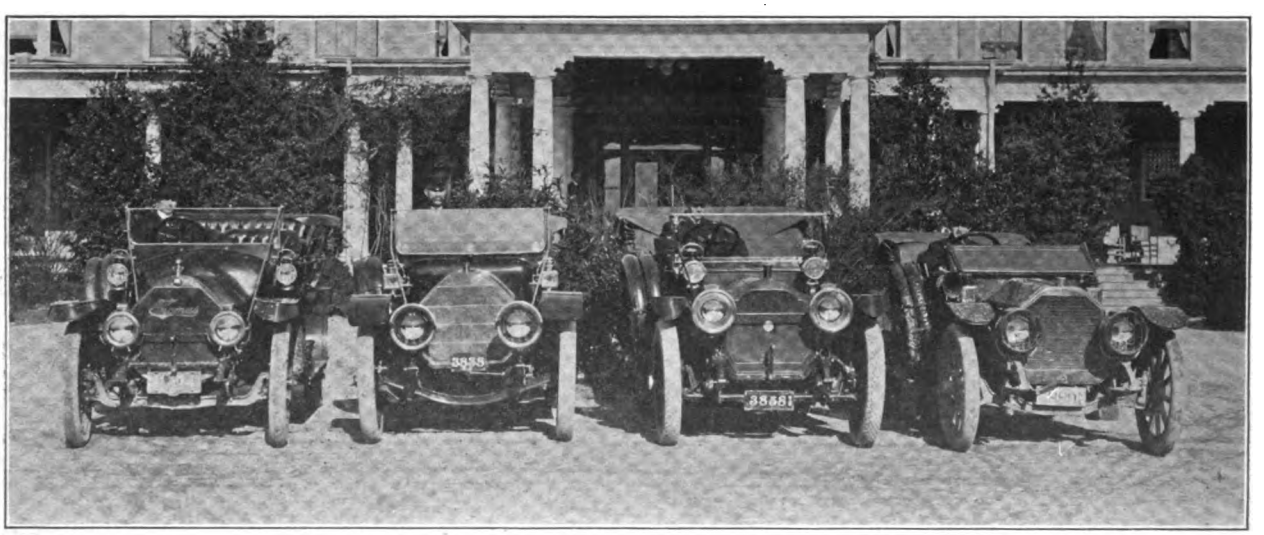
Staacke Bros., San Antonio, Tex., has dissolved, A. E. Staacke retiring. The business at 135 West Commerce street will be conducted hereafter by H. G. Staacke.

V. Durand, New Orleans, La., agent for the Amplex, made by the Simplex Motor Car Company, Mishawaka, Ind., has appointed the following sub-agents: Tartimer & Boudreaux, New Orleans; Thibaut & Leblanc, Klotzville; J. U. Folse, Paincourtville; Emile Dupont, Houma; G. W. Leah, Morgan City.

WITH THE MANUFACTURER.

Earl Chambers of Danville, Ill., has closed his garage and salesroom and accepted a position with the Chicago branch of the Velie Motor Vehicle Company, Moline, Ill.

The Henderson Motor Sales Company, Indianapolis, Ind., distributor for the Cole product, announces the appointment of the following new agencies: Cole Motor Sales Company, Cincinnati, O.; William E. Bell, Little Rock, Ark.; Mt. Lebanon Auto & Repair Company, Mt. Lebanon, Penn.; R. H. Pierpont, North Haven, Conn.; T. Williams, Canal Dover, O.; Crescent Garage Company, Odgensburg, N. Y.; J. H. Brown, Eveleth, Minn.; G. E. Sullivan, Oregon City, Ore.



Motoring Is Popular at Pinehurst, N. C., a Winter Resort, Owing to Many Beautiful Runs in and Around That Place—The Machine at the Left Is a Thomas, Owned by Leonard Tufts, Prominent in Good Roads Movement in the South.

The Abbott Motor Company, Detroit, announces the appointment of the following agencies: Missouri Motor Car Company, St. Louis, Mo.; W. D. Rightmire, Duluth, Minn.; D. B. Smith Auto Company, Burlington, Ia.; J. H. Fox, Grand Rapids, Mich.; E. F. Shriver, Benton Harbor, Mich.

Lucius A. French, advertising manager and assistant secretary of the Henderson Motor Sales Company, Indianapolis, Ind., has resigned from that company to become advertising manager for the Eller Music Houses, and left for Portland, Ore., recently. His many friends tendered him a banquet before his departure.

Edgar E. Muller has been appointed manager of the recently established service department of the Ohio Motor Car Company, Cincinnati, O. Mr. Muller has been connected with the company since its inception.

Reo Automobiles, made by the Reo Motor Car Company, Lansing, Mich., of which R. M. Owen & Co., New

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York City; is general sales agent, played an important role in a rabbit hunt conducted by 14 Reo enthusiasts at Cheney, Kan., recently. The hunt lasted two days and that the motorists were successful will be seen by the accompanying photograph which depicts a portion of the 1718 rabbits killed.

The Lininger Implement Company, Omaha, Neb., announces that its annual automobile accessory catalogue is ready for distribution and copies will be mailed free upon application.

H. C. Lathrop, secretary and treasurer of the Henderson Motor Sales Company, Indianapolis, Ind., and Miss Julia V. Hyland, a prominent Youngstown, O., society girl, were married in that city recently during the automobile show. They will reside in Indianapolis.

Alden L. MacMurtry has resigned his position with Gray & Davis, Amesbury, Mass., manufacturers of automobile lamps and an electric lighting dynamo. He will devote his entire attention in the future to the Mondex specialties handled by the Aristos Company, New York City.

Leonard Tufts of Pinehurst, N. C., who is prominent in the good roads movement in the South, is a Thomas enthusiast and in the accompanying illustration is shown the machine in front of the Carolina previous to its departure on an all day run. Motoring is extremely popular at this winter resort as there are numerous triangular runs of which Pinehurst is the starting point.



Motorists in Cheney, Kan., Utilize Automobiles in Hunting Rabbits—The Picture Depicts the Result of a Two Days' Hunt in Which Reo Cars Played a Prominent Part.

The Findeisen & Kropf Manufacturing Company, Chicago, announces that the Hall Motor Supplies Company, Toronto, will act as distributor for the Rayfield carburetor in Canada. The R. C. Hull Electric Company of Cleveland, O., will also handle the Rayfield.

The New York Lubricating Oil Company, consolidated with the Columbia Lubricants Company of New York, has found it necessary to open a branch office at Seattle, Wash., at the corner of Virginia and Railroad avenues, owing to the large increase in business on the Pacific Coast. A new and larger warehouse has been secured in Newark at 3739 New Jersey railroad avenue.

D. H. Wetzel, for the past year or more advertising manager of the Ajax-Grieb Rubber Company, has resigned to become advertising and sales manager of the Maple Products Company, Utica, N. Y. He assumed his new duties March 15.

Williams & Co., New England agent for the Cartercar, made by the Cartercar Company, Pontiac, Mich., is occupying new and more commodious salesrooms at 1000 Boylston street, Boston, where a full line of the product of the Pontiac concern will be shown.

The Northwestern Chemical Company, Marietta, O., maker of "The Chemically Correct Line," is mailing its 1912 catalogue of motor car specialties.

The Blood Bros. Machine Company, Kalamazoo, Mich., maker of universal joints, announces the operation of its plant 23 hours a day in order to handle its increased business. During the past six months the company has doubled its plant and even with the additions and special machinery finds it difficult to keep up with its orders.

The Kissel Motor Car Company of Hartford, Wis., has completed negotiations for a new home for its New England branch, and will erect a building 74 by 200 feet on Commonwealth avenue at Pleasant street, Brookline, Mass. When completed it will be one of the finest structures of its kind in New England and will have a salesroom 74 by 70 feet. The garage will occupy the rear of the first floor and the most modern appliances will be installed for the care and maintenance of motor vehicles. Manager H. B. Pruden has provided a room for the chauffeurs directly off the garage. The service shop will be located on the second floor, rear, and the machinery will be operated by electricity. A trolley system will be installed for handling heavy parts, also a large hydraulic elevator. The front portion of this floor will be utilized for the display of trucks.

The Thomas B. Jeffery Company, Kenosha, Wis., announces that plans have been completed for the erection of the new Rambler sales and service building in the newer Back Bay district of Boston. It will be four stories in height, of fire proof material and will be 216 by 127 feet, providing about 60,000 square feet of floor space. Work has begun upon the Chicago service station which is located at the corner of Indiana avenue and 23rd street. Both properties have been leased for a term of years.

Waverley electrics, made by the Waverley Company, Indianapolis, Ind., and other electric pleasure vehicles were extensively advertised by the dealers in that city recently and the advantages of these machines for city and suburban service emphasized. The campaign had been in progress but a few weeks when the Philadelphia representative of the Waverley Company placed an order for four cars. In the accompanying illustration is depicted the automobiles in front of the salesrooms at 2029 Market street. One of these is a Silent Waverley limousine five-passenger car in which all seats face forward.

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NEW YORK DEALERS ON LEGISLATION.

The Automobile Dealers' Association, Inc., of New York City, has been decidedly active in guarding the interests of motorists during the present session of the New York Legislature. It is probable that the decision of the political leaders at Albany to permit the so-called Callan law to remain unchanged for at least another year, is due in a large measure to the action of this organization.

The first bill introduced was that which provided for a signalling device at the rear of the car which would show all those following that the driver intended to slow down or stop. There may have been some merit in a device of this nature, but to make its adoption compulsory was considered an unwarranted hardship, and the result would have been to close the commonwealth to tourists.

Senator Long introduced two bills, the first of which provided for a division of fines collected from motorists between the state and the cities or villages collecting them. When the association showed that this would mean the establishing of speed traps throughout the entire state, the bill was withdrawn. The second provided for a similar division of the registration fees, and when it was shown that New York City would receive 70 per cent. of the money, leaving but 30 per cent. to be expended in the rest of the state, this also was withdrawn.

At the same hearing, there appeared a bill introduced by Senator Bussey, providing that "no chauffeur's license shall be issued to a person who has been convicted of a felony." This was opposed on the ground that it was class legislation, and that if such a law were passed, it should be made to apply to teamsters, motormen and all other classes of trade.

Another bill was introduced by Senator McManus, this prohibiting racing on either track or highways. This was opposed, not only by this association, but by the American Automobile Association and other organized bodies of motorists. It was pointed out that these organizations were engaged in formulating rules which would eliminate possible dangers, and the proposed legislation was entirely unnecessary.

NEW WASHINGTON CONCERN.

The Washington Motor Car Corporation has been organized in Washington, D. C., for the purpose of taking over the business of the Carter Motor Car Company of that city. The new concern will manufacture a full line of four and six-cylinder automobiles. The directors include: W. D. Barry, Louis S. Kann, W. L. Bowles, Dr. John R. Sharp, Dr. H. M. Dixon, Hugh F. Harvey, J. D. Darnall, Thomas F. Murphy, P. M. Galvin, M. H. Herriman, W. K. Hill, Samuel Gassenheimer, C. C. Gove, Dr. Thomas E. Latimer, Washington; Dr. Guy Latimer, W. P. Magruder, J. F. Lillard, Hyattsville, Md.

VALUE OF SERVICE STATIONS.

That automobile manufacturers are learning intrinsic value alone cannot be relied upon to create and maintain a demand for a product, is the opinion of C. P. Henderson, president of the Henderson Motor Sales Company, the Indianapolis organization that markets the Cole car, made by the Cole Motor Car Company of that city. He feels that the successful manufacturer of the future will be the one which follows up the right kind of advertising with the establishment of service departments for the benefit of users. He says:

"Owners are coming to see that it is a reckless waste to trade in their cars each year at such a heavy loss, when by taking proper care of their machine, and with the help and support of the manufacturer, years of use can be had with the minimum cost of upkeep. By rendering the proper support to the user the manufacturer secures his hearty indorsement. which will in a measure solve the second hand car problem. In fact, a rightly conducted service department can well be maintained in connection with the sales department, if the distributors and agents are brought to the proper kind of co-operation, and may easily become the most efficient part of the selling organization."

WARREN DOUBLES CAPITAL.

The Warren Motor Car Company, Detroit, maker of Warren cars, has increased its capital from $300,000 to $600,000, this step having been necessary because of rapidly increasing demands for its product. Lucius E. Wilson, retiring secretary of the Detroit Board of Commerce, has become vice president and general manager of the company with complete command over the production facilities.

TOURING CALIFORNIA IN THE R-C-H.

Three thousand, one hundred and sixty-nine miles in 15 days at a total cost for gasoline, oil, tires, etc., of $65, or about two cents a mile, is the result obtained by an R-C-H two-passenger roadster, made by the R-C-H Corporation, Detroit, in the hands of R. C. Luther. The car was selected for the purpose of distributing literature concerning the Panama-Pacific exposition.

During its tour the R-C-H visited every town between San Francisco and Redding on the north and between San Francisco and Santa Cruz on the south. It also covered the San Joaquin valley from Stockton south to Porterville and Hanford. Plans are now under way for sending the machine across the continent in the same interests.

The story of the trip has been compiled in an interesting booklet, which the R-C-H Corporation is sending free to all who make request at the main office of the concern, 107 Lycaste street, Detroit.

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MUFFLER CUT-OUT UNNECESSARY.

The indiscriminate use of the muffler cut-out has caused a very decided public sentiment against it recently, and several well known motor car manufacturers have been making exhaustive tests to determine whether or not efficiency is marred by its omission. Among these is the E. R. Thomas Motor Car Company, Buffalo, N. Y., maker of Thomas cars. Concerning the result of these tests. President F. R. Humpage says:

"In the early days, opening the cut-out gave increased power and speed with the free exhaust, but today, with the improvements in motors, mufflers and exhaust manifolds, there is no excuse for the flagrant disregard of the uses for which the cut-out was designed. Prospective purchasers and dealers have demanded a cut-out in the past, although our officials always have been opposed to it. We believe that when one is installed, it should be placed in such a position as to require the driver to deliberate before using it."

An ordinance has been introduced in New York City, prohibiting the use of this member, and public opinion has been aroused to such a point that it is probable the ordinance will pass in the near future.

MOTORING IN NATIONAL PARKS.

Senator Warren of Wyoming has introduced a resolution in Congress calling upon the secretary of the interior to submit complete information regarding the national parks in which motor driven vehicles are permitted, and asks what can be expected in the way of opening Yellowstone and other national parks which now forbid their use. The explanation that the roads must be widened before motor vehicles are admitted is an answer which does not find complete acceptance from those who contend that conditions can be adjusted to meet present day road travel.

TWELVE CARS IN 500-MILE RACE.

The 12th entry for the 500-mile race on the Indianapolis speedway, Memorial Day, has been made by the Clarke-Carter Automobile Company, Jackson, Mich., with a Cutting car, which will be driven by Robert Burman. Harry Goetz, who was mechanician for Ray Harroun, winner of last year's 500-mile race in a Marmon car, has gone with Burman and is helping him in the construction of the special racing machine. This will be equipped with a four-cylinder motor, having bore of 5.21875 inches and stroke of seven inches, giving a piston displacement of 597.9 cubic inches.

The other entries are: Two Stutz cars to be driven by Gilbert Anderson and Leonard Zengle; two Nationals with Donald Herr, Howard Wilcox or Charles Merz; two Case cars, with Harvey Herrick and Louis Disbrow; two Mercedes, with Ralph De Palma and Spencer Wishart; a Fiat, with Teddy Tetzlaff; a Simplex, with Bert Dingley, and a Lexington, with Harry Knight. Ralph Mulford has purchased a six-cylinder Knox which he will drive in the race, although his formal entry has not been filed as yet.

REMY BRASSARD IN HAVANA.

The recent suspension of E. A. Moross by the contest board of the American Automobile Association appears not to have affected his plans for holding a race meet at Havana, Cuba, March 10. One of these races was for the Remy grand brassard, which has been awarded for contests over American tracks in the past. This was won by Robert Burman, driving the Ohio car 999, made by the Ohio Motor Car Company, Cincinnati, O.

LARGE ABBOTT-DETROIT ORDER.

Train load shipments of motor cars from Detroit are common nowadays, when formerly they would have attracted attention. It is a frequent occurrence for a motor car company to receive large orders for machines and an instance of this kind is noted with the Abbott Motor Company which recently received an order for 300 automobiles to be shipped to New York City. If this order were filled at one time it would require four trains of 30 cars each.

AS TO IMPORTS AND EXPORTS.

For the first time in many months the report of the Department of Commerce and Labor for January, 1912, shows an increase in the value of automobiles and parts imported into this country from abroad. The totals for this month in 1911 and 1912 are, $171,301 and $224,342, respectively. During the same period the exports increased a little more than 87 per cent., or from $1,300,668 in 1911 to $2,427,891 in 1912. Classified according to countries the result is as follows, with respect to automobiles:

Exports

	1911		1912	
Country	No.	Value	No.	Value
United Kingdom	..	$194,589	719	$508,324
France	..	31,342	20	12,012
Germany	..	3,731	15	8,874
Italy	..	30,000	12	8,093
Other Europe	..	20,071	119	106,801
Canada	..	439,706	404	481,413
Mexico	..	56,043	46	64,973
West Indies	..	61,788	20	17,377
South America	..	85,413	187	240,536
British Oceanica	..	102,566	402	402,199
Asia	..	73,583	65	72,536
All others	..	36,467	38	32,152
Totals	924	$1,135,299	2047	$1,955,290

Imports.

Country	No.	Value	No.	Value
United Kingdom	8	$24,050	25	$58,341
France	36	57,205	38	102,770
Germany	13	34,041	6	13,955
Italy	7	13,095	10	11,942
All others	5	9,336	5	12,189
Total	69	$137,727	84	$199,197

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The Quality Lubricants

HARRIS

TRADE MARK—REG. U.S. PAT. OFF.

OILS

You get greater mileage out of HARRIS OILS because they are ALL lubrication—there is no waste. This is an established fact—not an advertising claim. No other lubricants are made with the same conscientious care.

We take pride in our product. We don't try to make as much as we can, but the best. That principle of manufacture has placed HARRIS OILS in the front rank.

We buy the finest grade of Pennsylvania Crude—what is called "Premium" Crude. We pay a premium to get this particular stock and we won't use anything else.

That is why HARRIS OILS cost considerably more to manufacture than ordinary oil. That is why they are best—surely you realize the absolute necessity of giving your engine the highest grade of lubricant the market affords. Nothing else compares with HARRIS OILS. Get a package today. You'll be more than pleased.

Made in three bodied consistencies.

LIGHT, MEDIUM, HEAVY. Sold in barrels, 1-2 barrels, two 5 gallon cans in wood case, single 5 gallon can cased, and 1 gallon cans. Ask your dealer or garage man.



Ask for HARRIS OILS. If your dealer does not sell them, send 80 cents (for 1 gallon can) or $3.75 (for 5 gallon can) and we will ship same prepaid.

A. W. HARRIS OIL COMPANY

326 South Water Street, PROVIDENCE, R. I.

143 North Wabash Avenue, CHICAGO, ILL.

SAVANNAH ABANDONS RACING CLASSICS.

At the recent annual meeting of the Savannah Automobile Club, Savannah, Ga., it was decided that the organization would not take the initiative in promoting the Vanderbilt Cup and Grand Prize races this year. This does not mean necessarily that these classic events will not be held over the southern course, but it does mean that the club will not bear the entire burden of the undertaking and that other interests will be compelled to take the first steps. From present indications, it would appear that these races will be held elsewhere.

NEW CARTERCAR CHICAGO HOME.

With the largely increasing business of the Cartercar Company, Pontiac, Mich., maker of Cartercars in Chicago and the Middle West, it has become necessary for the company to secure larger quarters for its Chicago branch. A beautiful new building, three stories in height, is to be erected at 1840 Michigan avenue, in the heart of the automobile district, and will be occupied exclusively by the Cartercar Chicago branch. The first floor will serve as a salesroom, while the second and third will be utilized for a service station. A complete stock of repair parts will be kept on hand continuously, and the trade throughout the entire section will be supplied with cars and parts from this branch.

FOREIGN OVERLAND AGENT.

Claude A. George, assistant sales manager of the Willys-Overland Company, Toledo, O., maker of Overland cars, left New York City on the Lusitania, March 20, bound for Hamburg, Germany, where he will locate permanently as Continental representative of the company. Mr. George has been associated with the Willys-Overland Company since the early days of its existence, and expects to be able to increase greatly the concern's foreign business during the coming year.

SEEK BOARD TRACK MEET.

Motor enthusiasts in Los Angeles, Cal., are planning to hold an automobile race meet on the board track at Playa del Ray, following the Santa Monica road race of May 4. It is understood that application will be made for a sanction in the near future. There seems to be no reason why the plan should not prove of value in promoting the road event, since it is expected that many manufacturers, who might hesitate about sending cars to the Pacific Coast to participate in only one race, will be glad of the opportunity to take part in both meets. Long distance contests on the board track probably will be eliminated, the longest undoubtedly being for 25 or 50 miles.

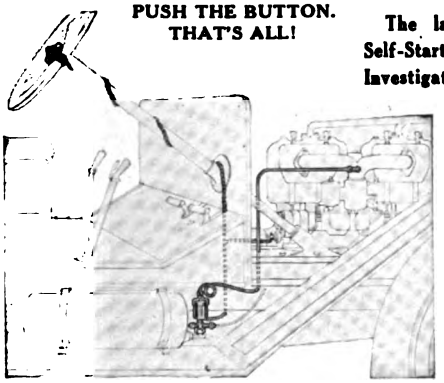
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FITS EVERY CAR

$18

Anyone who can drive can apply INVEX in a few minutes without cutting dash or mutilating the car.

Send us $18 with the year, make and model of your car, and we will send you an INVEX by return mail. If it does not prove its worth you may return it within ten days and money refunded.

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Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car. Model 41—4 Passenger Demi Tonneau. Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke, 40 H. P. $2400

Model 50—7 Passenger, Fore Door Touring Car. Model 51—4 Passenger Demi Tonneau. Model 52—Roadster type—all with the new "T" head 5 in. bore, 6 in. stroke motor 50 H. P..... $3400

Model 30-A—Fore-Door, a 40 H. P., 5 Passenger Touring Car at $1750
Model 32-B—A 40 H. P. Roadster at - - - - - - $1700

All fully described in our Art Catalog. Send for one today.

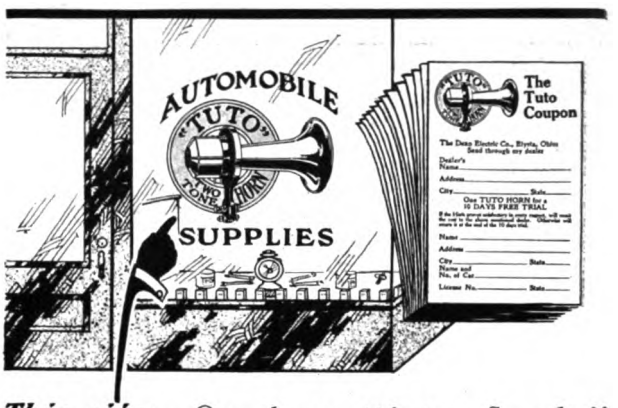
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Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.

CARTERCAR COMPANY, PONTIAC, MICH.



This sign on your window will sell many a Tuto for you

Our large "Auto Supply" window sign, advertising and cut service is ready to be sent to the dealers who sell the

TUTO HORN

A Two-Tone Electric Horn

The TUTO Horn easily outsells any horn line. Probably no warning signal was ever accorded such prompt endorsement by car drivers everywhere as the TUTO. The mechanical construction and ease of operation were in a great measure responsible, as these features at once placed the TUTO in a class by itself.

It's the only electric warning signal made with a low note for regular service and a loud note for emergency, both operated from the one push button, the one connecting cord and one set of batteries.

Send your order today for TUTO Horns. Get one of our large window signs, *which essentially is your sign.* Make use of our advertising and direct TUTO Horn buyers to your store.

It will be the most profitable trade winning investment you ever made. Act today.

The Dean Electric Co.

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"Look for Dean where Quality's seen."

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Has it ever entered your mind that

MONOGRAM OIL

is the standard of comparison for all automobile oils.

¶ Doesn't the oil salesman say to the dealer "Our oil is as good as **MONOGRAM** and we look after the trade just the same way as the **MONOGRAM** people do."

¶ Doesn't the dealer say to the automobile owners "The oil I sell is as good as **MONOGRAM**."

¶ Why not then use an oil that is known to every one as being good and that has been continually successful under one brand name for years.

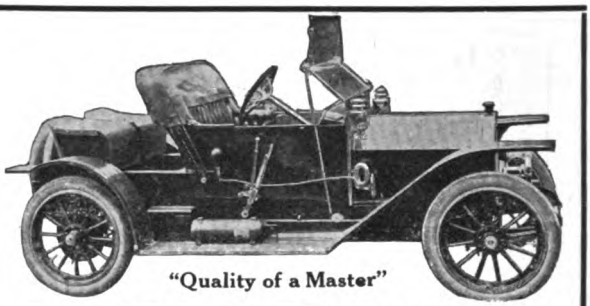
¶ Insist on **MONOGRAM** and be satisfied.

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Consolidated with
COLUMBIA LUBRICANTS CO. of N. Y.
116 Broad Street. New York City
New England Headquarters: 126 MASS. AVE., BOSTON, MASS.
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"The Car That Gets There and Back"
High Class Touring Cars and Roadsters
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STORAGE BATTERIES
CLASS A FOR ELECTRIC LIGHTING
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Manufactured by
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AJAX EXTRA HEAVY NON-SKID TIRES
The ONLY non-skid tire guaranteed for 5,000 miles or 200 days' service.
AJAX-GRIEB RUBBER COMPANY
15 Park Square, Boston, Mass.
Factories: Trenton, N. J. Branches in Principal Cities



"Quality of a Master"

LENOX CAR

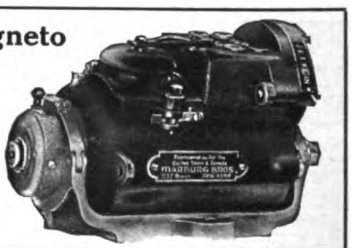
The best that money can buy. $1800—Fully Equipped
AGENTS WHO KNOW WANTED IN OPEN TERRITORY
Lenox Motor Car Co., Boston, Mass. { 3368 Washington St, 222 Eliot St.

Jackson
No Hill Too Steep
No Sand Too Deep

Model 52	- -	$1800
Model 45	- -	1650
Model 32	- -	1100
Model 26	- -	1100
Model 28	- -	1000

JACKSON AUTOMOBILE CO., 1203 East Main St. Jackson, Mich.

Mea Magneto
TRUE COMFORT
Gear changes a minimum
Marburg Bros. Inc.,
1777 Broadway,
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Herreshoff
"The Thoroughbred"

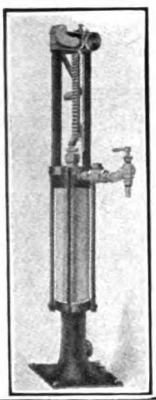
ROADSTER -	$950
TOURING CAR	$1150
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The luxurious upholstery, the riding qualities, the economy in the use of gasoline and oil, place the Herreshoff in line with cars selling at double the price.
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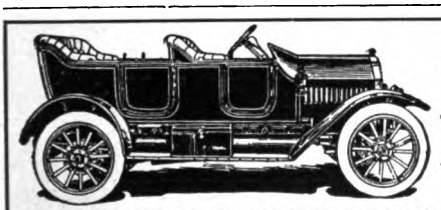
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"ALL THAT THE NAME IMPLIES"
The Peerless Motor Car Company Cleveland Ohio



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LAMBERT
FRICTION
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Automobiles and Trucks
Write for Agent's proposition.
THE BUCKEYE MFG. CO., ANDERSON, IND

BLITZ The Polishing Cloth
QUICK AND EASY SHINE
For Auto Brasses. Blitz is always ready and the polish is *in* the *cloth*. Sample Free, or Full Size Blitz Cloth, 25 Cents, by mail or at garages.
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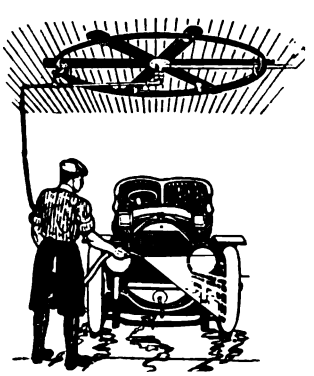
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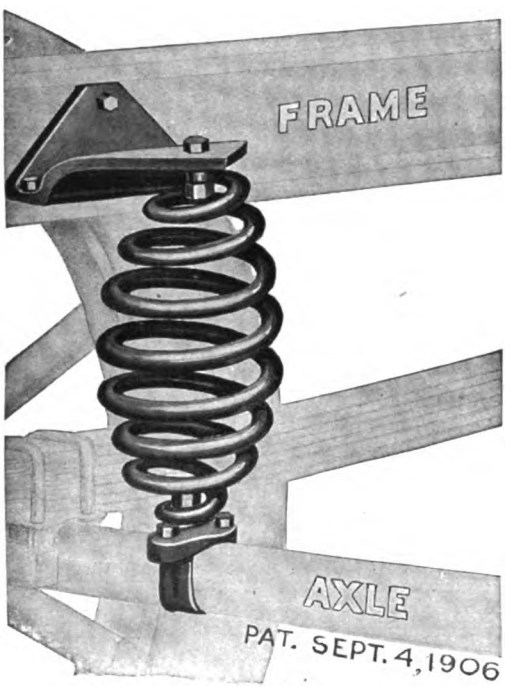
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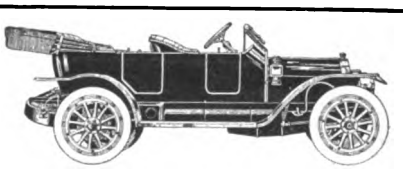
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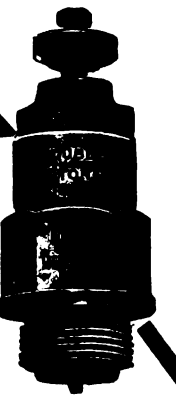
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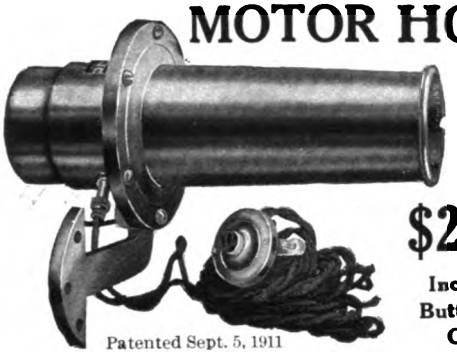
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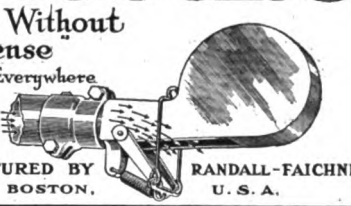
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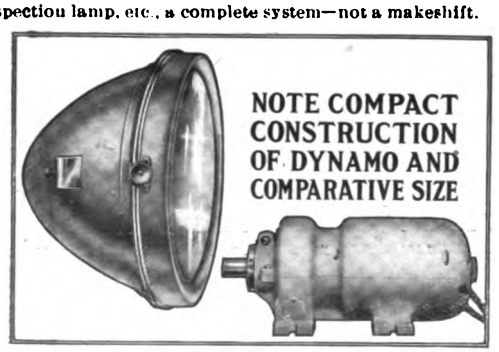
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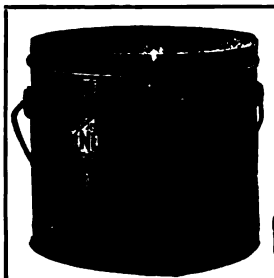
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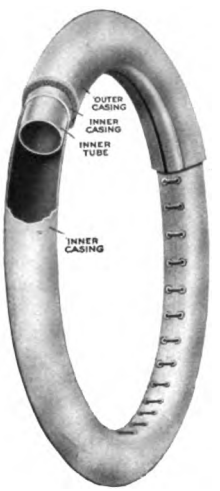
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Geissler Bros. Storage Battery Co., 514 W. 57th St., New York City.

Waite Auto Supply Co., 81 Exchange place, Providence, R. I. (Success.)

BLOWOUT PATCHES.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.

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Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

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Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Raybestos.)

Standard Woven Fabric Co., Worcester, Mass. (Multibestos.)

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Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas-Knight.)
Branch: N. E. corner Broadway and 64th St., New York City.

Berkshire Auto Car Co., Cambridge, Mass. (Berkshire.)

Brush Runabout Co., 3 West 61st St., New York City. (Brush runabout, Liberty-Brush.)

Buckeye Mfg. Co., Anderson, Ind. (Lambert.)

Cartercar Co., Pontiac, Mich. (Cartercar.)

Clarke-Carter Automobile Co., Jackson, Mich. (Cutting.)

Cole Motor Car Co. See Henderson Motor Sales Co.

Columbia Motor Car Co., 3 West 61st St., New York City. (Columbia.)

Dayton Motor Car Co., 3 West 61st St., New York City. (Stoddard-Dayton.)

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Henderson Motor Sales Co., Indianapolis, Ind. (Cole.)
Eastern Distributors: Colt-Stratton Co., Broadway at 68th St., New York City.

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Hupp Motor Car Co., Detroit, Mich. (Hupmobile.)
Branches: Detroit, Buffalo, Chicago, Cleveland, Denver, Kansas City, Los Angeles, Minneapolis, Philadelphia.

Ideal Motor Car Co., Indianapolis, Ind. (Stutz.)

Imperial Automobile Co., Jackson. Mich. (Imperial.)

Inter-State Automobile Co., Dept. N, Muncie, Ind. (Inter-State.)
Branch: 153 Massachusetts Ave., Boston, Mass.

Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)

Kissel Motor Car Co., 174 Kissel Ave., Hartford, Wis. (KisselKar.)

Knox Automobile Co., Springfield, Mass. (Knox.)

K-R-I-T Motor Car Co., Detroit, Mich. (K-R-I-T.)

Lenox Motor Car Co., Inc., Boston, Mass. (Lenox.)

Lexington Motor Car Co., Connersville, Ind. (Lexington.)

Lion Motor Sales Co., 646 Woodward Ave., Detroit, Mich. (Lion.)

Marquette Co., The, Detroit, Mich. (Marquette.)
Branches: New York, Boston, Chicago.

Maxwell-Briscoe Motor Co., 3 West 61st St., New York City. (Maxwell.)

Michigan Buggy Co., 147 Lay St., Kalamazoo, Mich. (Michigan.)

National Motor Vehicle Co., 1033 22d street, Indianapolis, Ind. (National.)

Oakland Motor Car Co., 1300 Oakland Ave., Pontiac, Mich. (Oakland.)

Paige-Detroit Motor Car Co., The, Detroit, Mich. (Paige-Detroit.)

Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: 660 Beacon St., Boston, Mass.; Broadway and 57th St., New York City; Michigan Ave. and 25th St., Chicago, Ill.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

R. C. H. Corporation, 107 Lycaste St., Detroit, Mich. (R. C. H.)

Reo Motor Car Co., Lansing, Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Selden Motor Vehicle Co., Rochester, N. Y. (Selden.)

Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)

Studebaker Corporation, Detroit, Mich. (E-M-F, Flanders.)

United States Motor Co., 3 West 61st St., New York City. (Brush, Maxwell, Sampson, Stoddard-Dayton, Columbia.)

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Willys-Overland Co., Toledo, O. (Overland.)

CARS—STEAM PLEASURE

White Co., The, 828 E. 79th St., Cleveland, O. (White.)
Branches: See Cars — Gasoline Pleasure.

CARS—GASOLINE COMMERCIAL.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branch: See Cars—Gasoline Pleasure.

Available Truck Co., 2334 Hamilton Ct., Chicago, Ill. (Available.)

Brush Runabout Co., 3 West 61st St., New York City. (Brush.)

Cartercar Co., Pontiac, Mich. (Cartercar.)

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches: New York, Chicago, Boston, Philadelphia, Kansas City.

Grand Rapids Motor Truck Co., Grand Rapids, Mich. (Hoosier Limited.)

Hupp Motor Car Co., Detroit, Mich. (Hupmobile.)
Branches: See Cars—Gasoline Pleasure.

Jarvis-Huntington Automobile Co., Huntington, W. Va. (Jarvis-Huntington.)

Knox Automobile Co., Springfield, Mass. (Knox.)

Mais Motor Truck Company, Indianapolis, Ind. (Mais.)

McIntyre Co., W. H., Auburn, Ind. (McIntyre.)

Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: See Cars—Gasoline Pleasure.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

Reo Motor Car Co., Lansing, Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Standard Motor Truck Co. of N. E., 9-11 Harcourt St., Boston, Mass. (McIntyre.)

Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)

United States Motor Co., 3 West 61st St., New York City. (Sampson, Brush, Stoddard.)

Victor Motor Truck Co., 656 Main St., Buffalo, N. Y. (Victor.)

Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Couple-Gear Freight-Wheel Co., 540 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York City; 178 Devonshire St., Boston, Mass.

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches: See Cars, Gasoline Commercial.

General Vehicle Co., Long Island City, N. Y. (G. V.)

CARS—FIRE, POLICE AND MUNICIPAL SERVICE.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
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Branches: See Cars—Electric Commercial.

Knox Automobile Co., Springfield, Mass. (Knox.)

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Brets Co., J. S., 250 W. 54th St., New York City (Hartford cone.)

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Beck Co., The, Box 67c, Rockville Centre, N. Y.

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee, Wis.
Prest-O-Lite Company (Prest-O-Carbon Remover). See under Acetylene Tanks for address of main office and branches.

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HORNS—BULB, ELECTRIC, EXHAUST.

Automobile Supply Mfg. Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)
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Branch: 1974 Broadway, New York City.

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Gray & Davis, 55 Lansdowne St., Boston, Mass.

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National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
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Edison Storage Battery Co., 137 Lakeside Ave., Orange, N. J.
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Geissler Bros., Storage Battery Co., 514-520 W. 57th St., New York City.
Gray & Davis, 55 Lansdowne St., Boston, Mass.
K-W Ignition Co., The, 2329 Chester Ave., Cleveland, O.
Sager Co., J. H., 271 South Ave., Rochester, N. Y.

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Emblem Mfg. Co., Angola, N. Y. (Emblem.)
Swenson, B. A., 298 Blackstone St., Providence, R. I. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.
International Automobile Association, Sheldon M. Booth, Old South Bldg., Boston, Mass.

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Hazard Motor Mfg. Co., 122 Coates St., Rochester, N. Y. (Hazard.)
Western Motor Company, Marion, Ind. (Rutenber.)

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Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)
Eagle Oil & Supply Co., 104 Broad St., Boston, (Eagleine No-Karbon.)
Fiske Bros. Refining Co., New York City. (Lubroleine.)
Branch: Pittsburg, Penn.
Harris Oil Co., A. W., 326 South Water St., Providence, R. I. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.
Harris Oil Co., Muncie, Ind. (Autoil.)
Havoline Oil Co., 133 William St., New York City (Havoline.)
Haws, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 399 Boylston St., Boston, Mass.
Keilem & Co., Chas. F., 113 Arch St., Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.
Kincaid Oil Co., 219-221 West Exchange St., Providence, R. I. (Kincaid.)
Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York Lubricating Oil Co., 116 Broad St., New York City. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 423 Passaic Ave., East Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.
New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)
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Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

Wolverine Lubricants Co., 80 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

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Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Randall-Faichney Co., Boston, Mass. (B-Line.)

POLISHES.

Harris Oil Co., Munice, Ind. (Metal, Wood, Leather.)

Auburn Specialty Co., 122 Green St., Auburn, N. Y. (Blitz Cloth.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

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Boyd, F. Shirley, 903 Boylston, St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittelsey Demontachable.)
Branches: New York, Chicago, San Francisco.

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Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")
Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Harris Oil Co., Muncie, Ind.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Hers & Co., 295 Lafayette St., New York City (Bougie Mercedes.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York City. (Rex.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPEEDOMETERS AND RECORDING DEVICES.

Casgrain Speedometer Co., 172 Columbus Ave., Boston, Mass.
Branches: 1919 Broadway, New York City; 2031 Euclid Ave., Cleveland, O.

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York City.

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park square, Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco,

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Cal.; 917 East Pike St., Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1776 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 72rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17½ Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

Western Automobile Supply Co., 3900 Sheridan road, Chicago, Ill. (Auto Inner Casings.)

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator). See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

New Tyr Manufacturing Co., 771 Lexington Ave., New York City. (New Tyr.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TIRE TOOLS AND REMOVING EQUIPMENT.

Beck Co., The, Box 67c, Rockville Centre, N. Y.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

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Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Butler Mfg. Co., The, Carthage, Ind.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TRUCK BODIES.

Lynch Manufacturing Co., East Side Station, Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

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Pitless Auto Turntable Co., Kansas City, Mo.

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Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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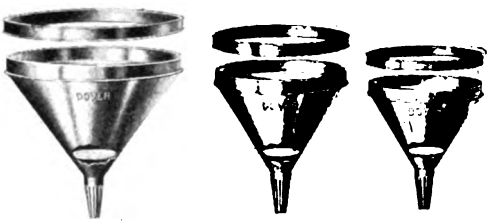
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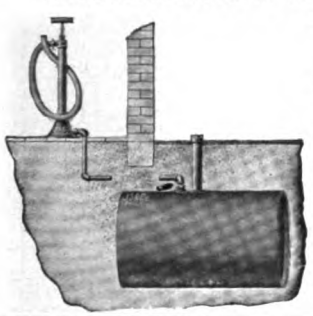
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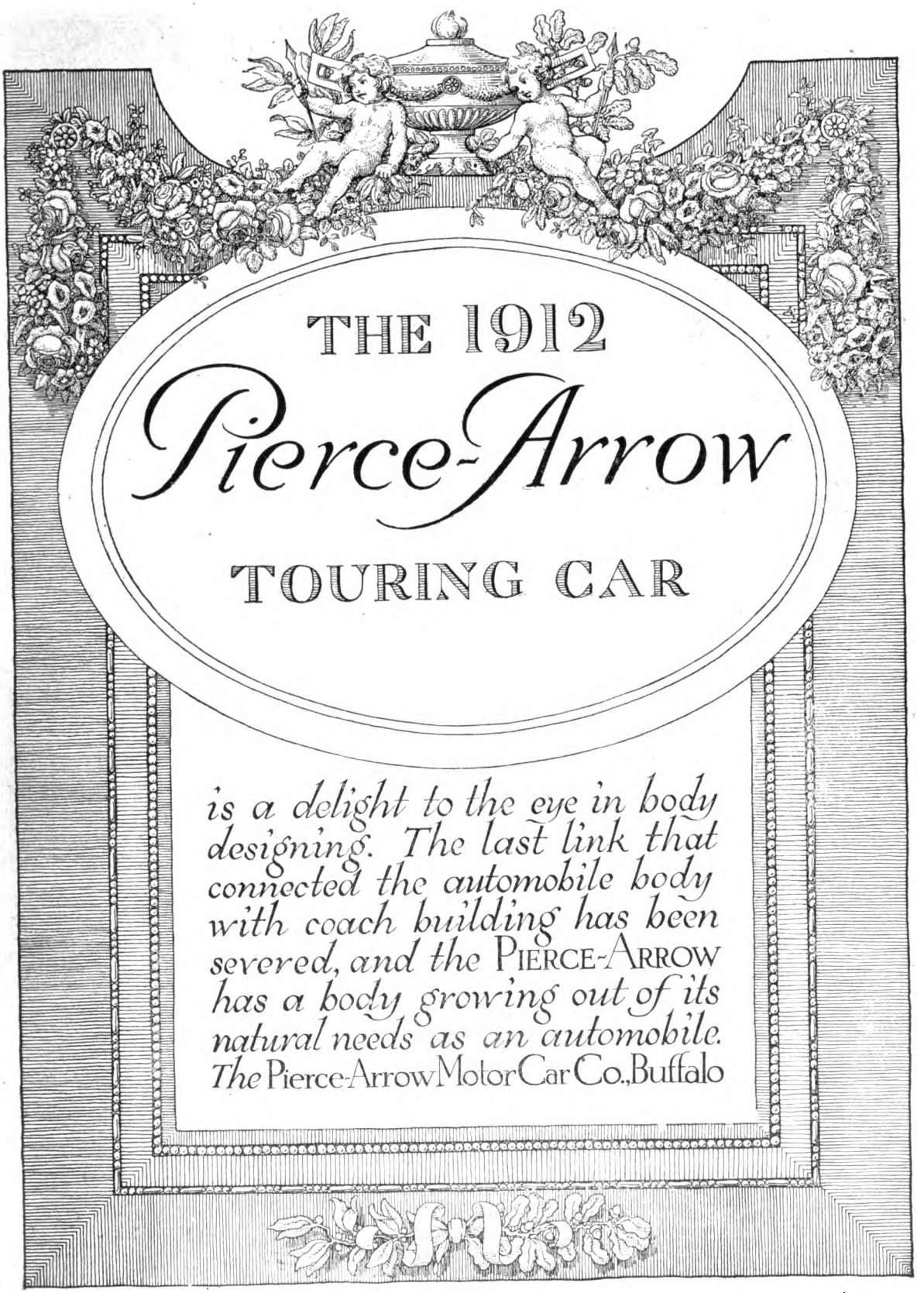
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VOL. XXXIII No. 5

AUTOMOBILE JOURNAL

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PAWTUCKET. R. I.

April 10, 1912

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The correct oil for a Fiat, for instance, is absolutely the wrong oil for a Packard.

The spring-strength of the piston rings must be considered; the fit of the piston ring into its recess; the length of the crank-shaft and connecting-rod bearings; the feed-systems; the length of the vacuum period, while intake and exhaust valves are both closed.

Before anything like correct lubrication can be determined, these, and other important considerations, must be known and studied.

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Altogether we found that they required five distinct grades of lubricating oil. We then produced the oils.

So far as it was practicable, we filtered out the free carbon.

We verified the fitness of these oils by frictional horse-power tests on many cars they were intended for.

All the oils were put through practical demonstrations on their respective cars.

The test-results called for some changes, which we made.

Our ultimate findings are printed in a list of recommendations showing the correct grade of oil for every American car and many of the foreign makes. We will send copy of this list on request.

Some cars change type from season to season. The list gives the oil required for each season's type.



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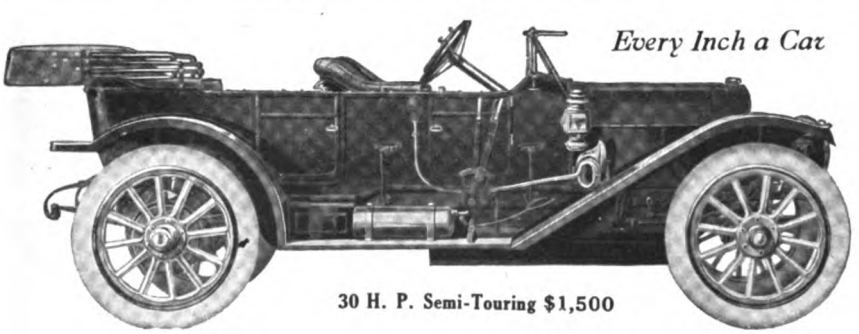
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KisselKar wheel bases are equal to the wheel bases of more expensive cars, and more liberal than the wheel bases of any other cars approximating KisselKar prices. This perfect "balance" of the KisselKar and the big wheels, big tires and commodious tonneau, place the KisselKar in the small class of better automobiles.

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We charge the *least* for the Stewart Speedometer because it's the *best* speedometer. Sounds like an Irish Bull, doesn't it? But the argument is sound.

The better an article the better it pleases users. The better it pleases users the larger its *sale*. The larger its sale the less the cost of *producing* it. For the oftener a machine is used the less is the machine charge on each part it makes.

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Not an *aristocrat*—it *works*.

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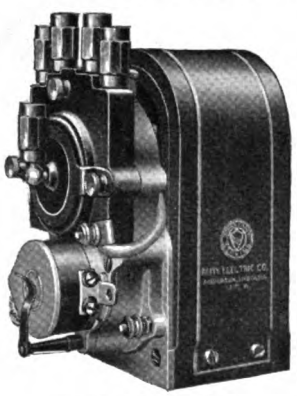
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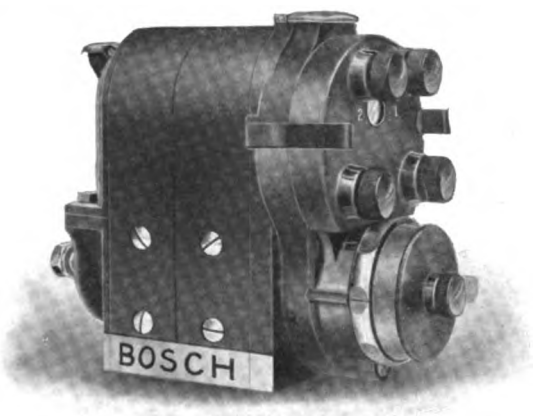
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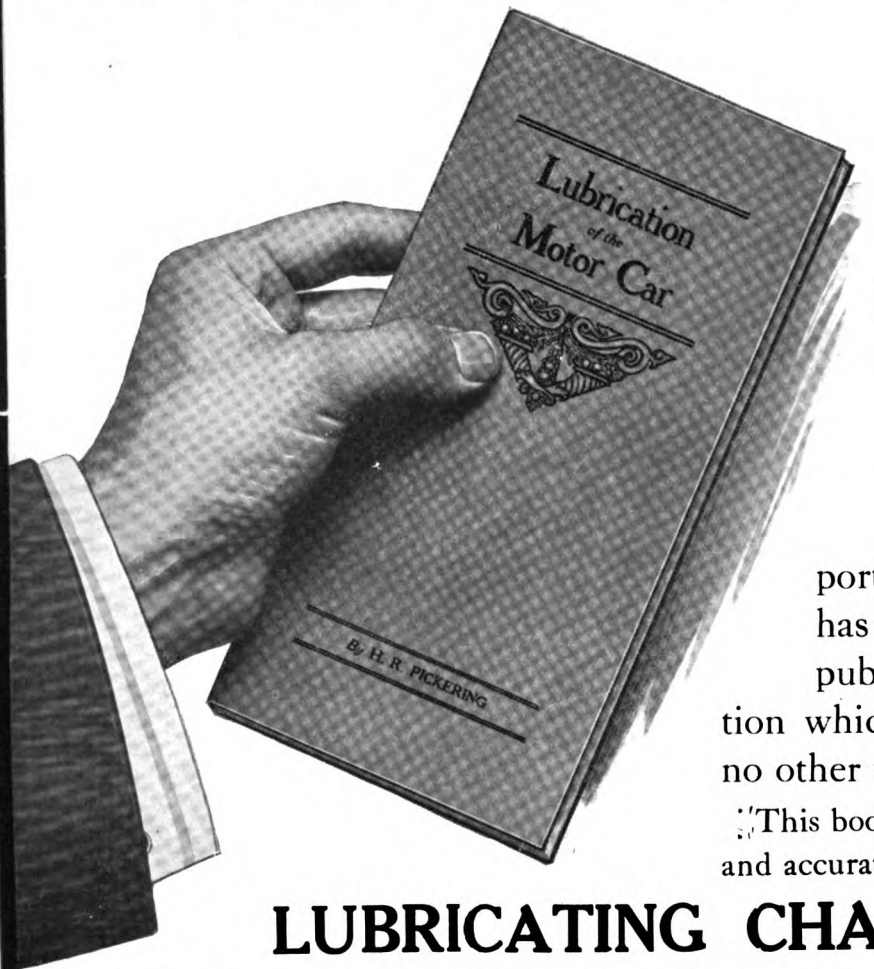
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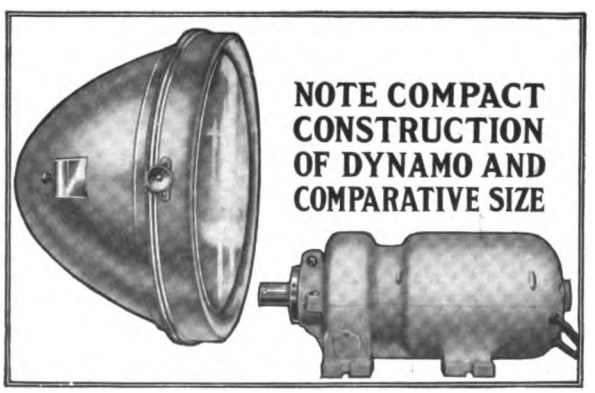
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No other lighting system in the world, can accomplish these things. Therefore your selection must be GRAY & DAVIS.



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Adopted by 200,000 Owners and by 127 Makers of Cars

In March the sales of Goodyear automobile tires will reach the million mark.

That means that these tires have been tested out, probably, on 200,000 cars.

The result is this:

No-Rim-Cut tires—our patented type—now far outsell any other make of tire.

127 leading makers of cars have contracted this year for the Goodyear tire.

In two years the demand has multiplied by six. It is three times larger than one year ago.

Save 48 Per Cent

Statistics show that 23 per cent of all ruined clincher tires are rim-cut.

Clinchers are the old-type tires—the hooked-base tires—which No-Rim-Cut tires are displacing.

Experience proves that 10 per cent oversize, under average conditions, adds 25 per cent to the tire mileage.

No-Rim-Cut tires make rim cutting impossible.

They are more than 10 per cent oversize. Comparison with the five leading makes of clinchers shows the average oversize 16.7 per cent.

Tens of thousands have proved that these two features together actually cut tire bills in two.

No Extra Price

These patented tires used to cost one-fifth more than other standard tires. Now they cost but an equal price.

Thus the saving is clear.

That is why 200,000 men who know have come to this new-type tire.

We Control It

Our Tire Book explains why our patented features are essential to this type of tire.

Other devices, used to meet our competition, have proved most unsatisfactory.

That is why the demand for this new type centers on Goodyear No-Rim-Cut tires.

You are bound to adopt No-Rim-Cut tires when you find them out. In the meantime you double your tire cost.

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No-Rim-Cut Tires

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THE SAVING is in the increased mileage they give. There is more lubrication in every drop of HARRIS OILS than there is in ordinary lubricants.

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It costs but little—a trifle to prove the efficiency of HARRIS OILS. One or two cans tell the story more graphically than thousands of advertisements.

If you, too, believe HARRIS OILS will save you money and give you a better motor—why not try them?



If your dealer does not sell Harris Oils, send 80 cents (for 1 gal. can) or $3.75 (for 5 gal. can) and we will ship same prepaid.

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The 25-Year Car

By R. E. Olds, Designer

I have spent 25 years in building automobiles. All I have learned is embodied in Reo the Fifth.

This splendid car, in every detail, marks the best I know.

If any man can build a car better he is a better man than I.

My Limit

The steel in this car is all analyzed to know it accords with my formulas.

The gears are tested in a crushing machine with 50 tons' capacity.

The carburetor is double heated—with hot air and hot water.

Roller bearings—Timken and Hyatt—take the place of ball bearings.

Tests and inspections, in every step of the making, are carried to extremes.

The margins of safety are much larger than usual.

The wheels are large, the tonneau is roomy, the car is over-tired.

The body finish consists of 17 coats. The lamps are enameled. The engine is nickel trimmed.

The upholstering is deep. It is genuine leather, filled with hair.

Inside and outside, regardless of cost, here's the best car I can build.

Center Control

Reo the Fifth has my new center control. All the gear shifting is done by moving this lever less than three inches in each of four directions.

Both brakes are operated by foot pedals. There are no side levers, so the entrance in front is clear.

The driver may sit, as he should sit, on the left hand side.

The Little Price

The initial price of $1,055 is too low to continue, in my estimation. It is based on maximum output, on minimum cost for materials. I believe that it must be advanced.

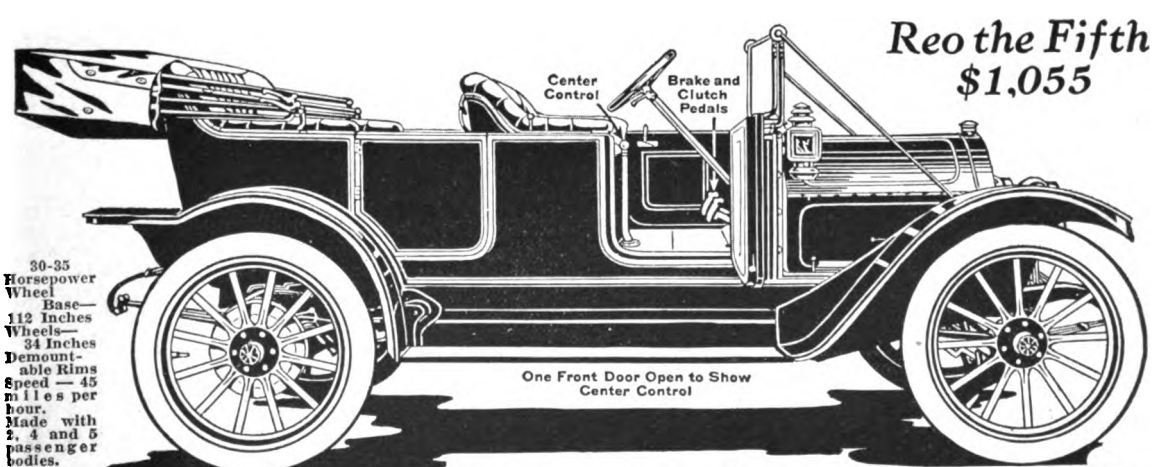
While it continues, no car on the market begins to give for the money as much as does Reo the Fifth.

Ask for our books, giving all the details, picturing all the bodies. We have dealers in a thousand towns. Address

R. M. OWEN & CO. General Sales Agents for

REO MOTOR CAR CO., Lansing, Mich.

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30-35 Horsepower
Wheel Base—112 Inches
Wheels—34 Inches
Demountable Rims
Speed — 45 miles per hour.
Made with 2, 4 and 5 passenger bodies.

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip-cover, windshield, gas tank and speedometer—all for $100 extra. **Self-starter, if wanted, $20.00 extra**

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Consumers' Prices Reduced Quality Unchanged

Size	Casings: Clincher, Q. D. or Dunlop Price	Casings: Bolted-on Price	Tubes: Clincher, Q. D. or Bolted-on Price	Tubes: Dunlop Price
3½ x 30	$20.35	$24.85	$ 4.90	$5.15
4½ x 36	45.20	50.20	9.20	9.65
4½ x 37	46.50		9.50	9.95
5 x 36	55.50	58.60	10.20	—
5 x 37	57.00	60.20	10.60	—
5½ x 38	68.30	72.15	12.30	—

PERFORMANCE is the factor behind the success of Fisk Heavy Car Type Tires. Their rapidly increasing sale is due to the verdict of car owners who, once using them, buy again for their own cars and recommend them to their friends. "You are urged to inquire among many Fisk Tire users" because we can present no stronger argument than the everyday service Fisk Equipment is giving. MILEAGE and DIRECT REPRESENTATION combine to make the only service that really interests any buyer. It is THAT SERVICE upon which the success of Fisk Tires is founded.

The Fisk Tube is the *Pure Para Tube*

This accounts for the slightly higher prices, in comparison with other tubes, at which it is sold. The initial increased expense is slight—the resulting additional service makes it a far better buy than any one of the many *compounded* tubes sold at a lower figure. We had but one choice—to lower our present standard and *compound* our tubes or to hold to present construction and maintain slightly higher prices than other makers. We have decided in favor of *quality*, believing it far more economical in the end for every buyer.

Two New Anti-Skid Tires

THE NEW FISK TOWN CAR TREAD—Heavy Car Type—this tire provides a heavy anti-skid tread designed to insure traction and affords the greatest possible protection against skidding. It is positive in action on city pavements and country roads and eliminates the necessity of chains with the attendant expense, noise and inconvenience.

THE NEW FISK BAILEY TREAD—Heavy Car Type—Heavy buttons and one more row than any other Bailey Tread on the market. This increases the anti-skid surface and length of service, as outside rows of buttons give anti-skid protection when center tread is worn down.

Fisk Heavy Car Type Tires are Sold by all Prominent Dealers.

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Overland

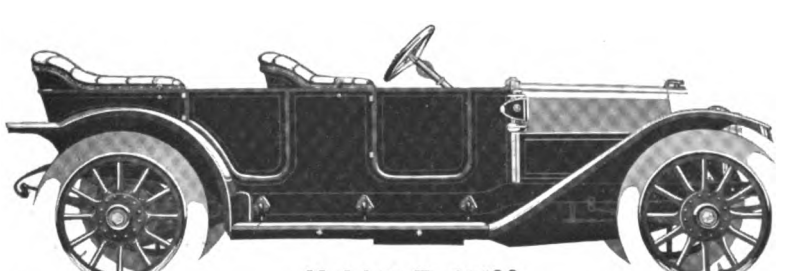
IF judged by the value received in the average forty-five horsepower five-passenger touring car our Model 61 will give you $1800 worth for $1500. It gives you everything that you get in the best of the other cars of this type and a little more than you can get in the average.

¶ Take the specifications of our Model 61---line them up against any set of $1800 specifications and you will find them practically the same. And not only are the base specifications almost identical but the appearance, comfort, finish and general construction are equal.

¶ If the $1500 Overland gets you about as much as you get in any other $1800 forty-five horsepower five-passenger touring car why should you pay the difference?

¶ Send for our interesting catalogue. Ask for book K44.

The Willys-Overland Co., Toledo, Ohio.



Model 61-T—$1500

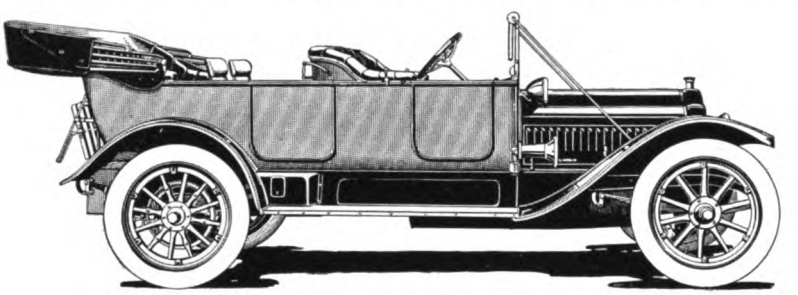
Wheel base, 115 inches; body, 5-passenger fore-door touring; motor, 4 3-8x4 1-2; horsepower, 45; Bosch magneto; tires, 34 x 4 inch Q. D.; finish, Brewster green, ivory stripe, all bright parts nickel-plated; 3 black and nickel oil lamps; 2 black and nickel gas lamps. Price, $1500.

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THE INCOMPARABLE WHITE SIX

ELECTRICALLY STARTED AND LIGHTED--LEFT HAND DRIVE



THE WHITE SIX is equipped with a starting system that cranks the motor easily and naturally. There are no valves to leak, no gears to engage, and no explosions taking place in the cylinders while the pistons are stationary.

The White starting system is one hundred per cent efficient. Moreover, the lights are operated by the same system that starts the engine. Logical, isn't it?

The White Six makes it possible to reach the driving seat, start, and light the car without the necessity of stepping into the street.

Powerful and economical, with graceful and luxurious body and perfect road balance, owners have pronounced it the ideal Six.

CATALOG UPON REQUEST

The White Company

CLEVELAND

MANUFACTURERS OF GASOLINE MOTOR CARS, TRUCKS, AND TAXICABS



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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 5 APRIL 10, 1912 Price $1.00 the Year

NON-POPPET VALVE MOTOR DESIGN.

Constructional Features of Successful Types Produced in America—Outlining Theory of Valve Action and Method of Operation.

SINCE the successful demonstration of the Knight sliding sleeve motor, numerous other practical designs of the non-poppet valve, internal combustion engine have made their appearance in the market. This statement should not be taken as a suggestion that these later models are in any way patterned after the Knight, but it will no doubt be admitted by their designers that the success of this type has done much to encourage greater activity in the production of engines effecting somewhat similar results by different means. It may be added that inventors were at work upon this problem long before Charles Y. Knight produced his first practical device, and some of these motors are the result of experimentation covering a period of several years.

However, the attention of the motoring public has been drawn to this type of motor, largely because of the results obtained by the Knight engine. It has become generally known, and has served in a measure as a basis for comparison with other designs. There still remains a wide difference of opinion among engineers as to the relative importance of the non-poppet valve motor, and it may be stated that lay motorists have as yet had but very little opportunity to arrive at any definite conclusion as to the respective merits of the different constructions. This is due largely to the fact that such information as they have been able to obtain has been more or less fragmentary and

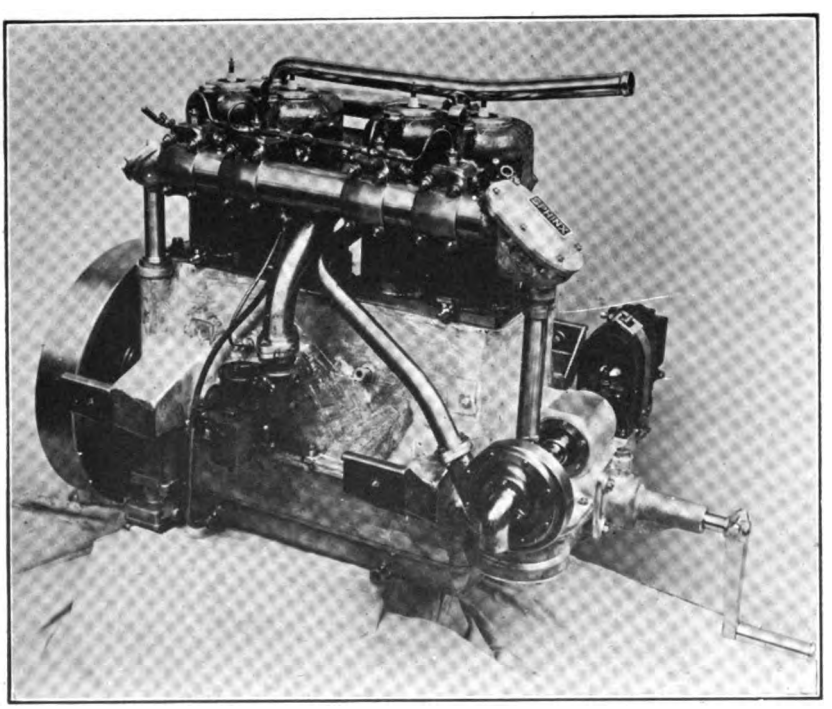


Fig. 1— Sphinx Slide Valve Motor Completely Assembled.

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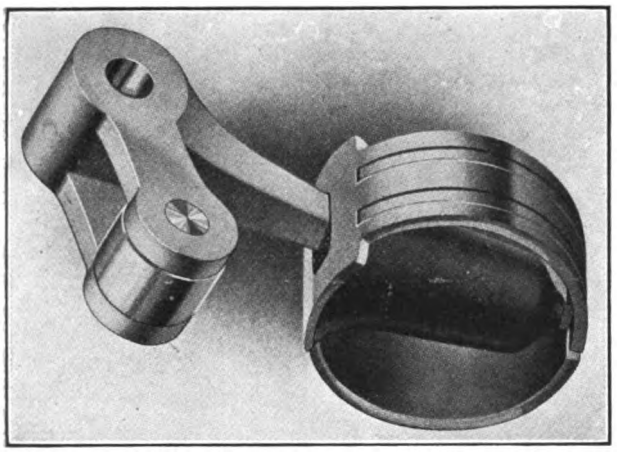


Fig. 2—Sphinx Split Ring, Presenting Construction of Hollow Spindle.

widely distributed as to time and source.

The object of this discussion is to present the claims of the various designers and manufacturers, devoid of all attempt to comment upon them, thus placing the average motorist in a position to decide for himself. It has been thought best to confine the descriptions to such motors as are produced or marketed in America, and the order of their presentation is not intended to convey any suggestion as to their relative merits.

Features of the Knight.

The Knight sleeve valve motor, utilized in this country in Columbia, Stoddard-Dayton, Atlas and Stearns cars, and announced for the new Edwards machine, has been very completely described in previous issues of The Automobile Journal, and as these cars have been displayed in all sections of the country, motorists are assumed to be familiar with its construction and method of operation. Briefly the valve functions are performed by two ported sleeves, one within the other, and both between the piston and the cylinder wall. The two sleeves are reciprocated by a half-speed shaft carrying small cranks equal in number to the sleeves.

Within the cylinder bore there is a thin sleeve, cut with ports on opposite sides to register with the inlet and exhaust. Within this sleeve is the other, also cut with ports near its upper end. The piston is located within the inner of the two sleeves. The cylinder head is detachable, and a part of it extends into the cylinder for some distance, but is of a diameter smaller than the cylinder bore, so that the two sleeves may enter between it and the cylinder wall. Both the cylinder head and the piston head are concave, the object being to secure a spherical combustion chamber, as nearly as possible.

As has been stated, the two sleeves are reciprocated by means of a half-speed shaft, which is driven from the crankshaft through a silent chain. The first named shaft is formed with a number of cranks, which connect through short connecting rods with lugs formed on the valve sleeves at their lower ends. The connecting rods for the two sets of sleeves are of different length, and usually are slightly inclined, a vertical line along which their upper end reciprocates passing somewhat closer to the cylinder axis than through the axis of the half-speed shaft.

It will be seen that the bore of the cylinder casting is not the effective bore of the engine, the latter being equal only to the bore of the inner sleeve. This usually is made of a thickness equal to about .04 inch for each inch of effective bore, and the outer sleeve is made a trifle thinner, because it is not subjected to the pressure of the explosion.

Office of Junk Ring.

Gas tightness is insured by two sets of packing rings, one set of three or four being placed on the piston in the usual manner, and the other on that portion of the cylinder head which projects into the cylinder proper and is surrounded by the sleeves. The latter set comprises one unusually broad ring at the bottom, referred to as a junk ring, and two or three of the same proportions as those employed on the piston. The junk ring does not possess sufficient spring force to apply itself properly against the sleeves, at least in most Knight motors, and spring rings are placed underneath it.

The object of the junk ring is to seal the ports

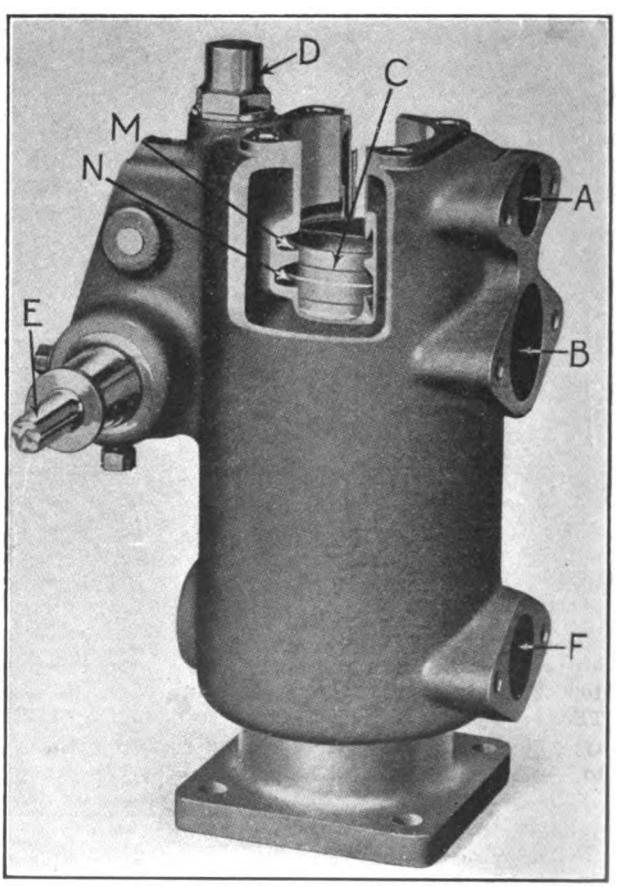


Fig. 3—Cut-Out Cylinder of Sphinx Motor, Showing Split Ring Position.

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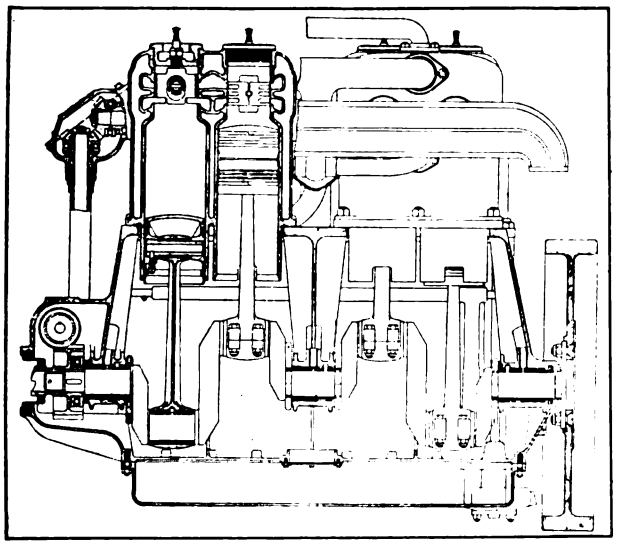


Fig. 4—Section through Sphinx Motor, Illustrating Piston and Split Ring Action.

in the valve sleeves when the explosion is taking place and while the gases are expanding in the cylinder. The ring, therefore, must be made of greater width than the height of the port, and usually is about half an inch wider than the exhaust member. Each port extends substantially around two-thirds of the cylinder, and it is provided with a bridge at the centre of its length, so as to prevent undue weakening of the sleeve.

On the suction stroke the inlet slots of the two sleeves come into juxtaposition one with the other so that the fresh mixture may enter as with the poppet or the mushroom type valve. When the compression stroke is begun these sleeves slide, one up and one down, so that the slots are out of register, and there is no way in which the gas can escape. After the compression stroke is finished, the piston having reached the top of the cylinder, the spark is timed to occur, and the explosion or power stroke takes place. Then, as the piston is at the bottom of its stroke, the opposite slots come into register, leaving an exit for the discharge of the burnt gases to escape.

Construction of the Sphinx.

The Sphinx slide valve motor, is produced in this country by the Sphinx Motor Company, 1770 Broadway, New York City, being made under license from the inventors of the Reno-Bois engine originally brought out in France, where it has been subjected to severe tests in the Unic F. N. and N. A. G. cars. The first bench tests of an American engine of this type were made recently, and the results were said to be entirely satisfactory in every respect.

In the cylinder walls and near the head are two annular chambers forming the intake and exhaust ports. Within the cylinder is a split ring having sufficient face depth to cover both of these ports, but having the necessary reciprocating motion to allow it to uncover either one or the other as required to assure the admission of the fuel and the discharge of the spent gases.

In its central position, the split ring covers the two ports, providing a gas tight chamber. One being moved down, it uncovers the intake port and the exhaust remains closed, and upon being raised it closes the intake and opens the exhaust. Being split, it is claimed that its extensibility assures that it shall be gas tight, the degree of tightness being in proportion to the pressure in the cylinder, while leakage around the ports is held to be impossible at any time. Its movement is slight, being less than one inch for a motor of 3.9-inch bore and 5.5-inch stroke, and the intake port being above the ring, this latter is swept by the fresh, cool gases at every induction stroke, and consequently maintained at a moderate temperature.

By examination of Figs. 3 and 5, which present a model of a single cylinder, it will be seen that the cylinder differs in construction from the usual poppet valve type, by having no outstanding chamber to receive the valves. Down on one side of the motor and near the head of the casting are the two ports, A being the intake and B the exhaust. On the op-

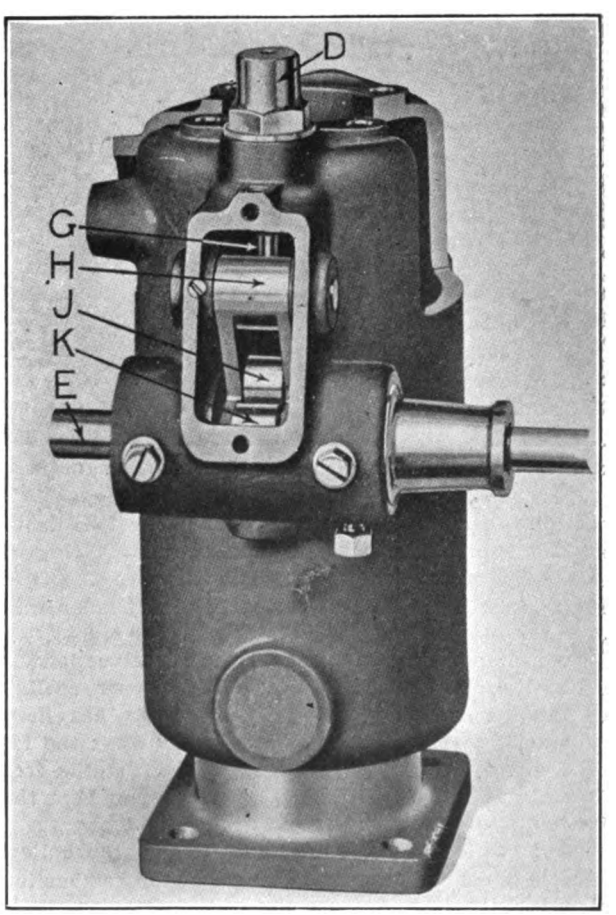


Fig. 5—Depicting Means for Operating Valve Mechanism in Sphinx Motor.

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posite side is a camshaft housing, cast with the cylinder. In the cutaway section of the cylinder, M and N are the annular chambers cast in the cylinder wall and registering with the intake and exhaust ports, respectively. C is the split ring, which is shown separately in Fig. 2. In the position indicated in Fig. 3 it is uncovering the intake port. F is the inlet to the water jacket.

Action of the Split Ring.

The split ring is a gray iron casting having face depth of 1.5 inches for a motor of 3.9-inch bore and 5.5-inch stroke, and being provided with a hollow spindle or bearing block into which the rocker arm H, Fig. 5, is received. As will be seen from examination of the illustration, the depth of the ring is greater around the hollow spindle than at any other point, this increased depth being necessary to uncover the port, through which the rocker arm passes from the

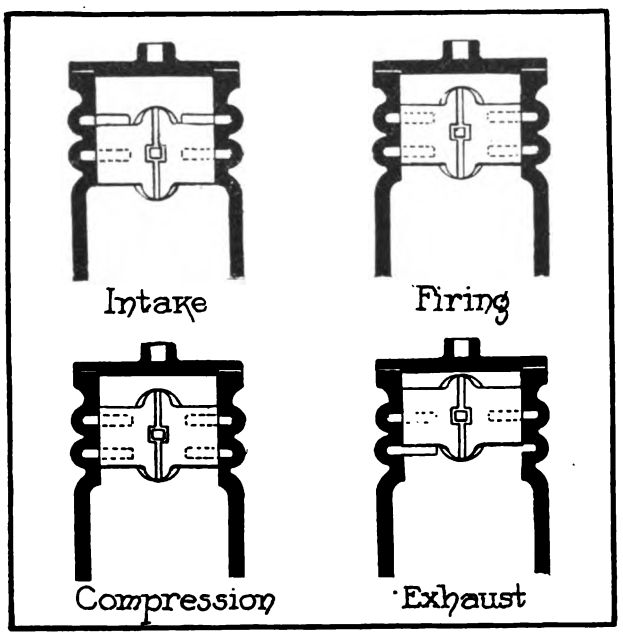


Fig. 6—Sketch Indicating Position of Sphinx Split Ring During Various Piston Strokes.

outside to the inside of the cylinder. The face depth at this point is sufficient to assure the covering of this port, no matter what the position of the split ring. In other words, this slot in the cylinder wall is never uncovered.

An important feature of the construction is claimed for the method of insuring proper cooling of the central portion of the ring. As has been explained, when the ring descends to uncover the intake, there is nothing whatever to obstruct the free flow of gas into the cylinder. It is obvious that the fresh mixture must be swept around and about the central portion of the ring, and although the hollow spindle is carried across the centre of the combustion chamber, its shape and the size of the space on either side are held to be such that there is nothing to prevent this free flow. Moreover, the cooling effect of the fresh charge being swept over the ring does much to maintain it at a moderate temperature.

When the ring is raised to uncover the exhaust port, this latter being below the ring, the hot gases escape without any obstruction and without being swept around the hollow spindle. The walls of the ring are in direct contact with the water jacketed walls of the cylinder, and work under practically the same conditions as do piston rings.

The method of operating the ring is by means of a bell crank H, the short arm of which carries a roller J, in constant contact with the face of the cam K. As the boss of the cam lifts the roller, the ring is raised. The return of the ring is obtained in practically the same way as with a poppet valve; namely, by means of coil springs carried in the housing D operated by the pin G. E is the camshaft.

The spring mentioned need only be sufficiently strong to compensate the weight of the split ring, for it is only responsible for its return and in no way for its proper seating. Further, as each upward movement of the ring is followed by the induction stroke of the motor, the work of the spring is relieved by the inrushing gases. In other words, the suction of the gas around the ring tends to draw it down, just as an automatic intake valve is drawn down on the suction stroke of the motor. The spring then, need only be sufficiently strong to keep the roller in contact with the face of the cam, and as it is carried in an independent housing and not subjected to a high temperature, its life is held to be practically indefinite.

Method of Lubrication.

All the main bearings receive their oil supply under pressure, with the crankshaft bored out to allow a supply of lubricant to reach the connecting rod ends. The oil thrown out from the bearings is claimed to be sufficient to assure the proper lubrication of the cylinder walls. The oil pump also delivers a supply of lubricant into the housing containing the bell cranks, a constant level being maintained at this point, and the overflow being returned to the oil tank in the base of the crankcase. The rotation of the camshaft throws the oil onto the bell crank and causes it to fill the hollow spindle of the split ring, thus allowing the inner bearing of the rocker arm to work in a bath of lubricant.

Sufficient oil escapes around the walls of the ring to assure its free movement within the cylinder, the constant expanding and contracting of the ring materially favoring the free distribution of the lubricant. There is said, however, to be no leakage during the compression and firing strokes, the high pressure in the cylinder at these periods maintaining the ring in close contact with the cylinder walls. It will be noted, also, that there is no movement of the ring during these strokes, and that its total movement is less than one inch.

Fig 6 sets forth the cycle of operation, this being brought about by means of the bell crank H, the rocker arm of which operates in the socket of the

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sleeve valve, and an ordinary type of camshaft shown at E, Fig. 3 and 5, gives the necessary reciprocating movement to the ring. Fig. 4 presents a sectional view of the motor, and still further indicates the action of the valve, as well as that of the piston.

Mead Twin Rotary Valve.

The Mead Engine Company, Dayton, O., has evolved the Mead twin rotary valve motor, which has been in operation for two years or more, both in testing laboratories and in automobiles. A very successful demonstration was given in connection with the recent meeting of the Society of Automobile Engineers in Dayton, O., and the design may be said to have been proven thoroughly practical.

In this design two cylindrical gray iron castings are employed, one on either side of the motor cylinder head. At suitable points in these cylinders slots are provided for the admission and egress of the gases. One cylinder may be termed the intake valve and the other the exhaust. These fit the holes within which they are to rotate with a clearance of .0015 inch at the five bearing points, and about .0005 inch more clearance in the zone opposite the port openings.

In the end of the cast iron valve cylinder is screwed and pinned a steel stud or shaft, upon which is mounted the valve driving gear, as may be noted from the illustration at Fig. 9. A gear is driven into this taper, and a nut and lock washer hold it in place. A set screw through the hub of the gear bears against the taper shaft and assists in keeping the gear from rotating on this shaft. The speed of rotation of the valve cylinders is one-quarter that of the engine crankshaft.

Cycle of Operation.

Both valves are 1.375 inches diameter, and with slots 3.75 inches long. The slots for the inlet valve are .3125 inch wide and those for the exhaust .375 inch. It is claimed that any desired timing can be obtained. As the piston begins to descend on the suction stroke the intake valve begins to open and the exhaust is fully closed. The intake valve remains open until the piston has reached lower dead centre, or nearly so, when it closes, and both valve openings are closed throughout the compression and explosion strokes. As the piston begins to ascend on the exhaust stroke, the exhaust port is opened and the scavenging takes place. Thus is explained the cycle of operation.

It will be seen that the use of two valve cylinders simplifies the passage of the gases through the rotating valves. The inlet valve is always exposed to the same temperature of the incoming mixture. The water jacket which surrounds this cylinder is of uniform temperature, and extended experimentation is said to have demonstrated that there is apparently no tendency to warp or distort the cylinder in any way. This cylinder is lubricated by feeding a manifold to the inlet side of the motor, which has five openings to the inlet valve bearings. Only one lead from the force feed lubricator takes care of this valve. The oil distributes itself over the entire length of the valve.

Much the same is true of the exhaust valve. The escaping products of combustion are very hot, but as the cylinder is exposed to an even degree of heat, it is claimed there are no injurious inequalities. The valve is in close contact with the water jacket, rotates slowly and uniformly, and is thoroughly cooled. The method

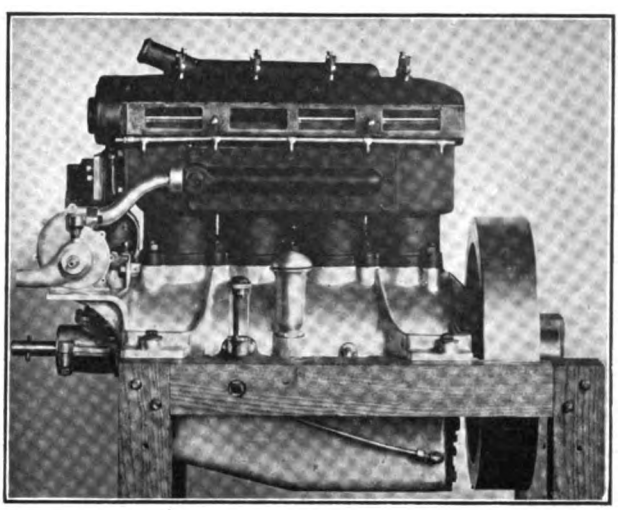


Fig. 7—Side View of Mead Engine, with Plate Removed to Expose Rotary Valve Cylinder.

of lubrication is the same as with the inlet valve.

Accompanying illustrations present the construction in more detail, and ought to assist materially in bringing out the features. Fig. 10 shows a section through the motor cylinder and valves and will aid in presenting the cycle of operation, explained above.

The Knight-Davidson Motor.

The Knight-Davidson motor, displayed publicly for the first time at the recent Boston automobile show, is the creation of Miss Margaret E. Knight of South Framingham, Mass., a woman of rare mechanical ability, who had the distinction of being the first woman to whom a United States patent was issued. The name is the combination of the names of the inventor and her niece, who has acquired a surprising

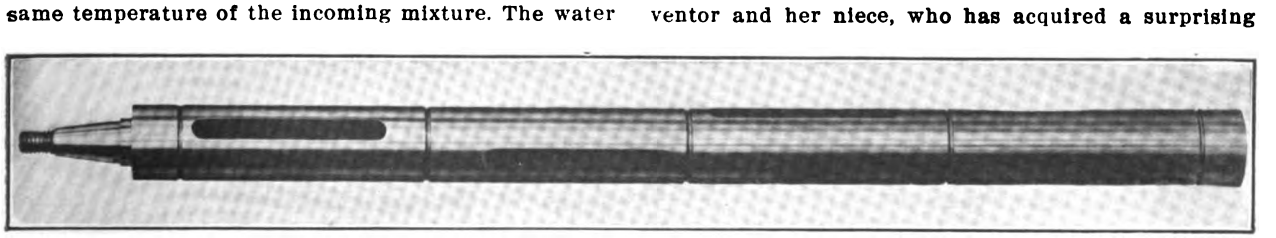


Fig. 8—One of the Rotary Valve Cylinders Employed as Intake and Exhaust Members in the Mead Motor.

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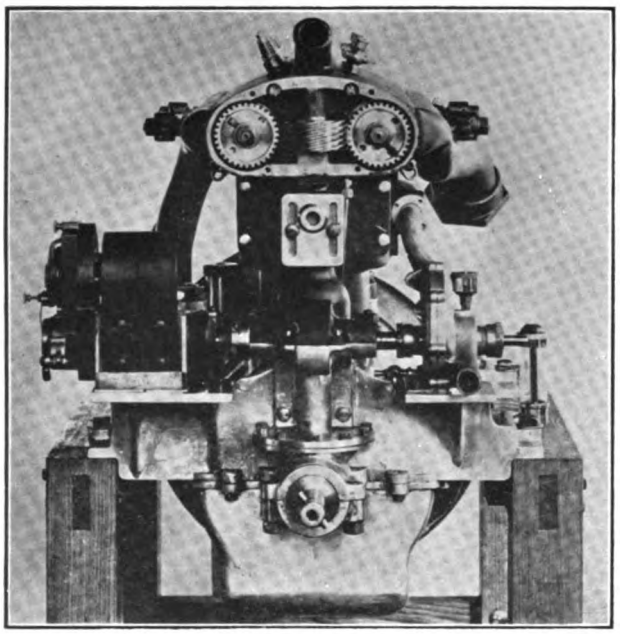


Fig. 9—End View of Mead Rotary Valve Motor, Showing Driving Means for Valve Cylinders.

knowledge of mechanics during her long association with her aunt.

Miss Knight has invented many machines that are in daily use, one of them being that which makes paper bags with the square bottom, the first practical mechanism that could produce a bag of this kind. Some of her inventions are in use in cotton mills, for Miss Knight when a girl and young woman, following a custom of New England families, worked in such factories and obtained improved results in her work through her mechanical ingenuity.

Later she turned her attention to the development of internal combustion engines and in 1896 produced her first slide valve or sleeve motor. She was at that time experimenting to learn the value of different fuels and while the original was crude she found results of sufficient value to justify her to continue its development. The work on the motor was not systematically followed for other things occupied Miss Knight's time. The original purpose was to use the motor for marine work and the first motor was quite heavy. With the progression of the work the engine has been lightened until that which was shown, though not the most perfected, was rated at 50 horsepower and weighed about 400 pounds. It is claimed that the power developed by this engine is more than the figure stated, as shown by brake test. This is more than double the rating of the S. A. E., which is 25.6 for a four-cylinder motor of four inches bore. The stroke is six inches, however, the stroke to bore ratio being 1.50 to one.

Details of Construction.

The motor differs mechanically with any other engine construction now built. The cylinder is a cast iron tube with the base fitted into a recess in the top face of the crankcase. The piston is exactly fitted to the cylinder. The head of the cylinder is separate and this forms the top of the assembly, it being recessed to receive the cylinder. The water jacket is a casing that resembles an I type motor cylinder in that it is bolted to the engine case and has water space the entire length of the expansion chamber. The water jacketed head is bolted to the water jacket, and when the assembly is complete the cylinder is cooled by water save for the centre of the head, which is of heavy section and carries the spark plug in the centre.

From this description it will be evident that there is a chamber between the cylinder tube and the inner wall of the water jacket, in which the valves are operated. The valves are halves of a split sleeve, with a scarfed joint, which are concentric with the cylinder tube. The cylinder tube has at opposite sides the inlet and exhaust ports, which register with ports in the sleeve valves and in the water jacket. The exhaust port is approximately 50 per cent. larger in area than the intake port, this making for more thorough cleansing of the cylinder of combustion products, and more quickly reducing the expansion pressure of the exhaust. These half sleeves are operated by rods attached to a minature crankshaft that is driven by gears from the crankshaft proper.

It will be noted that the intake and exhaust ports are high in the cylinder and the engine efficiency depends entirely upon the location of these ports and the relation or timing of the valves or sleeves. The exhaust port is opened 30 degrees before the bottom

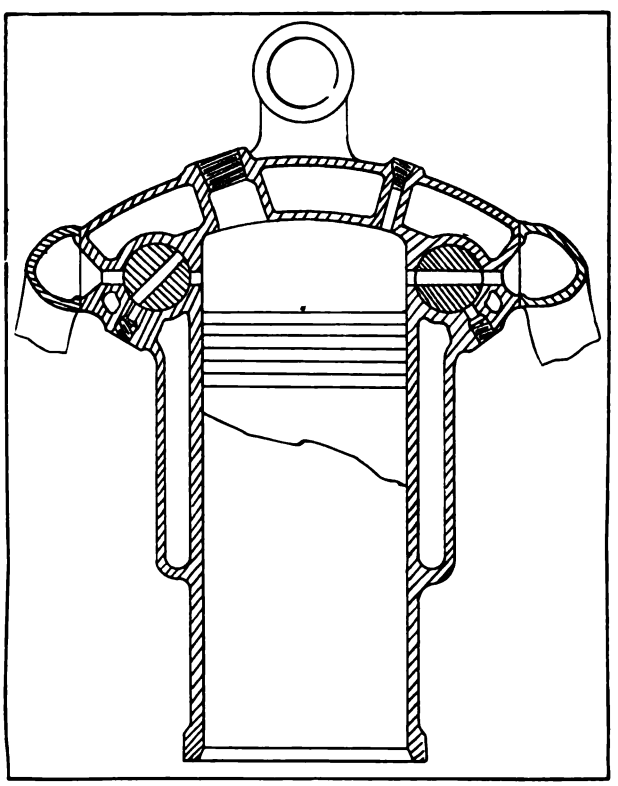


Fig. 10—Section through Mead Engine, Indicating Position of Valve Cylinders on Intake Stroke.

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centre is reached and it is closed eight degrees after the top centre is reached by the piston. The intake port is opened eight degrees after the top centre is reached by the piston, and is closed 15 degrees after the bottom centre is reached.

In other words the halves of the moving sleeve are operated between the outside wall of the cylinder and the inner wall of the water jacket, and the rods actuating them move vertically, their relation being preserved by the linkage with the valve shaft.

How It Operates.

Reference to the accompanying sketch showing the motor in section illustrates the elements of the assembly and their functions. A and B are the two sliding half sleeves which move up and down about the cylinder and within the water jacket. The scarf joint is shown at C. The sleeve ports are indicated by O and G, and these register with the ports in the cylinder wall and the water jacket wall, the inlet being at I and the exhaust port at E. In the drawing E is about to register with the exhaust port opening in the cylinder wall port, the piston P being shown as moving upward and the cylinder exhausting. The sleeves are operated by the long cylindrical rods F and G, which are actuated by cranks on a longitudinal shaft that replaces the customary camshaft and is driven at half the speed of the crankshaft through gearing, as illustrated in the drawing. The cylinder wall or tube is indicated as D in the drawing and it will be noted that it is retained in the assembly by the clamping pressure of the cylinder head N when bolted to the water jacketed cylinder casing. This casing is designated as H H, and the water space is defined as W.

The piston is very carefully fitted to the cylinder. The relation of the sleeves and the cylinder is maintained by what is termed a "bridge ring" in which two wide rings are fitted into a long recess in the outer cylinder wall, these rings being kept at the top and bottom of recess and well apart by springs. The ring also compensates for all wear in the sleeves and insures against leakage. This construction is claimed to afford an unusual degree of compression, which is stated to be 33.3 per cent. higher than with the usual form of poppet valve engines. The normal compression pressure is given as 90 pounds.

The engine is claimed to be perfectly cooled at all speeds and under all conditions. The lubrication is by splash. The piston is fitted with an oil ring that distributes lubricant thoroughly on the inner surface of the cylinder. The pushrods that operate the sleeves are constructed with oil grooves which convey oil from the crankcase and adequately lubricate every moving part, irrespective of the engine speed. The engine cylinder is so constructed that should it at any time become worn it may be replaced by the removal of the head, as it is then unclamped and may be readily lifted out.

(To Be Continued.)

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

VANDERBILT AT MILWAUKEE.

While definite action has not been taken by the contest board of the American Automobile Association, it is taken for granted that the Milwaukee Automobile Dealers' Association, Milwaukee, Wis., will secure the Vanderbilt Cup race of 1912. Formal application has been filed with the Motor Cups Holding Association, and William K. Vanderbilt, Jr., donor of the cup, is said to have told the Milwaukee people they could have the race if they provided suitable police protection. Inasmuch as the dealers of that city have set out to win the honor, there is little doubt that the event will be held in that city.

Two courses are open for the race, one being the

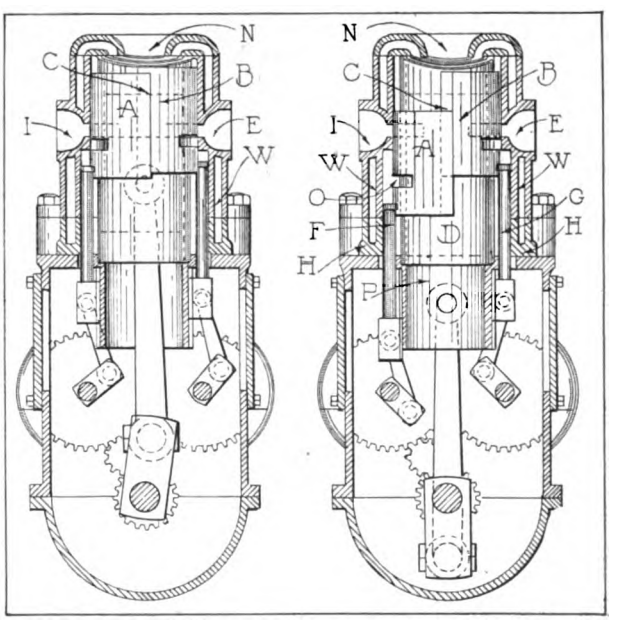


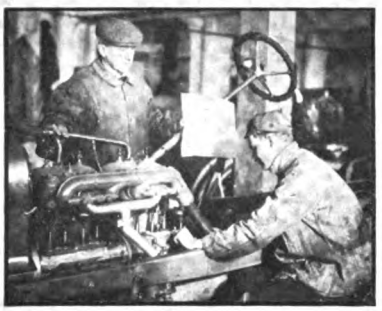
Fig. 11—Two Views of Knight-Davidson Sleeve Valve Motor, Illustrating Construction and Method of Operation.

so-called Milwaukee-Chicago course and the other being located in the Waukesha county lake district. Both are within easy access of all the important centres in the Middle West. The first course is the better known of the two, but the Waukesha has an added advantage in being in a district plentifully supplied with hotels.

It is understood that similar action has been taken with respect to the Grand Prize event as well, although motorists in Dallas, Tex., had made application for this race.

Changes in Dayton Club—W. L. Winning, formerly assistant secretary of the Chamber of Commerce in Dayton, O., and more recently secretary and general manager of the Dayton Auto Equipment Company of that city, has become secretary and general manager of the Dayton Automobile Club, succeeding Charles M. Stout, who became steward.

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Overhauling the Power Plant of the Motor Car

C. P. Shattuck

OVERHAULING and placing the automobile in commission for the road may involve much labor and expense as well as considerable time, this depending upon the age of the machine, its condition and the service expected. It is assumed that the progressive motorist is ready to begin the overhaul, having stripped the car of its accessories and body, and prepared the necessary equipment including the new parts and material essential to place the machine in first class condition.

A large number of owners, however, whose garages are not heated, have been unable to accomplish much if any work of preparation because of the extreme cold weather. Many of this class have an elementary knowledge of the gasoline propelled vehicle and attempt their own repairs to effect economy, while others undertake the work to become more familiar with its components.

There is no reason why the overhaul cannot be accomplished successfully by those possessing a knowledge of the use of ordinary tools and of the components of the machine, if the work be performed systematically, taking the power plant, transmission, rear system, etc., in logical sequence. If the amateur in attempting his first overhaul studies each part and its relation to its neighbor as well as its function, and marks or tags the pieces for identification, he should be able to reassemble without having extra nuts or bolts at the finish, and it is for the benefit of those not familiar with the overhaul that the suggestions herein are made.

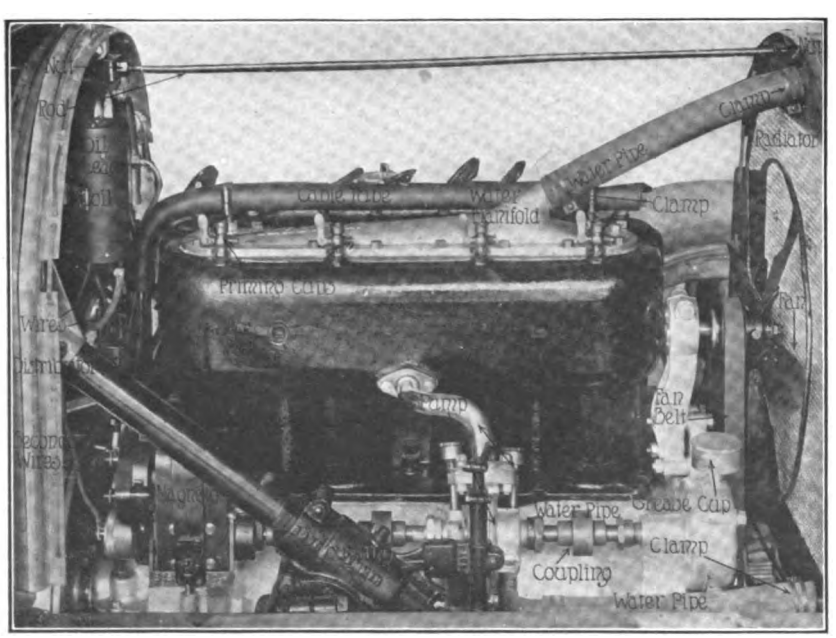


Fig. 1—A Conventional Power Plant with Hood Removed and Components Outlined to Facilitate the Dismantling of the Motor.

Care of the Hands.

Assume that the motor car is to be thoroughly overhauled; that is, stripped to the frame and each part examined for wear or needed replacements and adjustments. Having made ready the equipment for this work the overalls and jumper or old clothes should be donned and the car driven on the washstand where the first step is to remove the anti-freezing solution and to clean thoroughly the water circulating system. This is done easily by making a saturated solution of common washing soda and pouring it into the radiator, after which the motor should be started and run for some time. This will clean out all scale and deposits. The fluid should be drained out and replaced by fresh water and the motor again run. It is well to repeat the process until the water is clear.

The machine should then be run to a point convenient to the work bench and the hood removed. Before proceeding with the work of dismantling, the hands should be covered with hard soap and the material worked in under the finger nails if gloves are not to be worn. An old pair of gloves with the finger tips cut off may save bruises and cuts, although some workmen disregard these protectors. It is assumed that the accessories, top

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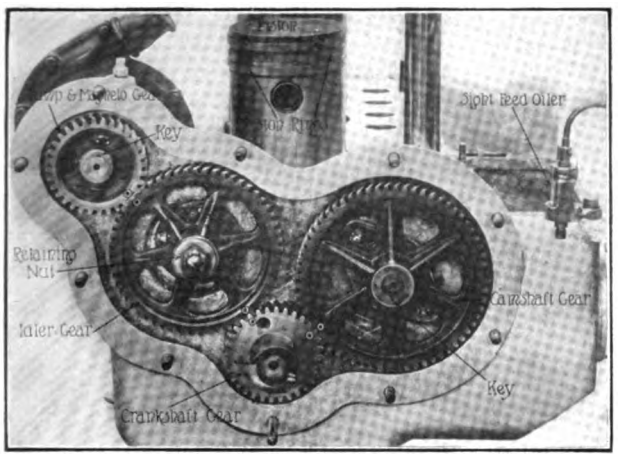


Fig. 2—Depicting How Timing Gears Should Be Marked Before Dismantling the Power Plant.

and body have been removed and covered carefully. The pan or undershield is usually held by straps, bolts and nuts and this member when removed should be carried outside for cleaning. The bolts and straps should be examined for wear and new ones secured if necessary.

Removing Radiator.

In dismantling the motor one should be systematic. At Fig. 1 is depicted a four-cylinder water-cooled motor with the exterior components clearly outlined. The gasoline should be drained from the fuel tank and placed in a can or cans for washing the parts. The fuel pipe at the carburetor is then disconnected. Some repairmen remove the superfluous dirt and grease before pulling down the engine while others postpone this work until it is on the motor stand.

The next step is to remove the radiator. The water connections should be disconnected and care taken not to spoil the clamps. If the starting crank extends through the cooler it is obvious that it must be disconnected before removing the latter. If the ratchet member be pinned the pin may be driven out with a punch and hammer, taking care not to injure the radiator. If the fan belt pulley be attached to the cooler, the belt will have to be disconnected and removed.

In removing the water pipes these members should be examined carefully and if not in first class condition new ones should be procured, retaining the old members for measurements. The radiator is usually supported by a rod connecting with the dash. The former is held by lock nuts and these should be loosened and the rod screwed out. After removing the nuts holding the cooler, this member should be lifted out. Some are very heavy and should be handled very carefully to prevent injury which might develop into a leak. If in need of repairs of a serious nature it should be sent to a competent tinsmith—one familiar with this type of work.

The water manifold on top of the motor is next removed, also the pipe leading from the pump to the cylinders. The retaining nuts and bolts should be loosened a trifle so that undue strain will not be exerted as some types of water manifolds are broken easily.

Disconnecting Wires.

The primary and secondary wires leading from the coil and magneto should be tagged before removal if the operator be not familiar with the ignition system. Where a dual system is employed a tag should be placed upon the wire and a corresponding identification mark on the terminal to which it is connected. Next, disconnect the spark and throttle leads and if in doubt tag the ignition members. Before loosening the bolts holding motor to frame, throw out and hold securely the clutch, or if the transmission be of the planetary type remove the flywheel bolts. The exhaust manifold and pipe should be disconnected and this may be a flange member or a union. If frozen, kerosene or heat may have to be applied to start the parts. All oil leads between motor and dash must be disconnected before taking out the motor.

Having made sure that the motor is clear and ready for removal, the stand should be moved in proximity to the chassis. It will require two or more persons to lift the engine out unless the garage be

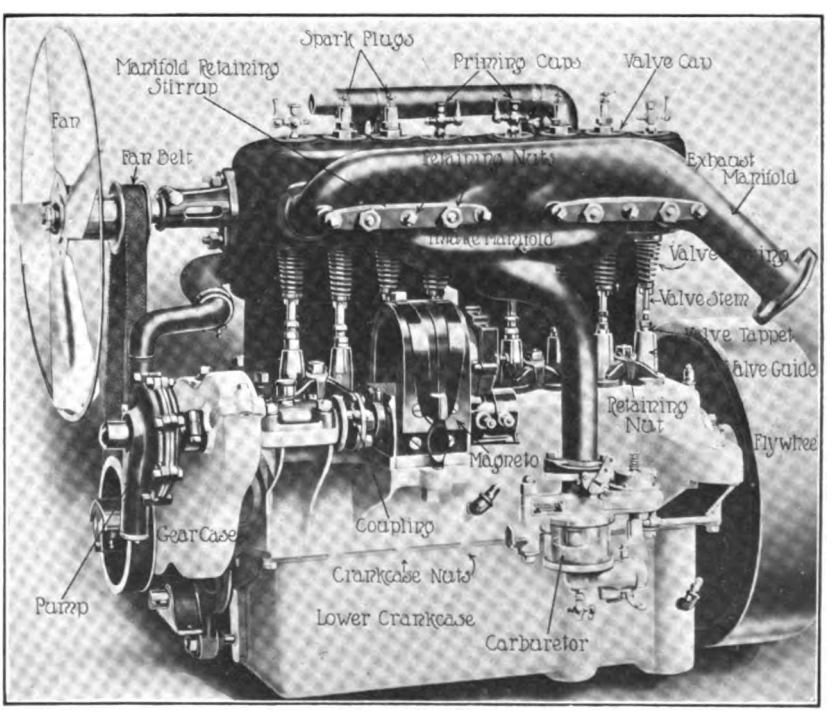


Fig. 3—Depicting the Valve Side of Engine and Outlining the Method of Retaining Intake and Exhaust Manifolds, also Pump, Magneto, Etc.

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equipped with a falls and tackle or a differential hoisting appliance. If the motor and transmission be a unit four persons will be required to lift it out of the chassis.

Before proceeding to dismantle the motor, several boxes should be secured for the parts removed. At Fig. 3 is depicted a motor removed from the chassis and ready for disassembling and all parts to be removed are indicated. It will be noted that the exhaust and intake manifolds are secured by stirrups held by bolts and nuts. Each of the latter should be loosened a trifle to prevent stresses, as some intake manifolds are constructed of aluminum and easily damaged. The carburetor may be disconnected previous to the operation or left attached. These members should be put away where they will not be liable to injury.

If the oiler be not incorporated in the crankcase but located on the side of the motor, its leads to the various bearings, etc., should be disconnected as well as the device itself. If the water pump be located in front and driven by the camshaft, this member as well as the fan pulley will have to be removed in order to take off the gearcase cover. These parts may be keyed or pinned and if keys are utilized care should be exercised in removing the gears. The gearcase cover is then removed and the gears examined to note if marked. Fig. 2 outlines the method and if the members are not marked they should be, and this may be accomplished with a centre punch. The indentations will be necessary when reassembling the motor, as will be explained in logical sequence.

Marking Timing Gears.

Next, examine the couplings connecting the shafts driving the pump and magneto and note if these members are worn or the retaining parts loose. The magneto may be secured to its base by studs or a strap and if the current generator has been giving trouble it is best to ship it to the nearest service station and have it looked over. This may save considerable trouble as outside of a few minor adjustments the average motorist is not capable of overhauling these members.

The relief or priming cups are next removed and placed in a box, also the spark plugs. A special

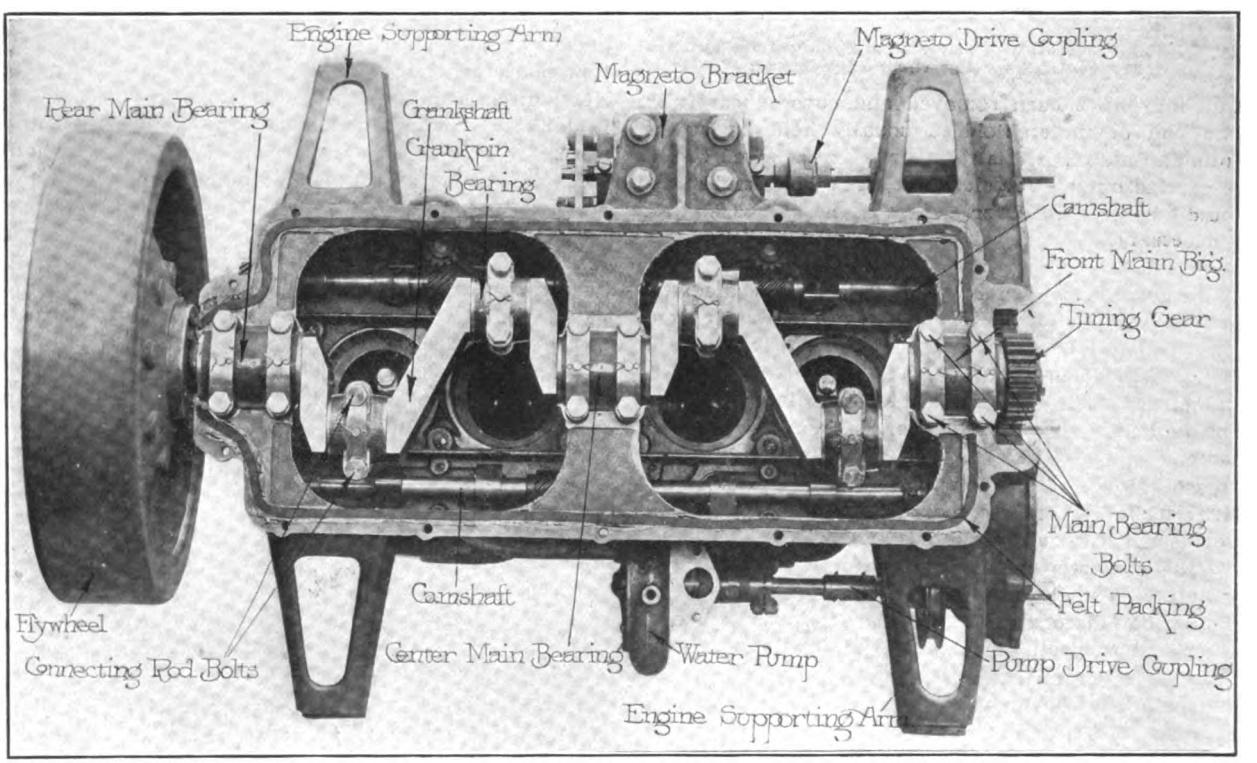


Fig. 4—How the Interior of Internal Combustion Motor of the Four-Cylinder Type Appears When Viewed from Bottom with Crankcase Removed.

wrench is usually provided for taking out the valve caps but when overhead valves of the rocket type are employed, ordinary tools will answer all purposes. The valve caps should be placed upon the work bench or a shelf in the order in which they were removed.

In displacing the valve springs a valve lifter will be useful although the operation may be performed with a block of wood and a heavy screw driver or old file, using the latter for the lever and the former for a fulcrum. A regular tool is best and one that holds down the valve will facilitate the work. The valve springs, retaining collar and pins should be taken out in order and laid upon a shelf on the bench. If a commutator or distributor is incorporated in the ignition system it should be taken off for inspection and

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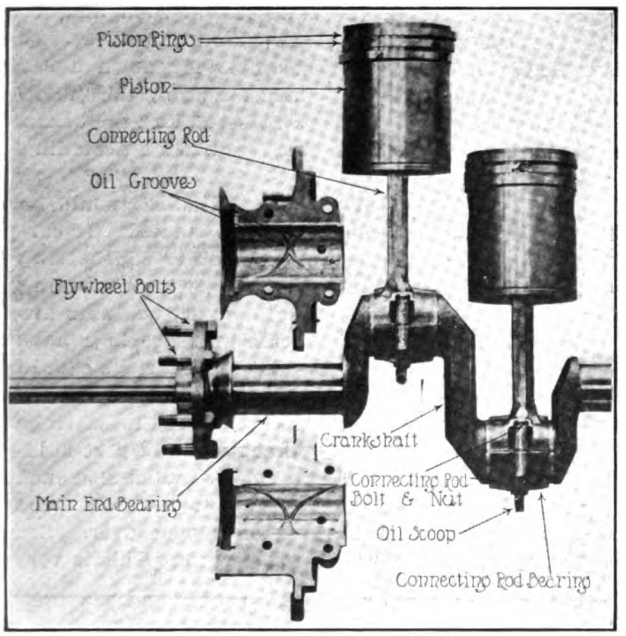


Fig. 5—Outlining Crankshaft, End Bearing, Connecting Rod and Piston, and Method of Assembly.

repairs if needed. Before removing this device the head of the shaft and the roller yoke should be marked in the same manner as the timing gears. This will save retiming the ignition.

Before removing the cylinders the old oil should be drained from the crankcase and the latter removed, exposing the connecting rods, crankshaft, etc. Fig. 4 outlines these members, each being marked for identification. Before taking out the connecting rod bolts it will be well to note if these be marked, and if not they should be so that in reassembling the bearings will not be reversed. If the rods be of the hinged type as shown at Fig. 7 C care should be taken to note on which side the hinge is located. This is important on some types of motors.

Removing Cylinders.

Having removed the connecting rod bolts the cylinders are now ready for removal. These are held by studs and nuts as outlined at Fig. 9. If cast en bloc there will be no need of marking, but should be if in pairs or singly. Take off the first cylinder with piston and connecting rod, observing that the latter is free from the crankshaft. Mark this cylinder with the centre punch with one dot, the next cylinder with two and so on. Place the cylinders on the bench and replace the connecting rod bearings in order; that is, just catch the nuts on the bolts.

The position of the motor is then reversed on the stand, which will permit of the inspection of the main and camshaft bearings. It may be that these members require but a slight adjustment. This may be determined easily by inserting a small bar of metal between the throw of the crankshaft and support and testing for looseness. Assuming that the bearings are loose: The retaining nuts of the main bearings are removed and it will be noted that these members are made up in two parts. If ball or roller bearings are fitted the novice had best not attempt to adjust them, as this work will require the services of an expert.

Scraping Bearings.

If the main bearing members are not numbered this may be accomplished with a centre punch. On a five bearing crankshaft these parts are marked on one side from one to five, and six to 10 on the other. This is done so that in reassembling the parts will not be reversed. The camshaft members should be similarly marked. The crankshaft is now removed, also the camshaft or shafts, and the crankcase bearing parts, crankshaft and camshafts thoroughly cleaned with gasoline. The bearings should be inspected for scores or uneven places and preparations made for removing these.

If the crankshaft, camshaft and crankpin bearings are worn oval the members should be sent to a machine shop equipped with a grinder. If but slightly scored a lapping tool may be constructed similar to a nut cracker, with the circular opening approximately the same size as the part to be smoothed. The size may be obtained by measuring with the calipers. Very fine emery paper or cloth, if properly used, will remove slight scores.

The cams should be examined carefully to note if the retaining pins are worn or the cams loose. In some types of motors camshaft bushings are employed and the camshaft driven in and cams fitted in the process. To remove a camshaft of this type will necessitate removing the retaining pins, which will be a difficult task for the amateur if not familiar with the work.

Before scraping in the bearings the valve guides and tappets should be examined for wear, also the

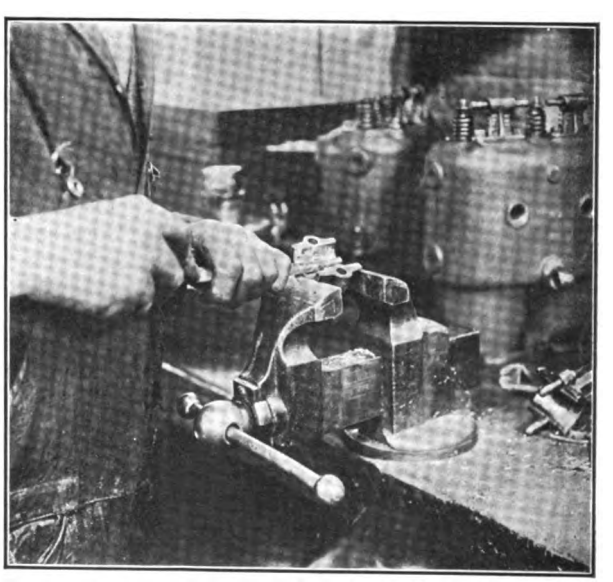


Fig. 6—Illustrating Proper Method of Holding Scraper While Working on Bearing Members.

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roller member and pin. If the bushing is considerably worn, oil will leak out. Some are of the removable type and new bushings and tappets may be purchased or the old parts rebushed. If the pin retaining the roller be worn or if the roller be out of true, the timing will be affected and these parts should be replaced with new members. In taking these out they should be marked for identification.

To scrape in the camshaft bearings, the shaft is replaced in its seat and the bearings smeared with Prussian blue. The brasses are replaced and screwed down, the shaft rotated and the brasses removed. The high spots will be indicated by blue places; where the members do not bear there will be no color. The brasses are then placed in the vise and the bright spots removed with a scraper. The method and manner of holding tool is outlined at Fig. 6. A sharp tool is essential for this work. After the high spots are removed the process of reassembling, testing and scraping is continued until a good bearing is obtained. It is not necessary that the color show all over and uniformly. If three good strips show it will suffice. The scraping may appear tedious to the novice but it should be done carefully, removing the metal from all parts as uniformly as possible.

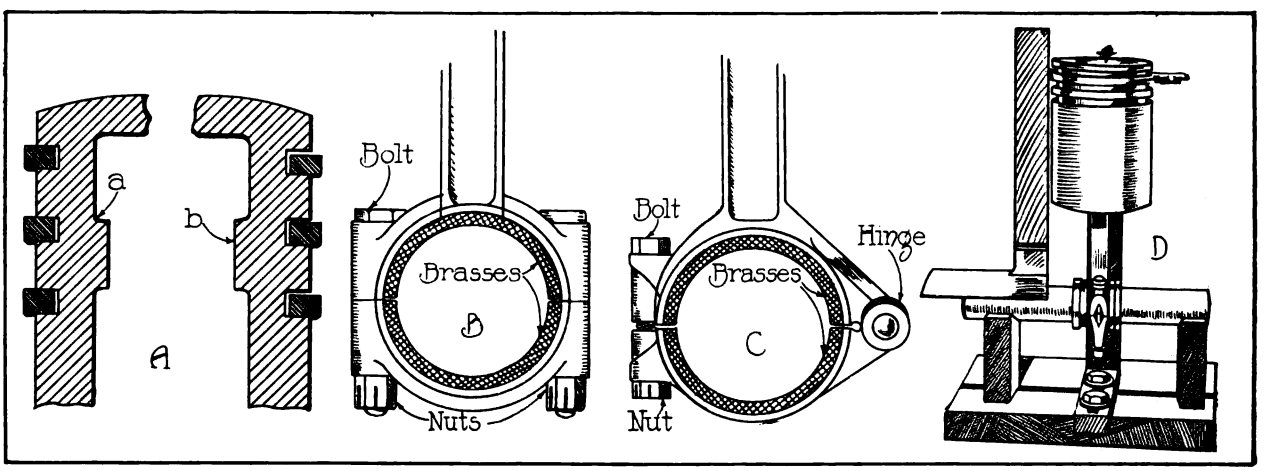


Fig. 7—Suggestions in the Overhaul: A, Proper and Incorrect Fitting of Piston Rings; B, Connecting Rod of Split Type; C, Hinged Member; D, Method of Aligning Piston.

Adjusting Bearings.

There are several methods of adjusting the bearings after scraping. If the two sections are removed from the crankcase, the members may be clamped to the crankshaft and tested on the work bench. The writer favors doing this work with the shaft in the crankcase, taking one end bearing and removing a shim or thinning it down, or if shims be not fitted, a board and emery cloth may be employed as indicated at Fig. 8 C. Care should be exercised not to remove too much of the surface. It is better to reduce a little at a time and try the part. If too much be taken off by mistake, a shim may be inserted. Sometimes a piece of tissue paper will suffice.

Bearings may be of different metals, and where babbitt is utilized this can be taken up snugly, for if properly lubricated at the start it will soon find its seat. Bronze and other metals should not be set up so tightly. It is rather difficult to lay down a set rule as the experienced workman knows by the "feel" when the bearing is right. In reassembling the crank and camshaft the gears should be meshed according to the marks as indicated at Fig. 3.

The nuts of the bearing being adjusted should be set up good and hard and the shaft rotated. If correct, the nuts are loosened and the other end bearing treated in a similar manner, as well as the remaining bearings. These are left loose; that is, the nuts are not screwed down until the camshaft bearings have been adjusted. Before assembling, all bearings should be liberally oiled and care should be taken to note if the oil holes and grooves are clear, else the bearings are liable to be burned out. Each nut and part holding bearings should be set up snugly and the wrench given a tap with a hammer. The nuts hould be fitted with new cotter pins and the ends bent over. See that every nut and bolt has a cotter pin. This is very important and is sometimes overlooked by experienced workmen.

Before scraping in the bearings the flywheel should be examined to note if it be snug upon the shaft; that is, if the key be not loose, which may account for that mysterious knock. Removing this key may appear to be difficult to the amateur but at Fig. 8 A is shown a method of doing this work. If the flywheel bolts are worn, the holes should be reamed out and new members fitted.

Overhauling Timer.

The gears driving the timer or distributor should be looked over for excessive wear or loose keys or pins, as well as the timing gears. When these members are loose or worn excessively the operation of the motor is affected thereby. Regarding the timer it may be loose and require a new bushing if not of the adjustable type. The fibre may be uneven, as well as the roller and pin. These should be taken to a machine shop and trued up and new pin fitted, unless

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the operator be familiar with the lathe. The timer or distributor shaft should be tested to note if there be any play in the bearings, and if any exist new bushings should be fitted. This is a task for the machine shop unless the parts can be secured from the maker of the car.

In adjusting the connecting rod bearings this work may be performed when the crankshaft is out of the case and on the bench. The cylinders are arranged in order, and the connecting rod and piston attached to it are removed from the cylinder nearest the radiator end. The rod may be of the hinged or split type, these being depicted at B and C, Fig. 7. If the bearings have not been adjusted many times shims or washers will be found. If these are strips of thin metal the work of adjusting will be easy. If a solid piece of brass or fibre, they will have to be reduced as required by laying flat and rubbing on a file or emery cloth. The bearings may be scraped, as were the main and camshaft members, and fitted

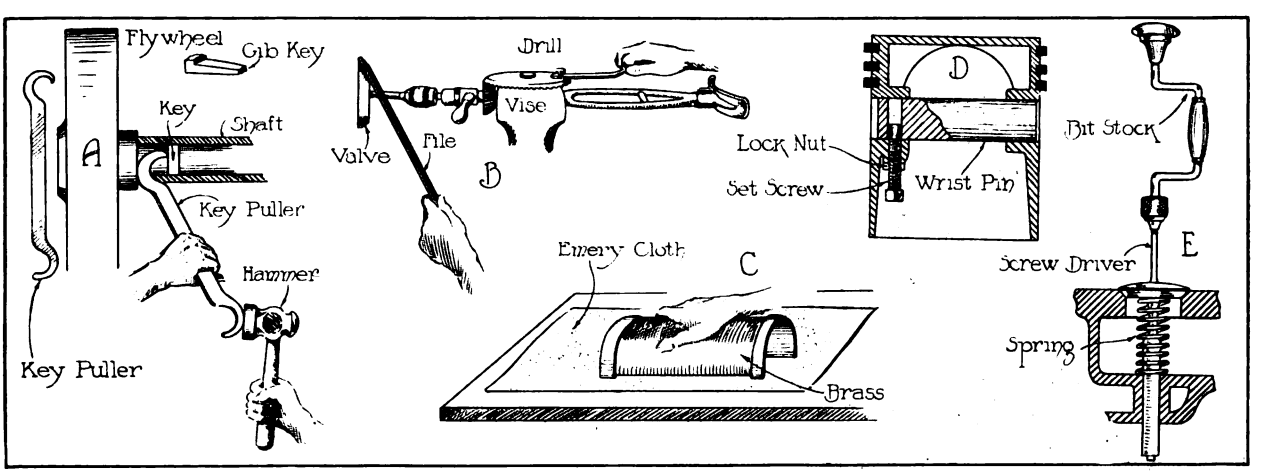


Fig. 8—Overhauling the Power Plant: A, How to Remove Key from Flywheel; B, Utilising Breast Drill and File to Reface Valve; C, Method of Reducing Bearing Member; D, Conventional Wristpin Retention; E, Illustrating the Use of Bit Stock in Grinding Valves.

properly, not neglecting the matter of lubricant.

If new bearings are fitted the piston should be tested for alignment; that is, the piston should be at the proper right angle to the crankshaft. At Fig. 7 D is presented a method of slipping the big end of the connecting rod on a mandrill or bar which itself rests upon a couple of V blocks, the latter having a base consisting of the usual surface plate. The piston is supported by a bar at the rear which keeps it upright. A square having a V shaped base, which fits on the mandrill, is held against the piston, behind which is placed a sheet of white paper. The white line between the edge of the set square and the piston enables the operator to note whether the width varies. If the piston prove to be out of line, it is better to set the connecting rod slightly in the vise than attempt to rectify the error in the bearing surfaces at either end.

Having scraped in and adjusted the connecting rod bearings at the large end, the piston, rings, wristpin, etc., should receive attention. The piston and rings should be washed with gasoline and examined. The rings should next be removed and this may be accomplished by utilizing thin strips of metal inserted between the members and the piston. Remove the top ring first and others in order, and take care not to mix the rings as they should be replaced in exactly the same order. The carbon is now removed from the piston head and seats of the rings.

The bearing of the small end of the connecting rod should be examined for wear and if not of the adjustable type and the wristpin be worn badly, new parts will be required. The wristpin is fastened by several methods, one of which is shown at Fig. 8 D. The set screw is turned completely out and the wristpin driven out. A block of wood should be used and care exercised, else the piston will be broken. In reassembling these members the locking device, be it either a spring or cotter pin, should be inserted. In adjusting the members they should be snug but not too tight, else the edges of the piston will knock against the walls of the cylinder. The bearings should be well supplied with oil when reassembling the components.

Fitting Piston Rings.

The piston rings may have lost their elasticity or fit improperly. This will be denoted by discolored spots caused by the escape of burning gas. If the piston be cracked and a new one necessary, new rings should be procured with it and these members stoned on an oil stone if not smooth. Old rings may be improved by placing a thin strip of metal in the recess of the piston. In fitting new rings too large a gap should not be left in the opening. If not familiar with this work it is best left to an experienced workman. The drawing at Fig. 7 A will be of assistance to the novice, the sketch at a denoting the proper fit while that at b indicates a faulty member. In replacing the rings, the recesses of the piston should be well oiled. The bottom ring should be slipped on

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first and the others in order. Having assembled the piston, rings and connecting rod, these are placed upon the crankshaft, and having adjusted the bearings of the rod correctly it is an easy matter to set these up snugly, taking care to use plenty of oil on the crankpin and insert cotter pins in each retaining nut. It should be mentioned, however, that the crankcase should be reversed in its position upon the motor stand.

The cylinders are next in order, and the carbon should be removed. If scraped clean to the metal the explosion chamber may be coated with graphite, also the head of the pistons, as this material will prevent to a certain extent the accumulation of the carbon. The writer adopts this method and engines thus treated do not carbonize as easily when the surfaces of the members are left rough.

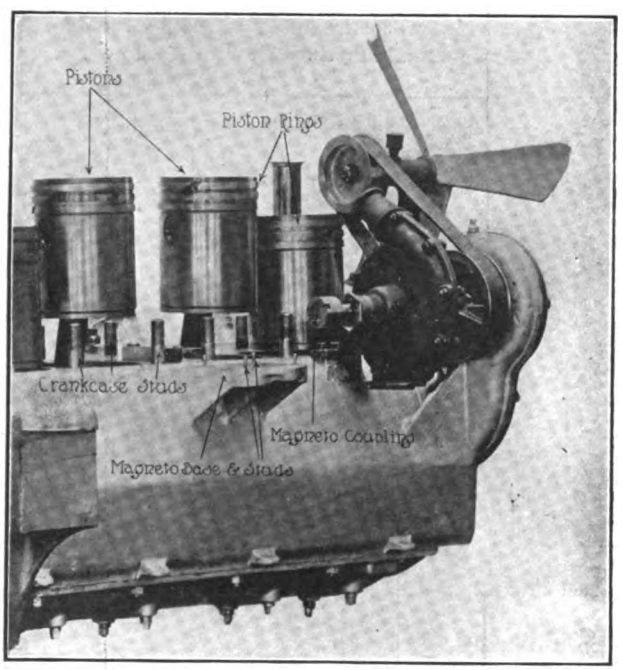


Fig. 9—Showing the Pistons in Position and Ready for the Replacing of Cylinders.

Before grinding in the valves they should be examined and if badly pitted or scored, and their seats as well, they should be refaced. If new members are required a valve seat cutting tool will be needed. At Fig. 8 B is outlined a method of refacing or truing up a valve by utilizing a breast drill in the vise and a flat file. There are several excellent valve grinding compounds on the market, but the writer favors the finest of carborundum mixed with plenty of oil. This will cut nicely and the operator should be careful in grinding.

Grinding Valves.

At Fig. 8 E is shown a method of grinding in a valve with a bit stock carrying a screw driver blade. The abrasive paste is spread upon the valve seat and the stem inserted in the cylinder with a spring fitted as shown in the drawing. The bit stock is turned first in one direction and then the other. Too much pressure must not be applied and from time to time it should be released, the paste washed off and renewed. The seat may be tested with Prussian blue as with the bearings. The valve and seat should be thoroughly cleansed with gasoline, and the valves and springs replaced. New springs may be needed or the old members stretched out.

Measuring Cylinders.

Previous to this work the cylinders should be examined for wear. If suspected of being out of true an inside micrometer or one with a vernier may be used. It is best to have a machinist attempt this work if necessary. If the cylinders are in bad shape, new ones may be procured or the old members bored out. This may require new pistons and rings as well, and upon this subject the novice will do well to consult some experienced repairman before planning the work.

If the cylinders are not found faulty, they are ready for replacement. The walls should be well covered with oil, also the piston and rings. At Fig. 9 is shown the power plant ready for the cylinders and in replacing these the novice is apt to break rings and damage fingers. With assistance and a ring clamp such as was described in a recent issue of The Automobile Journal, the work will be fairly easy. One person should steady the cylinder while the other compresses the rings.

Reassembling the Motor.

In reassembling the motor new gaskets may have to be purchased or made. These members are placed under the cylinders, used in assembling the water, exhaust and intake manifolds, and numerous other places. In dismantling, the type employed should be noted and the same material procured. Heavy wrapping paper may serve for the cylinders and lower crankcase, and when applied with a coating of shellac will make a tight joint. These gaskets may be made easily by placing the material over the cylinder or part and tapping the edges lightly with a hammer. Where the parts are exposed to heat, asbestos or mobiline should be employed or the copper asbestos ready made material.

In regard to gaskets the amateur will save time and trouble where the cylinders are cast singly, by making sure that these members line up; that is, the surfaces against which the intake and exhaust manifolds come in contact. In setting up, the nuts should be tightened gradually. In replacing the water manifold, rubber packing should be employed. This comes in sheets and may be procured at any mill supply house. In replacing the gearcase over the timing members, unless the case be machined and fit nicely, a thin gasket is recommended.

Before inserting the valve caps the threads should be smeared with a paste of graphite and oil, also the exhaust pipe union. The caps should be set up snugly to prevent leaks. The lift of the valves is next adjusted and by utilizing the marks upon the flywheel correct timing will be assured. When the tappets are

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not adjustable the valve stems will have to be lengthened slightly and this may be accomplished by laying them on an anvil or surface plate and hammering the ends of the stems.

The packings in the stuffing boxes of the shaft driving the magneto and pump should receive attention, the material renewed if necessary and the parts adjusted. The fan pulley bearings should be inspected and the belt shortened or adjusted. The water connections and radiator should be replaced and the cooler filled with water to note if there be any leaks in the system. The other parts are next replaced, such as timer, magneto, wires and spark plugs, after which the lower crankcase is put on and filled with clean oil. The motor may now be rotated by hand and this may require considerable energy, but it will serve to splash the lubricant before starting up the engine.

If the remainder of the car does not require overhauling the fuel pipe may be connected to the carburetor, the spark and throttle rods attached, and the motor started. The oiler should be set to feed more than the usual and there should be plenty of lubricant in the crankcase. It may be necessary to prime the motor to aid in starting and it should not be run too long, but a few minutes at the time, which will aid in working in the bearings. The exhaust and intake connections, as well as the valve plugs, should be tested for leaks. This may be accomplished by squirting thin oil between the gaskets and noting if the oil bubbles. The same treatment may be applied to the valve caps. Those showing signs of leakage should be set up again. If a four unit or single coil employing a vibrator be utilized in the ignition system, the platinum points should be cleaned and readjusted.

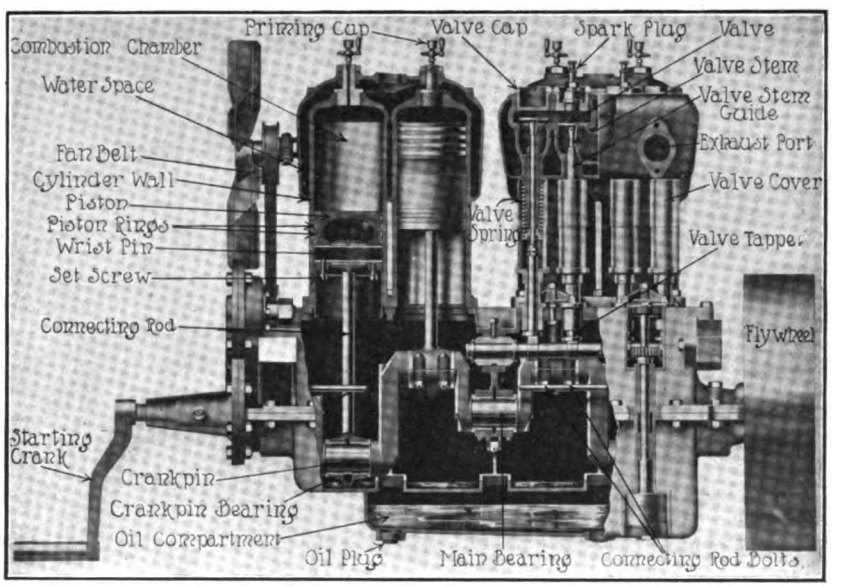


Fig. 10—Sectional View of Four-Cylinder Motor Showing Principal Components and Their Relation to Each Other When Assembled.

After the motor has been run a short time it is an excellent plan to go over it and try the nuts, as it will usually be found that some are not snug although set up tightly in the assembly. All grease cups should be removed in the overhaul, cleaned out and repacked with fresh lubricant. If the amateur proceeds slowly and when in doubt as to an adjustment will consult the experienced automobilist there is no reason why he should not successfully complete the overhaul of the power plant.

Indianapolis Orphans to Ride—The runs and tours committee of the Hoosier Motor Club, Indianapolis, Ind., has decided upon April 13, as the date for the first annual treat to the orphans of the city. The committee needs 50 cars to carry out its plans and anticipates it will have no difficulty in securing the co-operation of sufficient members of the club.

EDWARDS DISCUSSES FOREIGN FEATURES.

H. J. Edwards, who with O. G. Stoddard, both until recently connected with the Dayton Motor Car Company, a constituent of the United States Motor Company, has organized the Edwards Motor Company, for the production of a new Knight engined car, has returned from a trip to England where he studied the subject of designs. His discussion of this subject is interesting, in view of the bearing it may have upon the new Edwards car. He says:

"One thing which impressed me in my investigation of the wire wheel was the fact that the numerous accidents which we hear of on this side do not occur where wire wheels are used. I am fully convinced that nine-tenths of the cases where we have broken wheels would never have materialized had the spokes been of wire instead of wood.

"Very little if anything is being done in self-starters abroad. A few concerns are figuring on them but the fact that a very large percentage of the cars are driven by paid chauffeurs and that climatic temperatures do not reach the extremes we have here, has worked against any great amount of pressure being put upon manufacturers to furnish these devices.

"I am impressed very much with the progress and refinement in body design and construction across the water, as well as the tendency toward luxurious finish and the elimination of all vibration from the chassis."

Club in Davenport—A new automobile club has been organized in Davenport, Ia., with the following officers: President, Decker French; vice president, Lon Marks; secretary, Woodworth Clum; treasurer, Dr. J. T. Haller.

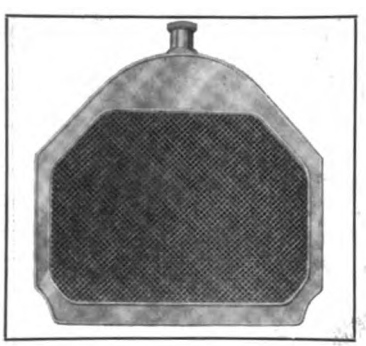
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FACTORS IN FOREIGN TRADE.

The bureau of manufactures, Department of Commerce and Labor, Washington, D. C., has prepared and is about ready to distribute a valuable booklet dealing with trade in foreign countries. In its 56 pages will be found answers to questions asked by every manufacturer sending out trade literature or opening correspondence with these countries. It tells what language is best to use, in what currency and weights and measures prices should be quoted, what postage should be placed on catalogues and letters, etc. Those desiring copies of this booklet, which is entitled "Factors in Foreign Trade" should make application at once.

EUREKA HONEYCOMB RADIATOR.

One of the important components in connection with the water-cooled motor is the radiator, for upon this member depends to a certain extent the efficiency of the engine. If the cooler be improperly designed the motor will overheat and its operation become affected thereby. The member should be substantial and so constructed as to resist the vibration set up in traversing rough roads. The proper mounting also is essential.



Eureka Radiator, of Which Great Strength and Efficiency Is Emphasized.

The Eureka Parts Manufacturing Company, 3100 Olive Street, St. Louis, Mo., is the maker of the Eureka honeycomb radiator of which is claimed great efficiency and correct construction. It is made of the very best material, of high grade workmanship throughout, and is provided with liberal radiating surfaces which are free from fins or projections. The cooler is very strong and handsome, guaranteed, and built in any size and design.

HONOR LONDON MEMBER.

Members of the Society of Automobile Engineers who participated in the recent European tour have purchased by subscription a Waltham chronometer for presentation to Arthur Ludlow Clayden, a member of the society resident in London, England. It appears that the original idea of the foreign trip was suggested by Mr. Clayden, and that he was actively engaged in making the arrangements on the other side. The gift was decided upon as a fitting testimonial in recognition of his services in this connection.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

COLE AND HENDERSON CARS.

Coincident with the announcement that Charles P. Henderson, president and general manager of the Henderson Motor Sales Company, Indianapolis, Ind., will become general sales manager of the Cole Motor Car Company of that city, July 1, comes the information that his brother, R. P. Henderson, is to become associated with the production of a new gasoline car to be known as the Henderson. Under the plan first mentioned, the present efficient selling organization of the Henderson company, which has acted as general sales agent for Cole cars, becomes a part of the Cole concern.

It is said that the change is due to the growth of the Cole Motor Car Company, which although but three years old is the largest individual manufacturer of motor cars in Indiana. The sales company was organized with stockholders and directors closely identified with the Cole company, and its entire efforts were devoted to the distribution of the Cole product, President J. J. Cole and his associates devoting their attention strictly to manufacture. Under the new regime no change in policy is to be made, the sales department retaining its downtown offices.

The new Henderson car is to be designed by Chester S. Ricker, until recently technical editor of Horseless Age. Among the stockholders of the new concern will be R. P. Henderson, C. P. Henderson, Chester S. Ricker, E. E. Rogers and L. Carter. Beyond the statement that the car will have a wheelbase of 116 inches, a self-starter and electric lighting equipment, no announcement has been made. Three chassis are now in process of construction in Indianapolis, where it is expected the plant will be located, and from a trial of these the final product will be determined.

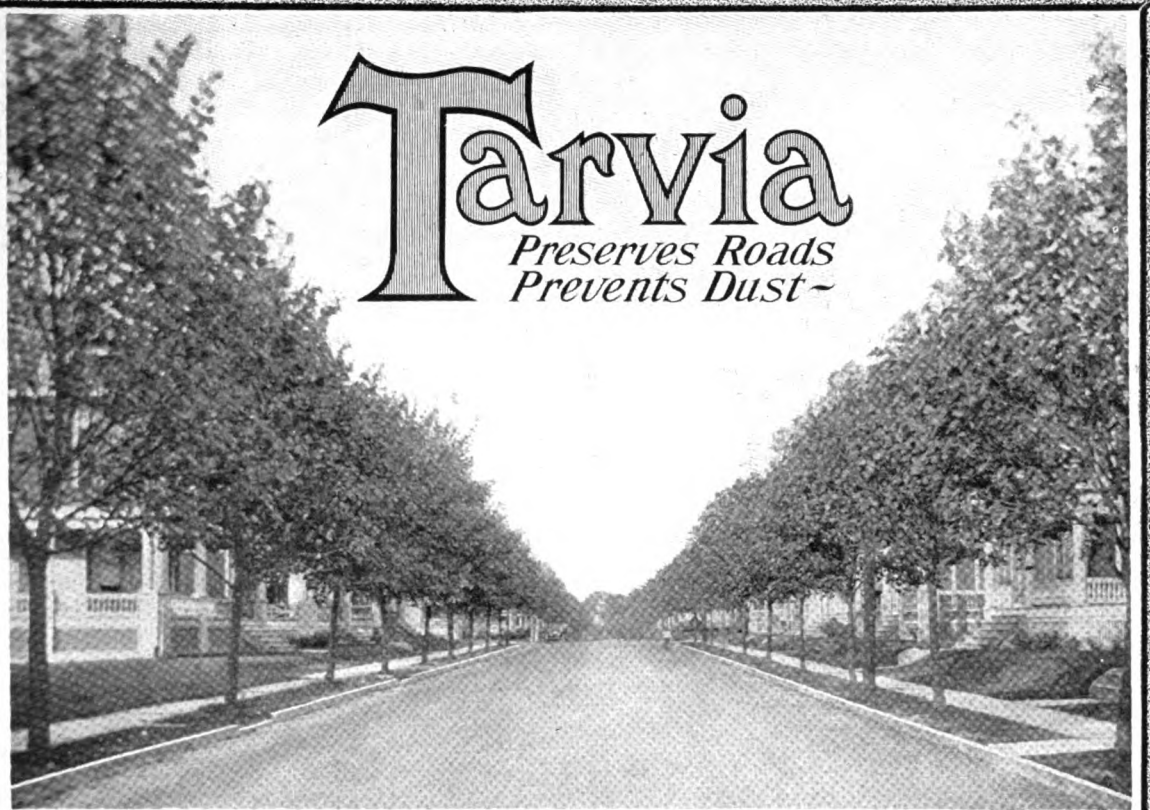
GOODYEAR TIRES AT SHOWS.

Records have been made of the tire equipment at 64 automobile shows throughout the country, and it is announced that no less than 6597 cars were displayed. The tire equipment was divided between 29 makes, and of these Goodyear No-Rim-Cut tires made by the Goodyear Tire & Rubber Company, Akron, O., were the equipment on 2284 machines, or 34.6 per cent. of the total. Goodyear's nearest competitor showed 995.5 sets or 15 per cent., while the next make has 14.6 per cent. with 967 sets.

INCREASES CAPITAL STOCK.

At the annual meeting of the Pittsfield Spark Coil Company, Dalton, Mass., maker of the Pittsfield magneto, it was voted to increase the capital of the company from $100,000 to $250,000. This action was taken in order to increase the facilities for the production of the Pittsfield magneto. The following officers were elected: President, William P. Wood; treasurer, Louis B. Hopkins; directors, the above and Zenas Crane and Michael Casey.

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Harrison Place, Irvington, N. J., Constructed with Tarvia X.

Latest Developments in Tarvia

TARVIA was the first bituminous preparation which appeared on the American market for preserving macadam roads and eliminating the dust nuisance.

The Tarvia, applied hot to the road, percolated into the macadam, sealed up the voids and locked the stone in a tough, plastic, automobile-proof matrix. The early work consisted merely of surface applications with "Tarvia A."

The development of the process has brought more and more thorough treatments until the best practice now calls for the use of Tarvia from top to bottom of the wearing course, applied during construction.

In some towns it has become a matter of fixed policy to build all new roads and pavements with "Tarvia X" as a binder.

Tarviated macadam is so much *more durable* than ordinary macadam, especially under automobile traffic, that the reduction in the cost of maintenance more than pays for the Tarvia. The use of Tarvia is thus justified merely on account of ultimate economy.

In addition, the tarviated surface is smoother and firmer. It is also dustless in dry weather and mudless in wet weather.

Tarvia is made in three grades:
"Tarvia X" for use in constructing roads.
"Tarvia A" for hot surface applications.
"Tarvia B" (applied cold) for dust prevention and road preservation.

Booklet describing the latest developments in methods for building tarviated roadways and pavements will be sent free on request. Address our nearest office.

BARRETT MANUFACTURING CO.

New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.

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TRADE B MARK

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RECENT DEVELOPMENTS IN SELF-STARTERS.

Continuing the Discussion of the Various Devices Now in the Market---Brief Description of Representative Types and Their Operating Methods.

CONSIDERABLE interest has been developed in the electric starter made by the Hartford Suspension Company, Jersey City, N. J. It has been known for months that E. V. Hartford was working on a device

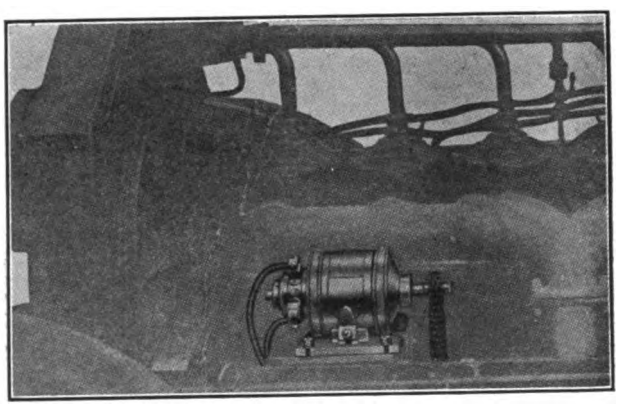


Fig. 1—Hartford Electric Starter Installed on Car, Indicating Its Small Size.

of this character, and it is now announced that he has been experimenting with his invention on a 90 horsepower, six-cylinder car for the past year and a half. As is the case with a number of the electric starters, it is designed to be operated in connection with the lighting system if desired.

The starting part of the system is shown at Fig. 1, and consists of a 12-volt motor, 4.5 inches diameter and 7.5 inches length. This is the size for medium powered cars, and that for machines of over 50 horsepower is about five by eight inches. This motor drives a combination worm and spur gear, the latter being keyed to the main shaft of the automobile between the engine flywheel and the gearbox, where a vacant space generally is to be found. This gear is fitted with a simple clutch and ball bearings. In mesh with the little motor is a worm gear, the reduction of which is 25 to one. The spur gear reduction is five to one, making a total gear reduction of 125 to one.

The motor also is fitted with a small balance wheel, weighing about 2.5 pounds and measuring four inches in diameter. The current is applied with a simple push button, and it is claimed that it uses approximately 180 watts. The speed of the motor is between 6000 and 8000 revolutions a minute, and the reduction is such that this turns the automobile engine over at the rate of 40 to 60 revolutions a minute.

As soon as the engine starts under its own power, the clutch on the main gear automatically and positively releases itself; the gears of the starting device, which are always in mesh, become stationary, and the main engine shaft simply runs on the ball bearings. The worm gear, instead of being keyed to the shaft, is simply slipped on the shaft and held in position by a little friction disc and a spider spring similar to the one used on the well known Truffault-Hartford shock absorber, made by this concern. Just enough tension is put there to drive the mechanism, and as a result, if a back-kick occur, it simply allows the shaft to slip around without injury.

Unlike some other electric systems, the little dynamo or generator is kept separate. The starting motor only being in operation a second or two when the engine is started. The generator, seen at Fig. 2, is placed at any convenient point where lighting generators are located at present, generally from the pump shaft of the engine, and is driven at about a two-to-one reduction. A combination magnetic cut-out and lighting switch is placed on the dash.

This disconnects the dynamo from the battery when the speed of the automobile becomes less than 10 miles an hour. There is an electrical checking system in the dynamo itself, which automatically controls the high speed without any mechanical slipping clutch or other device. This generator charges a 12-volt storage battery automatically, and the current for electric lighting, horn, starter and ignition is taken from this supply.

The Invincible Starter Company, Detroit, has only recently been incorporated for $25,000, and has elected the following officers: President, E. J. Corbett; vice president, D. W. Reinohl; secretary and general manager, H. J. Weeks; treasurer, G. S. Anderson;

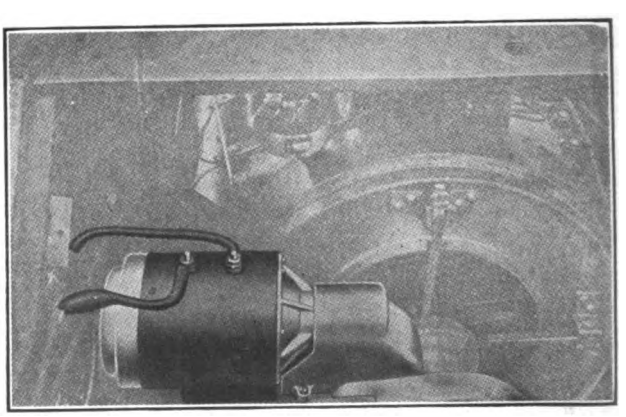


Fig. 2—Position and Appearance of Generator Employed with Hartford Electric Starter.

sales manager, Thomas Henderson; directors, E. J. Corbett, G. F. Monaghan, Walter E. Obtoby and D. W. Reinohl. This company manufactures the Invincible acetylene starter, in which the charge is drawn into

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the motor through the intake manifold during its last few revolutions, and remains in the cylinders until it is desired to start the engine again. The device is illustrated in a comprehensible manner at Fig. 3.

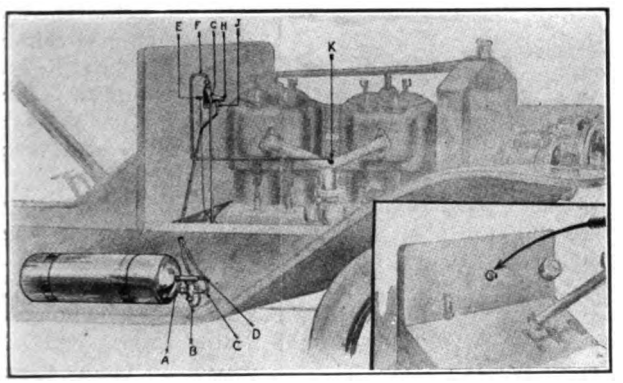


Fig 3—Illustrating Construction of Invincible Acetylene Gas Device.

The regular union is removed from the gas tank, and the two-way union B, supplied with the starter, is attached in its stead. The key way A is for the purpose of controlling the flow of gas to the lights, the acetylene being conveyed to these by means of the tube C. D indicates the lead to the mixing chamber E, on the front of the dash under the hood.

An adjustable air sleeve H permits of increasing or diminishing the flow of air, and is held in any desired position by a set screw. The mixture may be still further regulated by loosening a lock nut and adjusting a ball valve at G. J indicates the lead coming from the gas tank, and F the pipe carrying the mixture of acetylene and air to the intake manifold of the motor at K. The flow of gas through the starter is controlled by a Schrader tire valve. A plunger is fitted to the dash, within easy access of the driver's foot. This is shown in the insert at Fig. 3.

As the engine is about to be stopped, the operator retards the spark and throttle on the steering sector, switches the ignition control on the dash from the battery position to the magneto, and firmly presses the button on the plunger with the foot. This breaks the ground circuit, and allows the acetylene to flow to the mixing chamber, where it is mixed with air and passes through the drift tube to the intake manifold and thence to the combustion chambers. To start: Turn ignition control to battery, advance throttle and retard spark on the steering sector as is usual in starting car from spark. This is the device employed by the United States Motor Company on Maxwell cars.

The Henry Manufacturing Company, 141 West street, New York City, is producing the Blitzen acetylene device, which also charges the motor cylinders as the engine is about to come to rest. Those who have followed this series of articles are familiar with the fact that inventors disagree as to whether the cylinders should be charged during its last few revolutions, or when it is desired to start the motor. The Blitzen provides for both methods, in a measure.

Fig. 4 outlines in detail the construction of the device, and as the cut fully explains the various leads, there is little more to be said in the way of description. It may be stated that the two leads from the gas tank to the Blitzen valve and from this valve to the intake manifold, are of .1875-inch copper piping. The valve itself is small and exceedingly simple. The only other parts are the two-way valve for attachment to the gas tank, providing for a lead to the lighting system as well as the starter, and the starting switch on the dash, located within easy access, either of the hand or foot.

When the motor is about to come to a stop, the ignition switch is thrown to the magneto position. The switch on the Blitzen dash valve is then pulled against the binding post and held there until the engine is at rest. This action short circuits the magneto and at the same time opens the starter valve and allows acetylene gas to flow to the intake manifold.

In starting, the ignition switch is thrown to the battery position and the starter button is depressed. The motor should start at once, but if for any reason it is deemed advisable to give it more acetylene gas, the switch on the dash valve is operated in the same manner as when the motor was brought to a standstill, except that it is considered unnecessary to open the starter valve more than a little way in this instance.

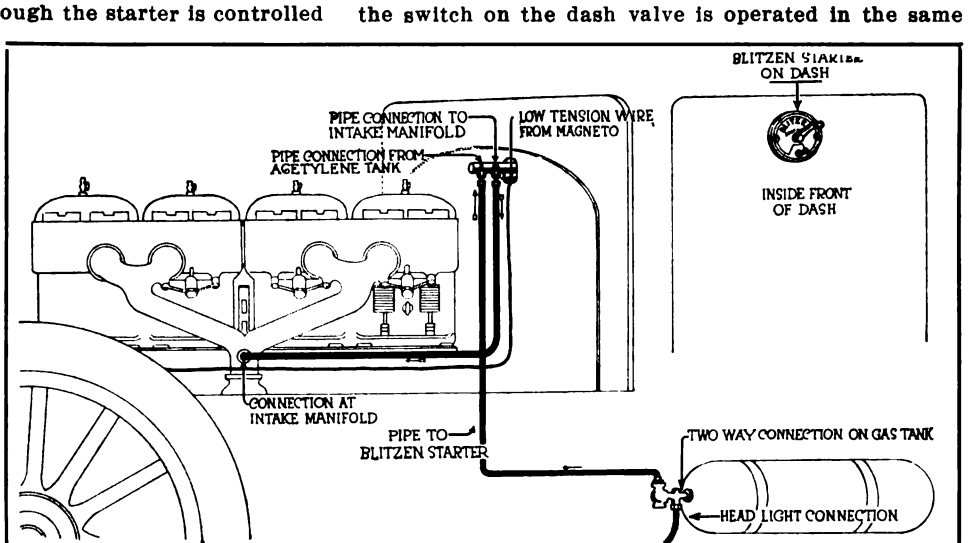


Fig. 4—Presenting the Features of the Blitzen Starter, Also Employing Acetylene Gas.

John W. Tudor, 35 Congress street, Boston, Mass.,

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is producing the Tudor mechanical starter, upon which he began experimentation some three years ago. The device operates the motor by the uncoiling of a powerful spring. When thrown into clutch with the engine shaft, this spring gives three rapid revolutions of the motor. This action is accomplished by depressing a pedal in the floor of the car, and when this is released, the spring is again thrown into clutch with the engine, but in a reverse direction, and is immediately rewound for the next start, being automatically disengaged when fully rewound.

Referring to the blueprint drawings at Fig. 5, the various parts of the starter are explained as follows: The shaft A of the starter is linked to the engine shaft and rotates with it between bearings in the fixed frame of the starter. To this shaft A are secured two oppositely placed cup members of clutches 1a and 1b, to engage corresponding cone members of clutches 2a and 2b on gears 3, which are on the sliding portion of the starter. These cups are spaced to allow of sliding the geared part of the shaft between them. When midway between, so that neither clutch engages, the shaft A is free to revolve without motion to the starter proper.

This consists of a power spring 5 mounted on a vertical shaft and connectable by gears 3 and clutches 1 and 2 to the shaft A, for winding by sliding into one clutch 1a, or unwinding by sliding into the opposite ciutch 1b. The vertical starter shaft rotates in two sliding bearings 4 between which the power spring 5 is attached to the shaft at one end, and to a pin on the sliding frame 6 at the other. These two bearings 4 are yoked together by a U piece, which extends beyond the expanded spring. The lower end of the shaft carries a ratchet 7, which engages with pawls 8, pivoted to the sliding bearing 4 to hold the shaft when the spring is wound. The bearings 4 and vertical shaft and gears are slidable within the sliding frame 6, which carries locking pawls to prevent this motion.

Referring to the side elevation, the spring being unwound, and the engine running: A motion of the lever to the left throws in the left hand clutch 1a, rotates the gears and vertical shaft, and whirls the spring. Meanwhile the winding of the spring pulls on the shaft and its sliding bearings 4, overcomes the locking pawls 9 in the sliding frame 6, and automatically pulls the starter out of clutch with the engine.

The engine being stopped, starting is effected by throwing the lever to the right, this bringing the starter into clutch with the motor. The rod 10 on fixed frame comes into contact with the holding pawl 8, throwing it off and allowing the spring to unwind. A spring 11 is provided on the sliding frame, against which the releasing lever acts so that after starting the engine, the starter will fly back of itself and rewind the spring. Provision also is made for attaching a movable crank for cranking the engine independently of the starter, or for winding the spring, if desired.

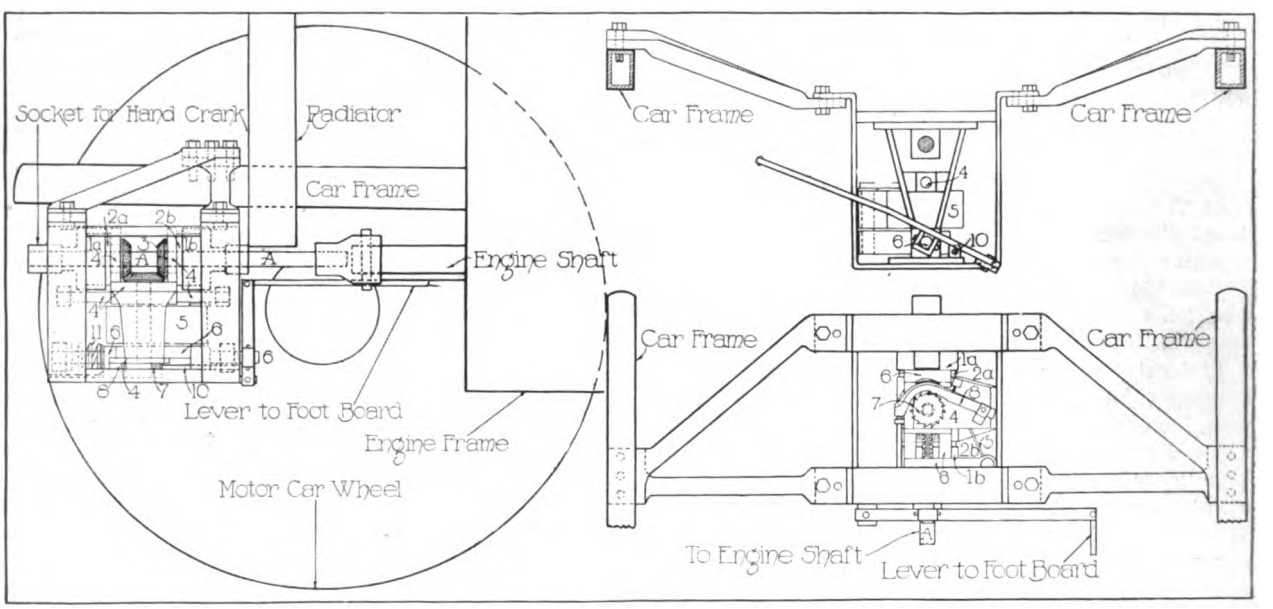


Fig. 5—Scale Drawing Indicating Construction and Operation of Tudor Mechanical Device: A, Side Elevation; B, End View; C, Plan.

NEW RECORD FOR DISBROW.

Driving a Jay Eye See special racing car, made by the J. I. Case Threshing Machine Company, Racine, Wis., Louis Disbrow made what is claimed to be a new world's speed record at San Diego, Cal., March 31. This mark is for one mile on a circular dirt track, which was covered in 0:38.62. The old record was held by Barney Oldfield at 0:51.8.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

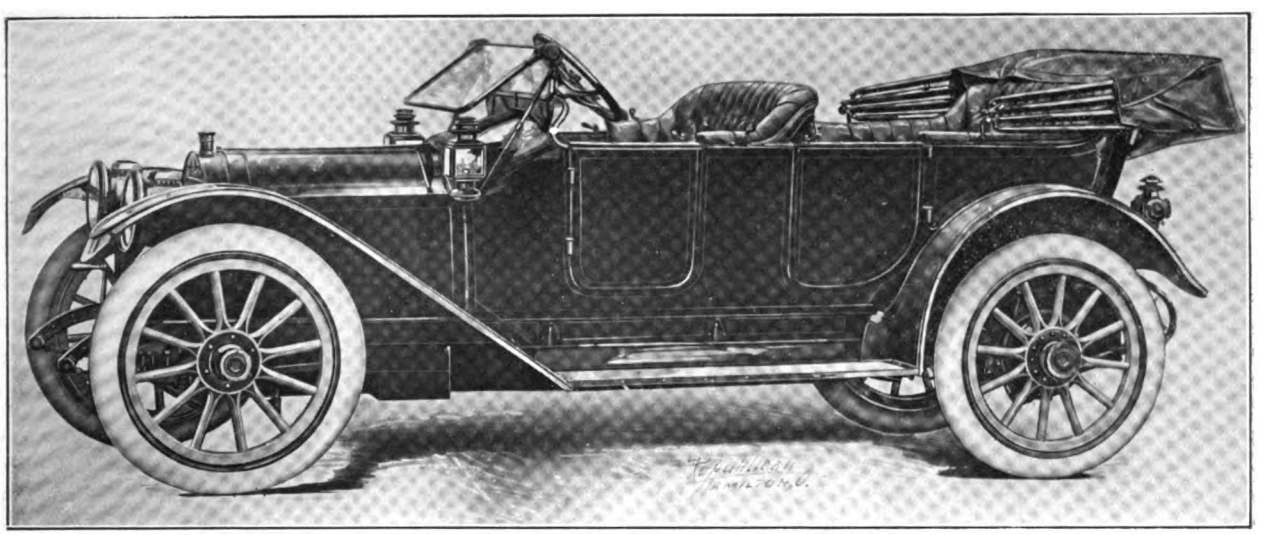
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FEATURES OF REPUBLIC CARS FOR 1912.

IN PRODUCING but one standard chassis the Republic Motor Car Company, Hamilton, O., is continuing a business and manufacturing policy that was inaugurated when the concern was organized, and which has been dictated by a purpose to develop one vehicle to the highest degree consistent with the market price. The Republic cars have been produced with careful regard for sound engineering and well established principles rather than by experiment, and every detail of construction has been proven by unusually prolonged and severe tests. The number of machines built is limited and it is the claim of the maker that these are the highest type of medium priced vehicles.

The chassis has a wheelbase of 120 inches and a tread of 56 inches. On this is installed as desired either a five or four-passenger touring body, or a roadster body. The touring bodies are fitted with that may be folded and stowed in a drawer-like compartment under the left side of the seat, this when rigged affording accommodation for a third passenger, who rides with his feet on the left running board. All the seats are low and deep. The five-passenger body is finished with Richelieu blue with black molding and gray stripe, or Republic gray with gray stripe, with gray wheels. The other bodies are finished with Republic gray with gray striping. The lamps and hardware are finished with black nickel or black enamel. The upholstery is black save in the roadster, which is gray.

The engine is a water-cooled, four-cylinder, four-cycle type with a bore of 4.25 inches and a stroke of five inches, having an S. A. E. rating of 28.9 and being rated by the maker at 35 horsepower. The cylinders are of the T head form and cast in pairs from



The Standard Republic Five-Passenger Touring Car for 1912.

fore doors of unusual width. The tonneau is spacious and there is abundant leg room for the occupants of the front seats. The forward compartments are ventilated by Republic patent ventilators placed in the skirt of the windshields, which may be regulated from the seat of the driver. The bodies are straight line with deep cowl dash, and the seats are so far back that the driver's seat is practically in the centre of the car. The running boards are short and the fenders are long and graceful, adding decidedly to the appearance of the vehicles. The four-passenger car has more room than the average machine of its class.

The roadster body has a long scuttle dash and the seat is well back, the doors being about the centre, while behind the seat is a high turtle back in which is abundant storage space. The doors are hinged at the front and can be opened by the driver without moving in the seat. There is a so-called trundle seat

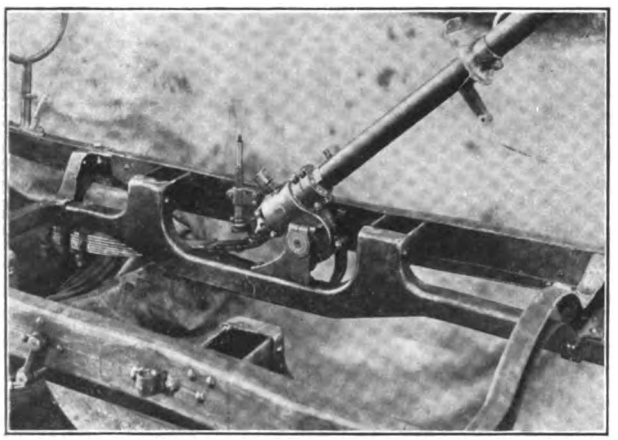
fine gray iron with the water jackets integral. The casts are made with a large opening at the top of the cylinder units which permits the removal of the core and the thorough cleaning of the large water jackets. The cylinders are bored, then aged and reamed and ground to exact size. The pistons are of soft gray iron and these are turned and ground to a precise fit. Each is fitted with three rings that are ground on the edges and the face to insure complete retention of compression.

The engine case is an aluminum casting in two sections, the upper carrying the main bearings for the crankshaft, the camshafts and their bearings, the timing gears and their cover. The lower forms the oil pan and includes the reservoir for the lubricant and the oil pump. The case is strengthened by bridgework and the web that carries the centre main bearing.

The crankshaft is a drop forging of special alloy

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steel and is heat treated. It is carefully ground to size and finished. It is carried on three large bearings of a fine grade of bearing metal, these having



Sub-Frame for Support of the Motor and the Substantial Installation of the Steering Gear and Column.

unusual length. The connecting rods are steel I section drop forgings and have large big and small end bearings, these also being lined with the same quality of bearing metal. The pistons are offset .75 inch from the crankshaft centre line. The camshafts are a high grade steel, hardened and ground to size, and these have bearings of liberal proportions.

The inlet valves are at the right side of the motor and the exhaust valves at the left. The valves are of a high quality of steel operating in long guides. The pushrods are of steel, hardened and ground and are carefully fitted to the guides. The pushrods are equipped with means for accurate adjustment to compensate for wear and the valve action is practically noiseless.

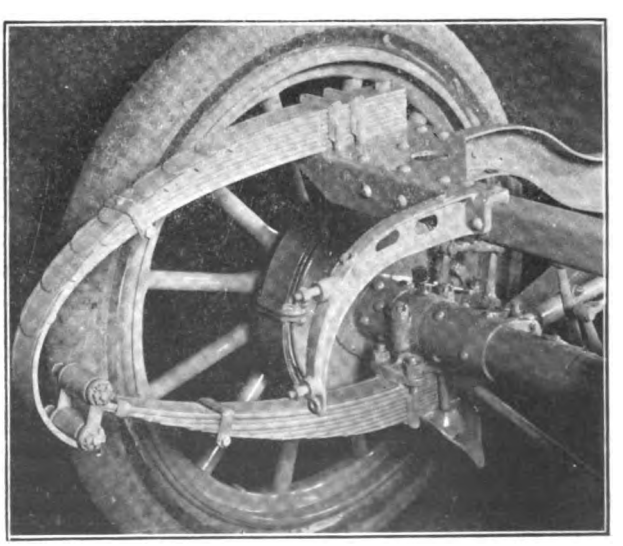
The large openings at the centre of the cylinder units are closed with plates that carry the water outlet manifold, these plates being retained by studs, the unions being made tight by gaskets. The manifold is large to insure a positive circulation of the water, which is driven by a centrifugal pump actuated by an outside camshaft. The water is passed through a large cellular radiator and enters the cylinders at the base of the exhaust valves, this insuring the positive reduction of the temperature of heated walls. The water capacity is large and the fluid is rapidly circulated, maintaining an efficient radiation at all times. The system is supplemented by a fan carried on a bracket ahead of the forward cylinder and which is driven by a flat belt from a pulley mounted on the water pump shaft. The fan shaft is adjustable to insure a proper tension of the driving belt.

The lubrication is by a combination of force feed and spray. The oil accumulates in a reservoir in the base of the crankcase and is drawn through a fine filter to a well at the base of a gear driven pump and forced through a system of tubes and a sight feed carried on the dash to each main engine bearing. The main bearings are grooved to retain the lubricant. In the crankshaft at each bearing is drilled a hole that registers with the tube outlet at each revolution and the crank throws are drilled from the shaft to the crankpins, with outlets to the crankpin bearings, so that the oil is forced through the channels in the shaft to each bearing, constantly flooding them when the engine is in motion. The spray thrown from the revolving shaft is sufficient to lubricate the camshafts, their bearings, the timing gears and the wristpins, cylinders and piston walls. The drainage of the oil after use is to the reservoir, where it is filtered and again circulated.

The ignition is by two distinct and separate systems, using two sets of spark plugs, one being carried at the side of the valve pockets and the other in the caps directly above the valves. In the caps above the exhaust valves are the compression relief and priming cocks. The initial system is with a Bosch magneto, using the spark plugs in the sides of the valve pockets, and the other is the Delco high-tension distributor battery system, with a battery of six dry cells as a source of current. The latter may be used as a reserve and for starting, and the magneto for regular service.

The fuel is stored in a tank having 18 gallons capacity, of which there is an emergency supply that may be reached easily by the driver. The feed is by gravity to a carburetor of the automatic float feed type. The intake is fitted with a special hot air attachment so that the conditions are uniform, and the lower section of the intake manifold is water jacketed.

The clutch is of the cone design, the cone being

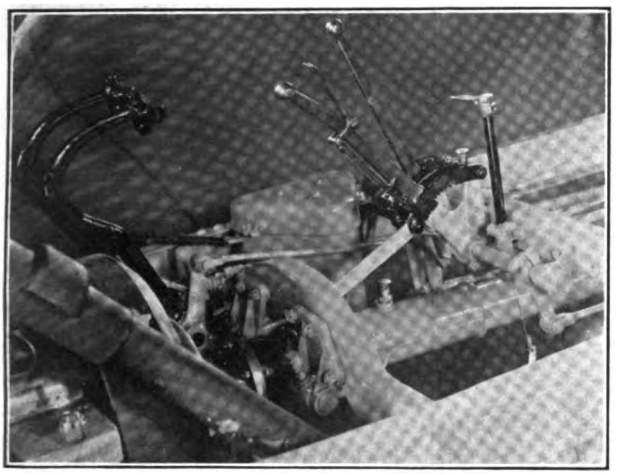


Rear Spring Suspension of Republic Chassis, Showing Attachment to Gusset Plate Extension and the Underslung Rear Axle.

faced with leather and having cork inserts, which insure against slipping and afford a positive ease of engagement that eliminates all possibility of the an-

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noyance of harsh clutching. The power plant and clutch are mounted in a sub-frame that is of unique design. The sub-frame is supported in the chassis



The Centre Control Levers, the Muffler Cut-Out Control, and the Steel Battery Box of Republic Cars.

frame by gusset plates that make for an extremely rigid construction. The engine is raised so as to have abundant road clearance with the chassis frame as low as is desirable to secure a satisfactory centre of gravity. The steering gear is attached to the sub-frame without obstructing the use of the engine auxiliaries.

Directly back of the clutch is the universal joint that couples the clutch shaft to the main driving shaft. The joint is with fixed centre and it is supported by the centre cross member of the chassis frame. Attached to the universal joint is the yoke at the forward end of the torsion tube that protects the driving shaft. The body may change its relation with the axles but there is no strain brought upon the driving shaft. The torsion tube is large and within it the shaft is mounted on a large roller bearing. This torsion tube extends to the transmission case, which is bolted to the front of the rear axle housing. The tube is very heavy and its position is maintained by two large distance rods extending from the rear axle to the sides of the chassis, just within the frame. There is no strain upon the torsion tube or the driving shaft.

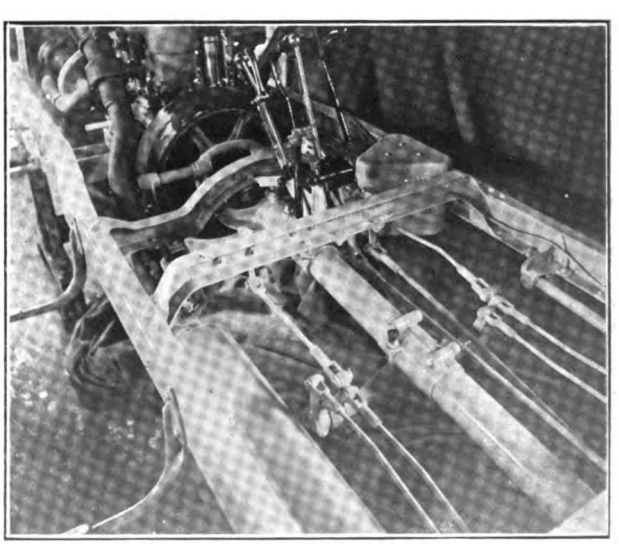
The transmission is a selective type with three forward speeds and reverse with heavy shafts mounted on imported annular ball bearings. The gears are with wide faces and are of chrome vanadium steel. The transmission is driven in a bath of oil. The rear axle is a full floating design with a heavy steel housing. The differential assembly is mounted on imported annular ball bearings and the driving shafts are of vanadium steel. The differential may be reached for examination or work by the removal of a large cover plate.

The chassis frame is a pressed steel channel section with gusset plates integral. It is cambered at the rear to permit the use of the three-quarter elliptic springs and is constricted forward to afford a wider wheel lock, it being possible to turn the vehicle in a radius of 38 feet. The springs are chrome vanadium steel, those forward being semi-elliptic, 42 inches length and two inches width, the rear three-quarter elliptic, 45 inches length and two inches width. The manner of attaching the rear springs is original with this chassis and it is claimed to afford the greatest resiliency and eliminate the danger of breakage. The upper half-spring is anchored to an extension of the gusset plate to secure an offset and held by two clips and a half-inch bolt. The lower half of the spring is slung under the axle on an inverted spring saddle, permitting the full spring clearance with a very low slung body.

The front axle is a steel drop forged I section. The wheel spindles are mounted with large ball bearings, and the wheels are driven on large heavy duty ball bearings. The tierod is carried behind the axle and the draglink is above it, there being protection from road obstructions.

The brakes are both internal expanding within drums on the rear wheels. All the brake rods and their connections are within the chassis frame and are mounted on the torsion tube. The yoke supporting them is placed at the same relative point as are the ends of the radius rods and the movement of the rods and brakes is always the same.

The control is by an 18-inch hand wheel at the right side with a two-inch column at an angle of 40 degrees for touring cars and 42 degrees for the roadster. The steering gear is mounted with a bearing on the chassis frame and the sub-frame, this giving an unusually strong support. The clutch and the



Suspension of Brake Rods on Torsion Tube of Republic Chassis.

service brake are operated by pedals with hand levers that are mounted in the centre of the chassis for the speed changes and the emergency brake.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

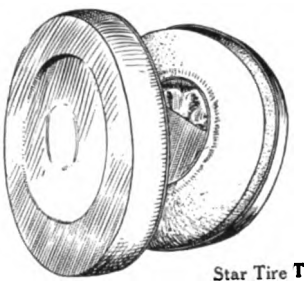
Star Tire Trunks will appeal to motorists of discriminating tastes as they are constructed in the form of a shoe and are very neat in appearance. They are made of pressed steel with a polished finish, and are light, strong, durable, clean and noiseless. A compartment is provided for the storing of inner tubes, and the trunks are thief and water proof. A feature is their accessibility. They are marketed by W. W. Winship, Boston.

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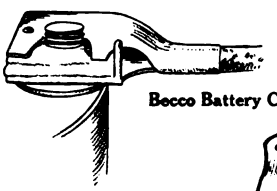
The Becco Battery Connector, manufactured by the Beck Company, Rockville Centre, N. Y., is an improvement over the ordinary form inasmuch as the construction of the device is such that it is claimed it cannot jar loose when properly attached. It is made in the form of a clip, two members being pivotally mounted and provided with a recess to fit the terminal of a battery. When placed over a binding post and the clips snapped together, it is stated that the use of a screw driver or similar tool is necessary to release the members. The device is made of heavy drawn brass, and is neat and inexpensive.

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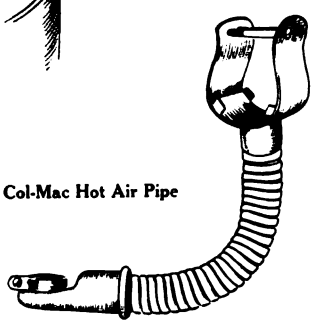
The Col-Mac Hot Air Pipe is a device for facilitating the vaporization of the fuel at the spraying nozzle. It consists of a metal bound flexible tubing in one end of which is a member so constructed that it fits over the air intake of the carburetor and is held in place by an adjustable ring and lock screw and nut. The other extremity is U shaped and is placed over the exhaust pipe where it is secured by means of two machine screws. By this arrangement heated air is taken from the exhaust pipe and drawn in through the tube to the carburetor, past the spraying nozzle. The hot, dry air not only effects a saving of gasoline but eliminates choking, condensation and freezing. It is claimed that sluggish motors will pick up quickly with the device and that climatic changes do not affect the action of the carburetor. Where a machine is not fitted with a pan or undershield it will prevent water and foreign elements being drawn into the vaporizer, thereby avoiding trouble from this source. The device is inexpensive and is applicable to any motor. It is manufactured by the Breeze Carburetor Company, Newark, N. J.



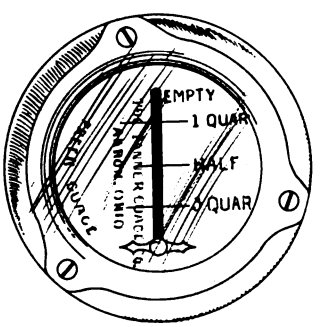
Star Tire Trunk



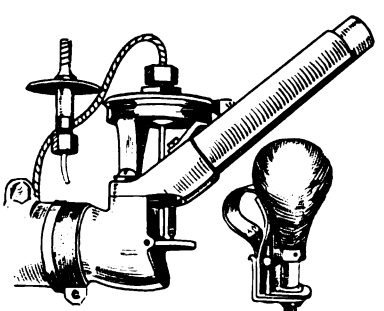
Becco Battery Connector



Col-Mac Hot Air Pipe



Freer Liquid Gauge



Waymaker Horn

★

The Freer Liquid Gauge is designed to overcome carburetor troubles caused by the use of improper measuring devices, such as dirty sticks, etc. It consists of a reading dial fitted with heavy plate glass and calibrated to indicate the amount of fuel in the tank. An indicator moves freely over the face of the dial and is actuated by a float in the container, the float rising and falling, thus moving a rod connected with the registering member. It is adaptable to any type of fuel tank either gravity or pressure feed, and the glass member permits of noting the amount of fluid in addition to the indicator. It is produced by the Tanner Gage Company, Akron, O.

★

The Waymaker Horn is a new type brought out recently by the Lee Tire & Rubber Company, Conshohocken, Penn., and differs from the usual exhaust actuated members inasmuch as it is operated by a miniature rubber bulb located on the steering wheel or in any convenient place. Connecting the bulb and device controlling the exhaust gases is a flexible tubing wound with metal for protection. When the bulb is pressed a valve-like device allows the gases to flow into the horn, the amount depending upon the pressure exerted on the bulb. The signal is attached to the end of the exhaust pipe leading from the muffler and is easily and quickly fitted. The Waymaker horn is also made with foot control.

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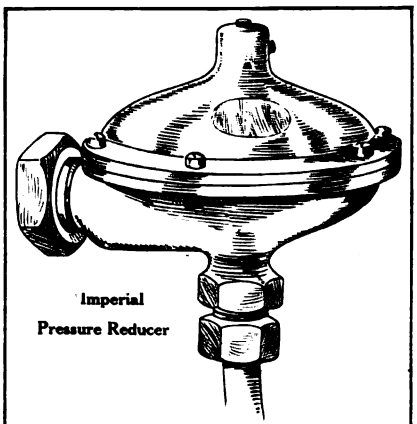
The Imperial Pressure Reducer is designed to reduce properly the pressure and to regulate automatically the flow of acetylene from tanks, the pressure of which may vary. It is a neat, compact device, attached to the usual connection of the tank and is so constructed that the pressure is reduced from 300 pounds to as low as two ounces. It delivers a steady, even flow of gas whether the container be empty or fully charged. It will appeal to motorists contemplating the fitting of an acetylene self-starting device as with the reducer the desired and necessary pressure may be obtained. It is made by the Imperial Brass Manufacturing Company, Chicago.

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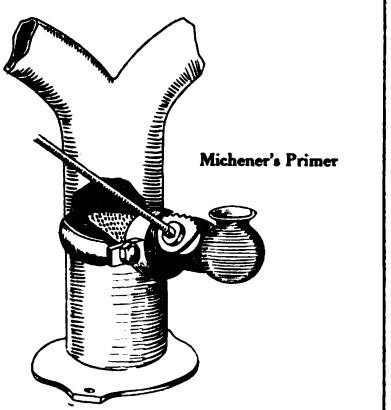
Michener's Gas Saver and Primer, made and marketed by E. S. Michener, New Castle, Penn., is a device for attachment to the intake pipe or manifold by means of a brass strap and lock nuts. It is hand controlled, and is fitted above the carburetor and operated from the dash by an adjustable rod. A wire gauze cone is incorporated, this being for the purpose of breaking up the fuel and for aiding in vaporization. The hand actuated valve permits of an opening ranging from zero to .5625 inch, admitting auxiliary air, and it is claimed that an economy of gasoline is effected thereby. A priming cup is incorporated for the purpose of facilitating starting in cold weather. The device is made of solid brass, highly polished, is installed easily and is not expensive.

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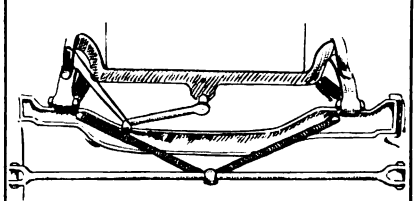
The Little Steersman is a spring device designed for attachment to the tierod and axle so that in the event of an accident to the steering gear or the breaking of any of its components, the front wheels are kept in alignment. It consists of a helical spring, constructed of oil tempered steel wire, with attachments for the end and centre. The latter are drop forgings. It is claimed that the Little Steersman makes driving easy, and takes up automatically lost motion between the steering gear and wheels. It is nickel plated and does not detract from the appearance of the machine. It is produced by the Modern Auto Appliance Company, Chatham, N. Y.



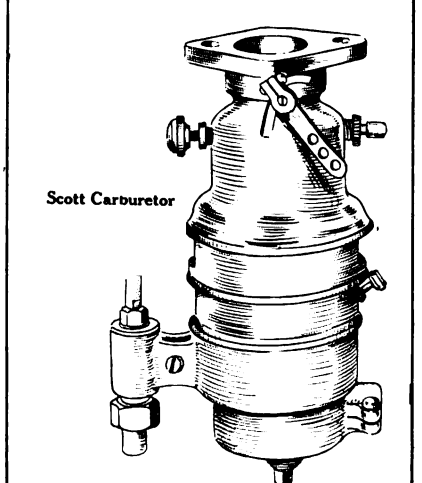
Imperial Pressure Reducer



Michener's Primer



Little Steersman



Scott Carburetor

★

The Scott Carburetor, manufactured by the Scott & Sons Company, Medford, Mass., is a double needle vaporizer in which the auxiliary air valve is not actuated by a spring, and it is claimed by the maker that it supplies a correct mixture at substantially the same stress at all speeds and automatically adjusts itself to altitude. These qualities are obtained by the action of the auxiliary air valve which controls the high speed needle member, differing from those of ordinary form inasmuch as it is slabbed tapering on three sides, producing a like number of fine sprays and facilitating vaporization of the fuel. The valve moves in accordance with the speed of the piston, that is to say, it moves downward as the speed increases, and as the taper on the needle is inverted the flow of fuel is increased and vice versa. A feature is the fitting of a starting valve which may be operated from the radiator or dash. An air adjustment for high speed is incorporated over the auxiliary member and a low and high speed adjustment for the fuel. The only spring utilized is that in conjunction with the high speed needle and it is claimed that its operation is such that it is not impaired by long service. The maker emphasizes the fact that the carburetor is adjusted easily and that when once set requires no further attention.

★

The Vim Spark Plug, manufactured by the K-W Ignition Company of Cleveland, O., well known maker of ignition specialties, differs from the usual members in the manner in which it ignites the mixture in the chamber. The shell is hollow, providing a chamber into which the gas is forced by the compression stroke of the piston. There are four nar-

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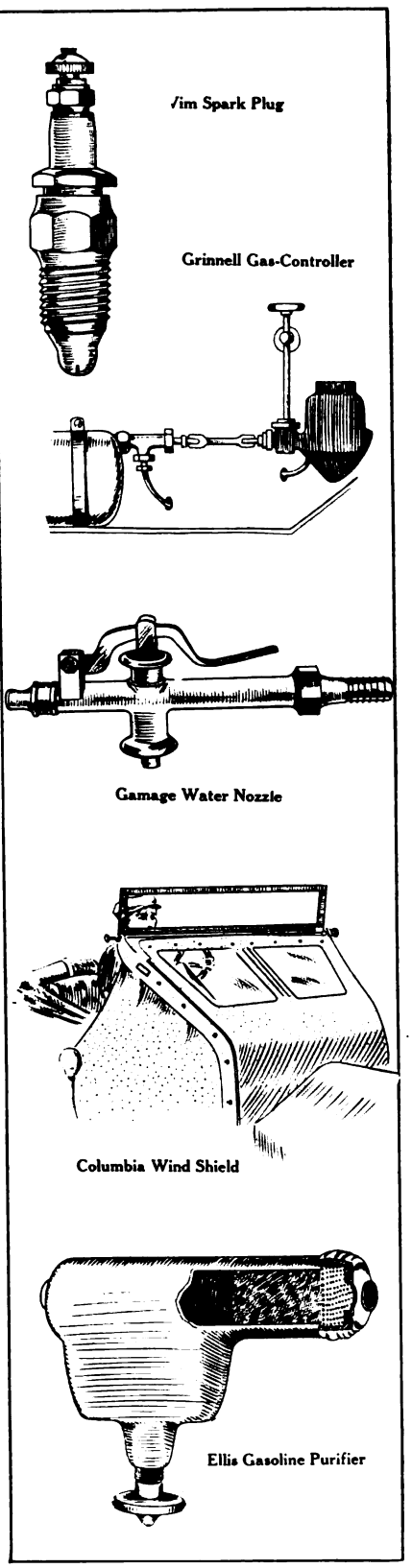
row slots across the bullet shaped nose of the plug, making for a concentration of heat around the firing point, and as the mixture is forced through this heat it ignites easily when the spark occurs. When this takes place a flame is shot out through the four slots into the vapor in the cylinder, facilitating combustion. Owing to the passage of the mixture the points are cleaned and it is said that sooting and fouling by oil is impossible. They are made with mica and porcelain cores in .5-inch pipe tap, metric or S. A. E. standard sizes.

★

The Grinnell Gas Controller and Igniter is produced by the G. C. A. Manufacturing Company, Pittsfield, Mass. As the name implies it is designed to regulate the flow of gas from the tank to the burners, and to light the latter from the seat by the turning of a small handle which is a part of the device. It includes the spark generating instrument and is neat and compact and attached easily to the frame of the car. Connecting the controlling mechanism and tank is a universally jointed rod which is provided with adjusting means so that in the event the pressure of the acetylene becomes reduced the proper flow to the burners may be secured. The lamps may be lighted and extinguished by a simple turn of the wrist, or dimmed as desired. The controller does not interfere with the operation of ignition system of the machine, being entirely separate, and the gas tank may be renewed in the usual manner. The burners are constructed to withstand hard usage and the spark points are held by brass springs, facilitating the removal and replacement of burners.

★

The Waste Not Water Nozzle has been brought out by A. W. Gamage, Ltd., London, England, to prevent an excessive waste of water when washing the motor car or other vehicles. It is fitted to the end of the usual hose and in place of the regular nozzle is provided with a hand cock and lever. Normally the water is shut off and to obtain use of the fluid the lever must be depressed. When released it automatically shuts off the supply. It is claimed that the initial cost of the device is saved in water bills in a short time as chauffeurs are prone to allow the fluid to run while performing other work in connection with the cleaning of the machine.



★

The Columbia Windshield is custom made by the Columbia Top & Tire Company, Boston, and is constructed both for the protection of the passengers in the front seats and the tonneau. When fitted to the latter it may be utilized as a light service table by folding back the upper part. It is made of flexible leather covering a light brass frame, steel lined, and the use of glass is avoided. Several adjustments as to positions are provided and it is claimed that the wind is deflected in such a manner that it does not strike the occupants of the rear seat.

★

The Ellis Gasoline Purifier differs from a fuel filter inasmuch as the device not only separates water from the fuel, but kerosene and dirt. It is a compact device, weighing about six ounces and is inserted in the fuel line between the supply tank and carburetor. The gasoline first enters the precipitation chamber and is filtered through two fine screens, two felts and quartz. Any water in the gasoline will lodge in the precipitation space while the fuel, being lighter, will rise and flow to the vaporizer. The device is equipped with a knurled thumb screw by means of which accumulations of water, dirt, etc., may be drained easily and quickly. It is made of an aluminum composition and comes complete for attachment. The L. P. Rhines Company, Boston, is special agent.

★

The Cooper Valve Lifter is the invention of John J. Cooper, Providence, R. I., and differs from the usual tool of this nature in

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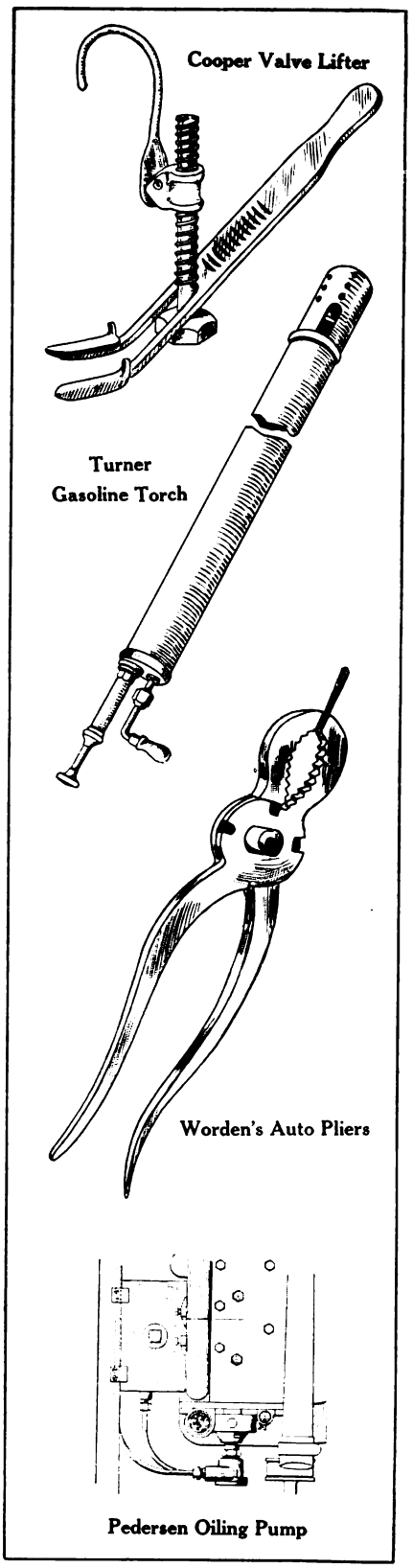
that means are incorporated whereby the instrument may be locked securely after the valve spring of a poppet valve has been compressed, enabling the operator to use both hands in removing the cotter key or retaining members. The device consists of a U shaped member, one end of which bears upon the valve proper while the other extremity is fitted with a movable threaded screw rod. The lower end of the latter is recessed to take a lever slotted at one end and having a bearing upon an enlarged portion. The forked part of the lever is slightly upturned and is equipped with two tilting shoes pivotally mounted which are designed to be self-levelling and to bear evenly against the retaining member of the valve spring when the latter is compressed. The inner edges of the movable shoes are adapted to engage the rim of the collar of spring to prevent the lever from moving too far forward. The upper surface of the lever is fitted with deep notches for the purpose of engaging and retaining a brace member which is interposed between the serrations and threaded screw or nut. The length of the screw is such that the valve lifter may be utilized on any sized engine by changing its adjustment, which may be accomplished easily with the tool in position.

★

Worden's Auto Pliers, produced by E. M. Worden, Ladysmith, Wis., is a combination tool which will appeal to motorists and repairmen, it being stated by the maker that it represents 15 tools in one. Among the important offices which they fill are a pipe wrench, wire cutter, screw driver, nail puller, belt puncher, cotter pin tool, etc. They are constructed of a high grade of material, nickel plated and guaranteed by the maker.

★

The Turner Hot Blast Tubular Gasoline Torch is a new product of the Turner Brass Works, Sycamore, Ill., and is said to produce an intensely hot blast flame



easily controlled by a gasoline valve. Its construction is such that it is adaptable to a large variety of work. It is about five feet long, constructed of heavy gauge brass tubing, two inches in diameter, with a burner at one end and a pressure pump at the other. The long tube is utilized to contain the supply of fuel and holds about three quarts. A unique feature of the appliance is the controlling valve inside the tube which regulates the flow of the gasoline in such manner that the torch may be used in any position. A pump supplies air pressure in the fuel chamber. The size of the flame at the burner is 12 inches long and two in diameter. The torch weighs about 16 pounds and it is claimed that a quart of fuel will last an hour.

★

The Pedersen Oiling System for model T Ford cars is manufactured by the Pedersen Lubricator Company, New York City, and is similar in operation to the oil pumps made by this concern. It consists of an oil tank, pump, tubing and an adjustable sight feed indicator. The pump is attached to the timer shaft by a nut, this operation requiring the fitting of a new commutator cover which is a part of the equipment. The oil container is secured to the frame or any other convenient place near the motor and a pipe leads from the vessel to the pump and another to the indicator on the dash. Still another tube carries the lubricant from the sight feed member to a pet cock in the crankcase. When the motor is operating the pump draws lubricant from the tank and forces it to the dash device, equipped with an adjusting screw by means of which the amount of oil fed to the crankcase may be regulated to a nicety. As the speed of the engine increases the amount of oil pumped is in proportion and it is claimed that smoking is eliminated, as well as the necessity for refilling the crankcase. The pipes are cut to length and provided with connections ready to screw together and are attached easily.

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PLEASURE CARS AS BUSINESS VEHICLES.

Experience of Springfield Water Department During Last Eight Years Indicates One Machine Will Do the Work of at Least Three Horses and at a Substantial Saving in Money and Efficiency.

WHILE it must be admitted that motor vehicles were first used for pleasure purposes, or at least their unquestioned practicability was demonstrated through such use, it is somewhat unfortunate that even the so-called pleasure car has come to be thus known. Because the general public has been accustomed to associate a touring car or runabout with thoughts of long distance riding or Sunday afternoon drives through the country, it is difficult to appreciate the utilitarian value of these machines. Many business men have been surprised to learn the economy which might be effected by the substitution of an automobile for the horse and wagon.

COST OF OPERATION, SPRINGFIELD WATER DEP'T.

Knox Two-Cylinder Air-Cooled Car.

	Gasoline	Tires	Oil	Repairs	Overhaul	Total
1904....	$117.88	$80.52	$7.25	$107.97	.....	$313.62
1905...	115.15	308.78	16.00	174.41	.....	614.34
1906...	194.23	296.13	10.00	421.64	$72.67	994.67
1907...	108.79	106.46	5.45	113.71	54.30	388.71
1908...	66.33	105.84	5.13	91.05	70.64	338.99
1909...	65.89	122.81	9.65	73.06	137.99	409.40
Totals	$668.27	$1020.54	$53.48	$981.84	$335.60	$3059.73

Knox Air-Cooled Touring Car, Engineer.

1907....	$144.03	$192.81	$32.32	$343.33	.....	$712.49
1908...	151.35	230.29	27.32	79.67	$274.61	763.24
1909...	132.05	208.50	14.66	98.24	289.57	743.02
1910...	52.98	154.74	8.88	67.39	68.19	352.18
Totals	$480.41	$786.34	$83.18	$588.63	$632.37	$2570.93

Knox Air-Cooled Runabout, Superintendent.

1908...	$38.02	.....	$6.68	$95.65	.....	$140.35
1909...	64.88	$124.48	10.62	302.13	$110.36	612.47
1910...	78.57	229.55	11.04	340.68	315.06	974.90
1911...	146.98	213.11	29.74	279.97	234.48	904.28
Totals	$328.45	$567.14	$58.08	$1018.43	$659.90	$2632.00

Knox Water-Cooled Touring Car, Engineer.

1910....	$104.75	$352.12	$20.84	$82.26	.....	$559.97
1911...	163.99	555.48	23.33	207.23	$70.19	1020.22
Totals	$268.74	$907.60	$44.17	$289.49	$70.19	$1580.19

Hudson Runabout, Assistant Superintendent.

1911...	$85.75	$103.71	$20.88	$133.14	.....	$343.48

To cite an instance of this nature, mention may be made of one large farmer whose work is so subdivided that it is necessary that he shall visit each section of the work, practically that of an overseer. When using horses, he was compelled to keep three constantly in service, this necessitating even more in reserve in order that there should be no loss of efficiency. With one automobile he is able to do the work of these three horses, and finds time to spend two or three hours in his office daily.

The motor car has made a decided appeal with physicians, and while it was at first expected by them that they would be able to answer calls more quickly, thus saving time when time might mean the saving of human life, most of these physicians were still imbued with the pleasure car feature, expecting that it would afford them opportunity to get away from their work for indefinite periods during each day, thus giving a change and a needed rest. The result has been that they have increased their earning capacity by at least 100 per cent., by being able to answer more calls in a given time and to make visits in the country at a greater distance from the office.

These indefinite suggestions give a hint as to the possibilities of the so-called pleasure car as a business proposition. The average motorist has little conception of what the operation of his car is costing him, or how its maintenance compares with that of horses. In many instances it has been considered solely as a pleasure vehicle and as such of insufficient importance in a practical way to merit keeping an exact account of the expenditures. Presented herewith is a detailed statement of the cost of gasoline, tires, oil, repairs and overhaul charges on five machines operated by the water department of the city of Springfield, Mass., to the end of the last fiscal year. The length of time these cars have been in service is such as to give an excellent basis for comparison, and it is doubtful if a more complete set of figures of this character ever has been compiled for publication.

The first essential is to know something of the work these machines are called upon to do, and it will be found that with some of them this is decidedly more severe than in most lines of activity. The city of Springfield recently augmented its water supply by the construction of what is known as the Little River system. This involved the selection of a new water shed, and it was necessary to go some little distance from the city in order to secure one of sufficient possibilities, having in mind the future. The plans finally developed into the construction of three reservoirs, the Borden Brook, about 16 miles from Court square; Tunnel Mountain, 12 or 13 miles distant, and Proven Mountain, five miles out.

In the first place, all these various sites, and such others as might be considered available were surveyed. It ought to be mentioned here that the entire problem was under the direction of Chief Engineer E. E. Lochridge, although the specific work was done by assistants. This surveying was accomplished before permission to take the land was secured from the legislature, and very naturally dates back some years.

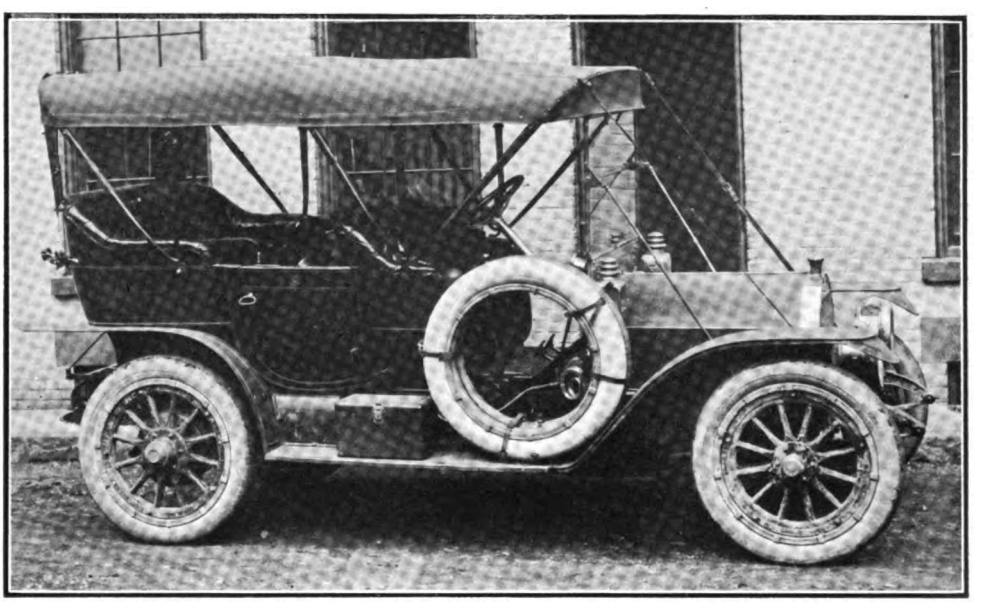
To go a little further into details: The Tunnel

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Mountain reservoir eventually was located on Little river, between two high hills, and a tunnel, practically one mile long, was driven from the dam to the filter beds. The topography of this section was such that the engineers were forced to climb over rough ledges and through virgin forests in laying out the line for the tunnel and preparing for the construction of the dam. A house on the future site of the filter beds was purchased and utilized as a field station. This was approximately 12 miles from the department headquarters, and it is easy to understand that the chief engineer was forced to find some ready means of communication between the two.

The Borden Brook site was selected on meadow land, reached after traversing some three miles of deep woods, where the roads ran up hill and down dale, and were typical of country districts of this character. Grass had been allowed to grow between the wheel tracks and the latter were badly rutted. In order to reach the point on Proven Mountain where the distributing reservoir was located, it was necessary to construct a new road. Previous to its completion an old woods trail with many steep grades was utilized.

In July, 1904, the water department purchased its first automobile, a two-cylinder air-cooled Knox, made by the Knox Automobile Company of that city. It was used to convey the engineers to and from the field stations, and by chief engineer as indicated.



Knox Touring Car Utilized by Springfield Water Department in Little River Construction Work.

Although the Tunnel Mountain work was that first brought to a conclusion, it readily may be seen that considerable time still had to be spent on the other contracts, in order that all should be made to progress in logical sequence.

This little car was forced to climb hills, over roads that were by no means designed for automobile use, hardly more than woods trails in most instances. While no speedometer was installed, a conservative estimate of the ground covered each day would be not less than 25 miles, and often Sunday trips were necessary. It can be seen that a horse and buggy could not be depended upon for such service, even had it been possible to keep three horses, using one while the others rested. The road conditions would have interfered.

In December, 1906, the work had progressed sufficiently to warrant the purchase of a second machine, and this time a Knox four-cylinder air-cooled touring model was chosen. This supplanted the older car in the chief engineer's favor, but "Sarah," as it had been nicknamed by the employees, was still utilized in department work, making frequent trips to Little river, and when not busy in this manner, running around town to look after the work in charge of Supt. A. E. Martin. After being in service nearly six years it was sold at the end of 1909.

The accompanying table shows that during this time it cost the department $668.27 for gasoline, $1020.54 for tires, $53.48 for oil, $981.84 in repairs, $335.60 for overhaul work at the Knox factory; a total of $3059.73. Assuming that it was used for 5.5 years, this makes an annual expense of approximately $550. That it was in a saleable condition at the end of the period is of particular interest.

It will be noted that the item of tires was by far the largest, but this is not at all strange when the nature of the roads over which it was called upon to operate is taken into consideration. By reference to the table it is discovered that this tire expense fell off materially as soon as the greater portion of its time was spent in the city.

The touring car purchased in 1906 received the brunt of the Little River work until January, 1910, when a more modern water-cooled machine of the same make was purchased. The former still continued to make frequent trips to the various contracts for a time, but was converted into a tool wagon for the superintendent and again placed in service in October, 1911. During its four years of use as a touring car it cost the department $480.41 for gasoline, $786.34 for tires, $83.18 for oil, $588.63 in repairs and $632.37 for overhaul work, making a total of $2570.93. Dividing this by four gives an average

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expense of about $640 for each year of service.

This was a five-passenger machine, and the new car which replaced it had a carrying capacity of seven persons. In the two years it has been in service it has cost $1580.19, or an annual expense of $790. Of this, $268.74 was for gasoline, $907.60 for tires, $44.17 for oil, $289.49 for repairs, and $70.19 for overhaul. It will be noted that the tire expense is much larger proportionately than with the two other machines. To gain the best information on this point, however, it is necessary to confine the comparison to the time in which each was employed exclusively on the Little River work.

The two-cylinder car was thus employed for 2.5 years at an average annual tire expense of $274.17. The average for the five-passenger car during its three years in the same service was $210.53, and for the seven-passenger machine, $453.80. It is noted in this connection, however, that the tire expense for this machine during 1911 was $555.48, practically double that for any one year with any other car owned by the department.

Tire equipment is an item from which it is not possible to secure the best comparison of results. In traversing such roads as these machines were called upon to undertake on this work one set of shoes might last much longer than another, simply because it was fortunate in escaping the dangers which the next encountered with surprising rapidity.

Perhaps a better method of comparison would be that of gasoline used, or repairs needed. In the matter of gasoline the two-cylinder machine had an average annual expense of $170.90, the five-passenger car $142.48 and the seven-passenger $134.37. The repair account shows the following: Two-cylinder, $282.41; five-passenger, $173.75; seven-passenger, $144.75.

Taking everything into consideration, the average annual expense of these machines in this work was: Two-cylinder, $769.05; five-passenger, $739.58; seven-passenger, $790.09. Leave the tire account out of the computation and the result is: Two-cylinder, $494.88; five-passenger, $529.05; seven-passenger, $336.30.

The department was so well satisfied with the machines that had been in service with the chief engineer, that in July, 1908, a Knox air-cooled runabout was purchased for the use of Supt. A. E. Martin in running about the city to look after the construction and maintenance work of the water supply there. This has had an annual expense of $290.98 for tires, $162.04 for gasoline and $752 for the total during its 3.5 years of use. This seems to compare very favorably with those utilized on the Little River work, and there does not appear to be any great amount of difference.

In April, 1911, a Hudson runabout was purchased for the assistant superintendent's use. As it had been in operation but seven months its figures are of but little service in making comparison with the others.

For the purpose of arriving at an average, it will be seen that the five machines have been in service a period equivalent to one machine for 15.5 years. This gives an average annual expense for each of the items as follows: Gasoline, $118.17; tires, $218.41; oil, $16.76; repairs, $194.28; overhaul, $109.58, and a total average expense of $657.20. Let it be assumed that the average cost of the automobiles was $3000, although it readily will be agreed that serviceable machines can be purchased for much less money. Inasmuch as it has been proven that the first car purchased was capable of giving at least six years satisfactory service, and they were thoroughly overhauled each year, an allowance of 10 per cent. for depreciation seems eminently fair.

The water department utilized no horse and buggy for this work, so it will be necessary to go elsewhere for figures on this class of service. An example will be taken from Springfield, and a firm in that city which utilizes 12 horses says the annual cost of feeding, bedding, etc., for one horse is $255.50. Shoeing adds $26 a year more, and repairs to harness and wagon $32.10. Horses are charged at $325 each, wagon at $150 and harness at $70. Depreciation is figured at 25 per cent. A comparison of costs, based upon the experience of the farmer who found that one automobile would do the work of three horses and leave time to spare for other duties, reveals the following:

Average Annual Expense with Horses.

Feed, etc., for three horses	$766.50
Rent	300.00
Shoeing	98.00
Repairs	32.10
Veterinary	24.00
Depreciation, horses, 25% on $975	243.75
Depreciation, wagon, 25% on $150	37.50
Depreciation, harnesses, 25% on $70	17.50
Interest, 6% on $1195	71.70
Total average expense for horses	$1591.05

Average Annual Expense with Automobiles.

Fuel	$118.17
Tires	218.41
Oil	16.76
Repairs	194.28
Overhaul	109.58
Depreciation, 10% on $3000	300.00
Interest, 6% on $3000	180.00
Total average expense for automobiles.	$1137.20
Balance in favor of automobiles	$ 453.85

So much for economy. In the matter of efficiency, there is no question that even with three horses it would have been impossible to duplicate the performance of the machines employed on the Little River construction work. The road conditions would have prohibited, even if the mileage did not. And it will be remembered that the farmer cited was compelled to keep a number of reserve animals in order to have satisfactory efficiency with his horse and buggy.

The figures presented by the Springfield water department are valuable because of their completeness. Everything has been included, but it is conceivable that these might be reduced somewhat by the owner who cared for his own machine. It is well known that in municipal work, the same personal attention

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is not given that would be the case with a private owner. Repairs and adjustments that would be turned over to a repair shop in the one instance undoubtedly would be looked after at home in the other, making a corresponding decrease in the annual expense.

There can be little question that the use of the so-called pleasure vehicle for business purposes can be made to show a remarkable saving in economy and efficiency over horse equipment, just as the motor truck has demonstrated its superiority in its legitimate field. The principal source of expense is in the matter of tires, and it will be noted that in the case of the machines included in the accompanying tabulations, one-third of the entire total was occasioned by these.

However, the total mileage covered is a matter for consideration in this connection. It has been stated that the average daily mileage on the Little River work was at least 25, and probably it was decidedly in excess of this. The cars used inside the city certainly would make the total average nothing less than that. Sunday trips were included, but basing the estimate on 312 working days, the annual mileage is not far from 8000. This would give a cost of 2.7 cents a mile, which is by no means excessive. This calculation is far from satisfactory, because it will be admitted that the estimate of mileage is undoubtedly too low.

NEW LUBROLEINE CONTAINERS.

The Fiske Bros. Refining Company, New York City, is calling the attention of dealers and motorists to the fact that in the future its well known motor greases, heretofore sold under the name of Climax Synovia, Cup Grease, Phoenixo Gear Case Lubricant and Centaur Graphite Grease, are to be marketed in new lithographed packages under the trade mark "Lubroleine," which is the brand of its well known high quality motor oils. This company recently issued the fourth edition of its booklet, entitled "The Mission of Lubroleine," which describes these various lubricants and gives valuable information essential to the motorist in his selection of the proper oils and greases for the various types of automobile and marine motors. This booklet is mailed free upon request.

ENGINEERS REMOVE HEADQUARTERS.

After May 1, the headquarters of the Society of Automobile Engineers, which is now located at 1451 Broadway, New York City, will be removed to the United States Rubber Company building at Broadway and 58th street The offices and meeting rooms will be on the 12th floor which is now in process of construction. Out-of-town members will appreciate the convenience of the central location of the new quarters, as it is close to the Columbus Circle subway station, and the Sixth Avenue Elevated line.

RICHMOND DEALERS ORGANIZE.

Nineteen automobile dealers in Richmond, Va., assembled in the rooms of the Automobile Club of Richmond last month and organized the Richmond Automobile Dealers' Association. One of the objects of the new organization will be the holding of a motor car show in that city next spring. The officers follow: President, L. M. Foster; vice president, Joseph F. Leonard; treasurer, D. W. Richards; directors, L. A. Folger, R. B. Allport, Mark R. Lloyd and Nixon Ball. The office of secretary was left vacant for the present.

WILL EXPLOIT COLE CARS.

The accompanying illustration is that of Homer McKee, who has been appointed to succeed Lucius S. French as general manager of the Henderson Motor Sales Company, Indianapolis, in full charge of the advertising of Cole cars. As is well known the Henderson company is general distributor for the product of the Cole Motor Car Company of that city.



Homer McKee, General Manager, Henderson Motor Sales Company.

Mr. McKee has been a writer of automobile copy for a number of years, and his work has attracted unusual attention at the New York and Chicago shows. His style is intimate and his understanding of the demands of the industry broad in its scope.

Furthermore, he has had extensive newspaper and magazine experience, and is recognized as one of the best known men in the advertising business, particularly with motor cars.

Few American machines have had the benefit of more efficient exploitation than the Cole. Mr. McKee brings to his new position, not only an intimate knowledge of his chosen field and the Cole car, but a wide circle of friends and acquaintances who will join in congratulating him and the Henderson Motor Sales Company upon his selection to carry forward this work.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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THE MASSACHUSETTS LEGISLATURE.

Apparently the Massachusetts Legislature is intent upon curtailing the market for commercial vehicles in that commonwealth. Hardly had those interested in the development of this market succeeded in convincing the legislators that it would be unwise to limit the weight of trucks operating over the highways in that state, before Governor Foss sent a special message asking that the fees for motor car registration be materially increased. The sub-committee to which thas matter was referred has prepared a bill, which seems even more imprudent than the other.

Not only is it proposed to increase the fees on so-called pleasure cars, but these increased fees are to be applied to motor trucks under a horsepower rating, according to the present conception of the bill. President L. R. Speare of the Massachusetts State Automobile Association very wisely points out the injustice of any such plan.

Irrespective of whether owners and manufacturers of industrial transports will agree with this association in the suggested substitute rating as to load capacity, it is manifestly more fair than that contemplated by the proposed legislation. Unless given careful and judicious study any proposition to compel motor vehicles to bear the full cost of needed highway improvement is bound to result in discrimination against an important factor in modern economics.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

JERSEY PAYS FOR RECIPROCITY.

Non-resident motorists are in danger of overlooking one important feature of the so-called Stickel bill, under the terms of which they are to be readmitted to New Jersey for 15 days in any one calendar year. While the people of that state will reap the benefits of reciprocity when visiting other commonwealths, it is worthy of consideration that they will be compelled to pay a registration fee 50 per cent. greater than formerly in order to make up the deficit which is expected to develop because of the loss from non-resident special licenses.

Naturally, motorists in other states are much elated over the successful outcome of an agitation which has been going on for five years. New Jersey has been so far without the pale of reciprocity that most other states have advanced materially in this respect during that time, still the 15 days which non-residents are to be permitted to use the highways of that state is perhaps the best that could be expected under the circumstances.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

BAR HARBOR'S SURRENDER.

The deep rooted prejudice against the automobile, which has existed in certain quarters, seems to have been overcome in a measure. Bar Harbor, Me., has decided to admit the motor vehicles at least to within half a mile of the postoffice. This in itself is a decided concession, in view of the determined opposition which was manifest a few years ago when the Maine Legislature passed the act that occupied the attention of the state supreme court for a time at the behest of certain summer visitors at this well known resort. It even is conceivable that the time will come in the near future when automobiles will be permitted to operate in all sections of Mt. Desert Isle and the town of Eden.

It is of interest in this connection that staid old Nantucket, in Massachusetts, is said to have purchased a piece of motor propelled fire apparatus. The orig-

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inal announcement of this information was met with the suggestion that it would prove difficult to overcome the provision of the state law, which not only forbids the operation of automobiles but prohibits their landing upon the island. Probably special permission will be secured from the Legislature now in session, and it is not unreasonable to expect that the residents will become so pleased with the vehicle that they will be desirous of securing the permanent repeal of the statute.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

MOTOR FIRE APPARATUS.

The automobile industry is of such recent origin that few realize its enormous growth until brought face to face with some particular phase of the situation. It is not many years since the first automobile fire apparatus was placed in commission, but today there are in America 300 cities and towns in which over 600 motor driven machines are utilized in extinguishing fires.

Wherever the newer equipment has been tried there has been splendid interest on the investment, not only in the matter of maintenance but through quick propulsion, and prompt and efficient work.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

RESULT IN NEW YORK.

It has been some time since the Legislature in New York State has had as many opportunities to pass bills inimical to the interests of motorists, and it is subject for congratulation that final adjournment was taken before any of these were enacted into law. As a result of strenuous work on the part of organized motorists, the obnoxious propositions were killed in committee, and two very favorable projects were passed. Reference is made to the bill providing for the submission to the people of a proposition to issue $50,000,000 in bonds for good roads work, and that providing that detours shall be maintained around state road work in progress of improvement or construction.

It is somewhat to be regretted that the attention of the legislators and motorists was so far taken up in defeating objectionable measures, that the bill providing for lights on all vehicles using the highways during the night season, patterned after the very successful statute in Massachusetts, was not reached. This was important legislation and it was hoped that New York would add its support in favor of this movement for the safety of the public.

Other legislatures have similar bills before them, which have not progressed very far beyond the hearing stage. It would appear that the example set by the organized motorists in New York should indicate to those of other states in which the Legislature is now sitting that they ought to take this matter up without delay.

Universal lighting and uniform laws are the prime necessities for safe and sane motoring.

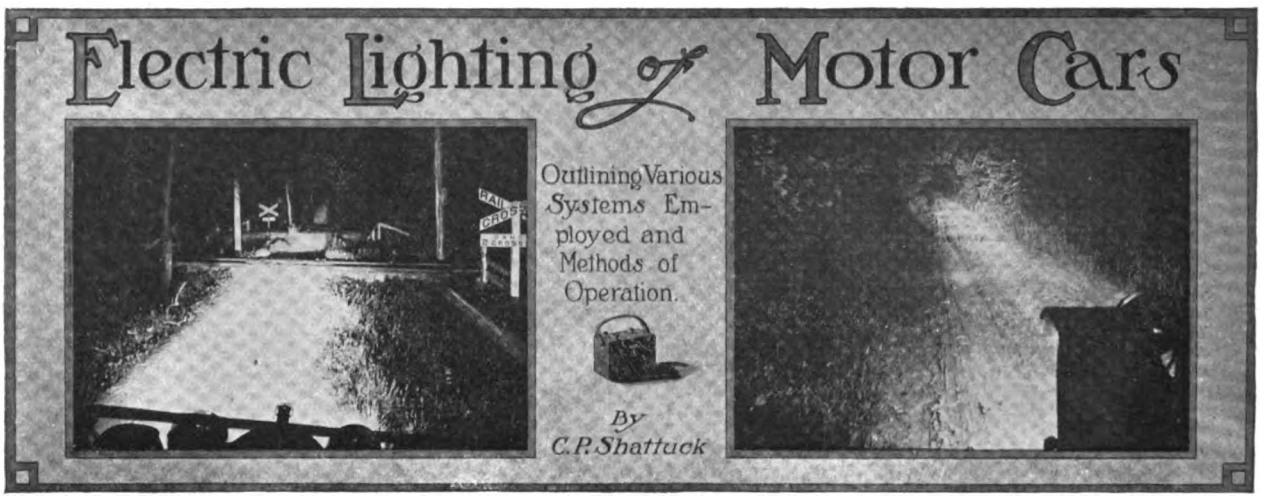
SEEING AMERICA FIRST.

There is decided merit in the resolutions passed by the boards of trade in the States of Utah, Wyoming, Montana and Idaho with respect to the opening of Yellowstone National Park for motor vehicle traffic. It is pointed out in this connection that should the national government follow the example of European countries, which give automobilists free access to all points of interest, American citizens would avail themselves of the opportunity to "See America First," thereby keeping millions of dollars in this country that otherwise would be expended in making annual tours abroad.

This is a phase of the situation which should appeal to the national government. As the matter rests at present, there is bound to be more or less disposition to question the right of any concessionary to monopolize the traffic of a supposedly public possession to the total exclusion of those who have the means and the inclination to enjoy these natural beauties in their own way. Transcontinental touring is bound to have a notable increase during the season of 1912, but the present policy in this situation assuredly is not encouraging Americans to spend their money at home.

Several of the states west of the Mississippi have become imbued with the doctrine of good roads, and while the citizens of these commonwealths are bound to reap the direct benefit of the funds thus appropriated, it is significant that they are doing their full part to encourage tourists from the eastern states. It is to be hoped that they will receive generous support from the national government, particularly as it is possible to grant such requests as that embodied in the resolutions to which reference has been made, without entailing any expense whatever.

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Part V—The Remy Combined Lighting and Ignition System.

IN CONSIDERING the installation of an electric lighting system, the size of the generator, its position and method of drive are important factors. With the present day automobile some manufacturers make provision for the operation of a mechanical current generator and its fitting is consequently an easy matter. There are, however, machines not thus equipped and the installation of a lighting system using a generator may call for alterations to the power plant.

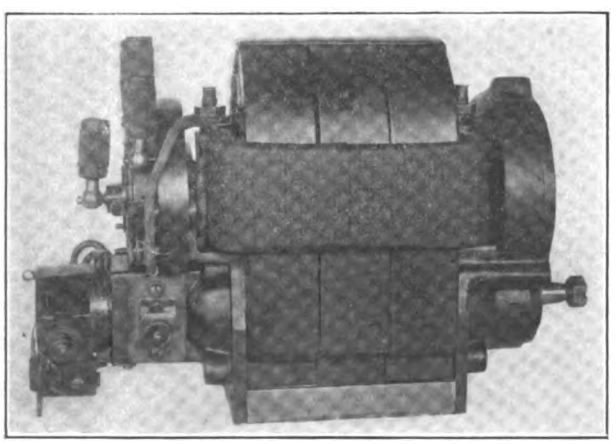


Fig. 31—Type B Remy Magneto Adapted to Four-Cylinder Motors, Outlining the Exciting or Field Coils Encircling Permanent Magnets.

In designing these systems the manufacturers have taken into consideration the fact that there are thousands of high grade cars in operation which have been in service one or more seasons, and while some of these lack the lines and equipment of the modern type, they are efficient and capable of meeting the requirements of the owner. And it is surprising to note that many of the machines are not fitted with a magneto, relying upon dry cells or storage batteries to furnish current for ignition.

While many of the power plants were designed so that a magneto could be fitted easily, the attaching and driving of an extra mechanical generator is a task which the class of motorists who equip their cars with modern appliances and perform the work themselves, hesitate to undertake because of the labor and expense that might be involved. To overcome this difficulty, combined ignition and lighting systems have been brought out, in which the magneto and generator are a unit yet operate independently of each other insofar as the two systems are concerned.

Features of System.

The Remy magneto light, made by the Remy Electric Company, Anderson, Ind., well known manufacturer of the ignition magneto of that name, is a combined system which furnishes a high-tension current for igniting the mixture in the cylinders and a constant source of low-tension electricity for the lamps, current to the latter being supplied by a mechanical generator when the motor is operating and by a storage battery when the car is at rest. The battery is floated on the line and is charged by the generator and by a clever, yet simple automatic regulator, the current cut in or out, this action depending upon the speed of the generator.

Provision is made in the dual ignition system for starting on the switch, and as a six-volt, 120-ampere storage battery, fully charged at all times, is utilized it is obvious that starting troubles due to a weak battery are eliminated. The system consists of a magneto, dash coil box, storage battery and a small distribution block with proper terminals for attaching the wires, also an auxiliary fuse block for attaching connections for an electric horn, speedometer, trouble or small lamps and electrical devices.

Two Models of Magnetos.

The magneto is produced in two models, that known as A being adapted for service on a six-cylinder motor, while B is utilized with four-cylinder power plants. The latter is depicted at Fig. 31 being similar in appearance to the usual Remy ignition

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magneto with the exception that the horseshoe magnets are surrounded by field or exciting coils. The magneto is a direct current generator providing a low-tension current, which when used for ignition purposes is built up or strengthened by a transformer coil unit, carried back to the magneto and to a high-tension distributor, and thence distributed properly to the spark plugs. The system operates independently of the lighting equipment insofar as the use of electricity generated is concerned and were it not for the fact that the current utilized to light the lamps also is derived from the magneto it could be classed as a separate and distinct system.

The features emphasized of the ignition system of the magneto are: That it will furnish a hot spark at all speeds and that the motor may be so throttled that it scarcely revolves; that, being equipped with a 70-degree timing range, greater flexibility is obtained, and that the device is mechanically correct and fool proof, requiring no other attention than oiling every 1000 miles.

The current generated is a low-tension direct for lighting the lamps and for charging the battery. This is collected from the armature by brushes and regulated by an automatic controller which holds the current at eight amperes.

There are three sets of permanent magnets, each set comprising four horseshoe members and these are depicted at Fig. 35 A, being shown with the field or exciting coils and their connections. The two inner magnets are shorter than the others and rest upon the top of the base end illustrated at B. These magnets are of the finest grade of tungsten steel, heat treated and hardened in the company's own furnaces by a special patented process.

Function of Armature.

Attached to the base member are two pole pieces and within these is mounted an armature, which is

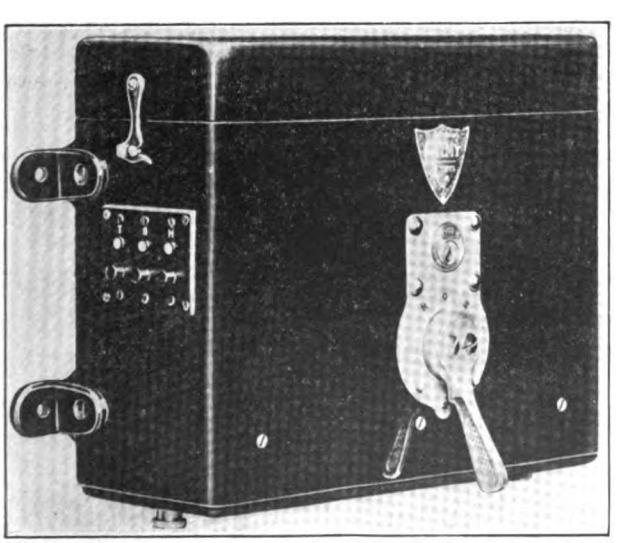


Fig. 32—Depicting Mahogany Coil Box, Kick Ignition Switch and Push Buttons on Side Controlling Electric Lights.

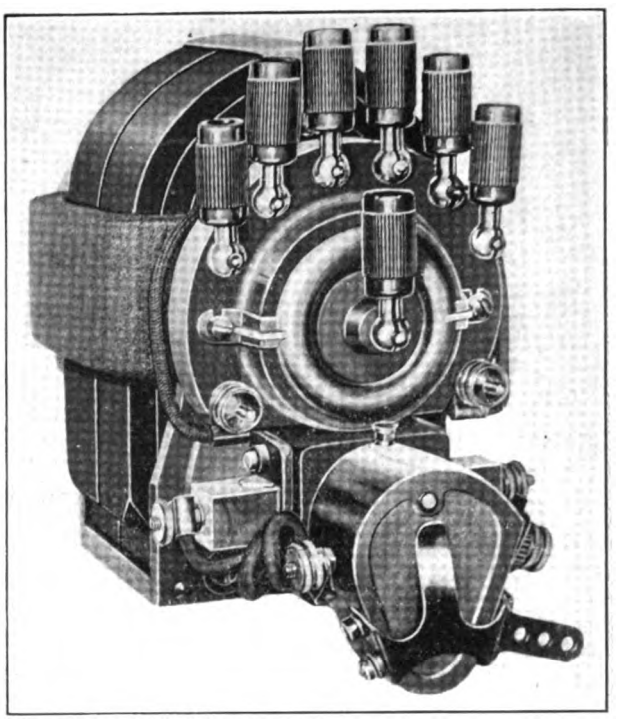


Fig. 33—Type B Remy Magneto Utilized with Six-Cylinder Motors.

illustrated at Fig. 36. This armature is drum wound on a laminated iron core and revolves freely upon ball bearings. It will be noted that one end of this member, which is made of the finest steel and ground accurately to size, has a taper shaft, cut for a Woodruff key, this arrangement making for absolute security of the gear rotating this member. Another gear is integral with the shaft and operates the distributor gear located above it. The armature is wound by a special process and the wires are treated by a compound, rendering them water, heat and oil proof.

The commutator is of liberal area and upon this member rest spring actuated brushes, the function of which will be explained later. Attached to the end of the armature shaft is a cam operating a cam lever and spring, which moves freely within a housing.

Distributor and Circuit Breaker.

Mounted over the armature and separated from it by a plate is a distributor shaft having two bearings. On one end of this shaft is fitted a gear which meshes with another gear on the armature shaft and both members are fully protected by a dust and moisture proof housing, and means are incorporated for oiling. At Fig. 34 B is depicted the distributor shaft and the carrying member, also the distributor, which is constructed of a heat resisting insulating material. Attached to one end of the distributor shaft is the distributor segment, this member being indicated by arrows for the purpose of noting in which direction the shaft is revolving and for facilitating the timing of the ignition.

The distributor housing is fastened to the frame

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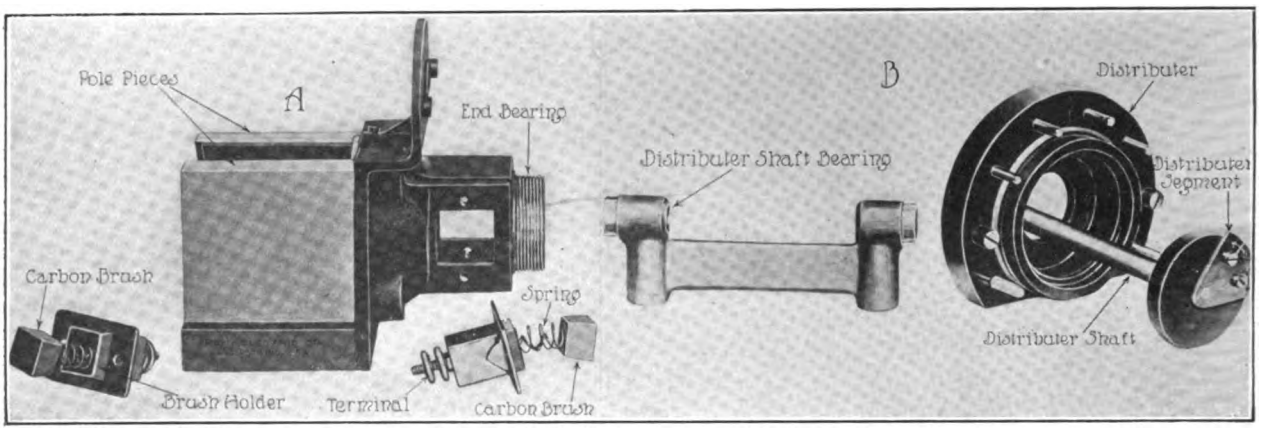


Fig. 34—Components of Remy B Magneto: A, Pole Pieces, Base End Bearing and Carbon Brushes; B, Distributor Shaft and Bearing, Brass Segment and Distributor.

of the magneto and access to it is by means of a lid, spring retained. A spring actuated distributor brush is connected to a secondary terminal to which is attached the wire leading from the transformer coil.

Mounted upon the armature shaft is the cam housing, shown at Fig. 35 B. This is a V shaped lever, pivotally mounted and carries a spring tipped with a platinum point normally in contact with another platinum point integral with an adjustable screw which is insulated. As the cam revolves it causes the normally closed contact points to separate twice during one revolution of the armature shaft, breaking the primary circuit. This circuit breaker device is so mounted that the housing may be moved to and fro by means of a lever integral with it and connected by a rod with the lever on the steering wheel. This is called advancing and retarding the spark; that is, the points are made to separate earlier or later, as desired by the operator, and as a 70-degree timing range is provided it is obvious that a greater flexibility of the power plant is obtained.

In practise the low-tension current, either from the magneto or battery, is allowed to flow until interrupted by the separation of the contact points, which movement induces a high-tension current in the transformer coil. This current is led back to the secondary terminal in contact with the spring actuated brush and distributed by means of the rotating segment to the proper plugs in turn.

Lighting Current.

With any mechanical generator utilized to charge a storage battery the current must be direct or if an alternating current be employed it must be transformed into direct by the use of a rectifier. A direct current is uniform in strength and direction, while an alternating one rises rapidly from zero to maximum, falls to zero again, reverses its direction, attains maximum in the new direction, and again returns to zero. After the flow of a current has been established the only opposition to movement is the resistance offered by the conductor to the passage of the current through it.

The direct current generated by the Remy instrument is collected by two large carbon brushes fitted accurately to the commutator surface of the armature. These members are depicted at Fig. 34 A, and it will be noted that the carbon blocks are contained in holders which fit into a recess in the end

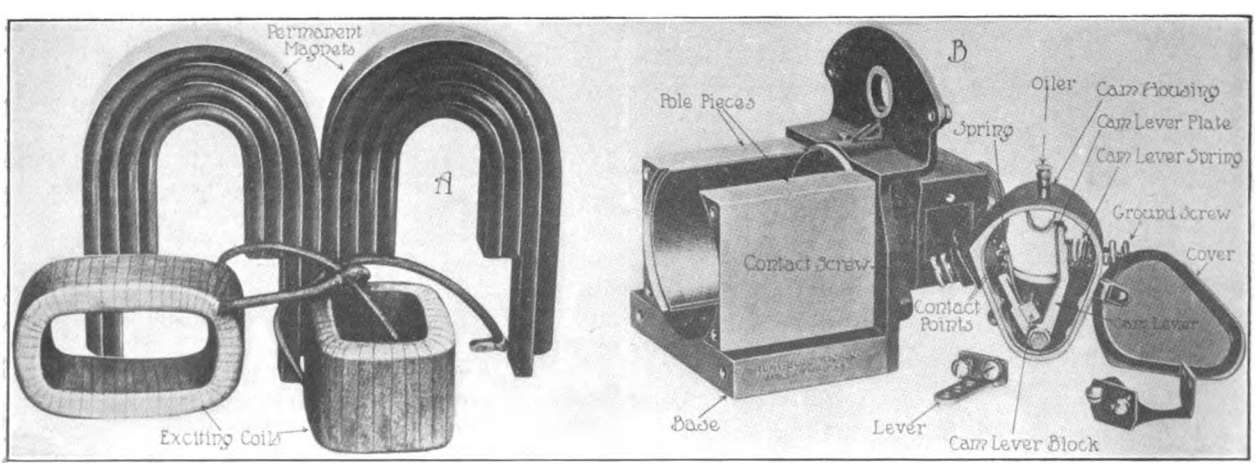


Fig. 35—Components of Remy B Magneto: A, Permanent Horseshoe Magnets and Exciting or Field Coils; B, Base, Pole Pieces, End Bearing Circuit Breaking Device and Cam House Cover.

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bearing member. Connecting the terminal screw and brush is a spring which keeps the brush lightly but firmly in contact with the surface of the commutator, and a flexible cable is firmly attached to the brush and brush holder, insuring a positive connection.

Control of Electricity.

As the armature shaft is driven at crankshaft speed, it is obvious that the number of rotations varies. It may revolve at the minimum when the motor is operating slowly or at an exceedingly fast rate when the automobile is being driven at say, 40 to 60 miles an hour, and it is obvious that the amount of electricity generated by the magneto will vary correspondingly. If the current were led direct to the lamps and no means provided for its control, the lights would be dim at low and bright at high speeds and their value as an illuminant impaired, since in motor car lighting a steady light is desirable.

To secure efficiency from the bulbs a current of proper strength must pass through the filament and this flow must be steady. When the current is in

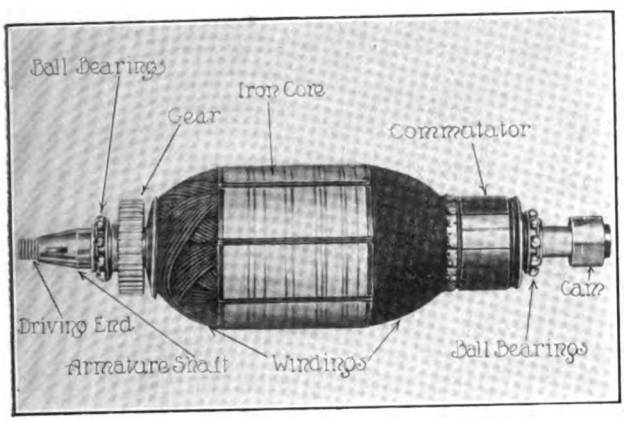


Fig. 36—Drum Wound Armature Which Runs on Ball Bearings and Which Carries Circuit Breaking Cam.

excess of the capacity of the filament the latter is destroyed or burnt out. Also, if the electricity were led to the storage battery it would have an injurious effect upon the plates of that number.

In the Remy system the amperage is held constant by automatically varying the current in the shunt wound, exciting or field coils around the magnets, thereby increasing and decreasing the intensity of the magnetic field to compensate for the varying speed of the magneto armature.

Automatic Regulator.

The current is held at eight amperes by the automatic regulator depicted at Fig. 38, which is located inside the coil box, shown at Fig. 32. This regulator is a carbon arrangement consisting of 10 carbon discs, one inch in diameter, held in place by four posts, but so arranged that they move freely; that is, they may be separated or held together closely, according to the movement of the armature member. The latter is pivotally mounted and actuated by an electro-magnet which has a series winding.

This acts at approximately eight amperes. That

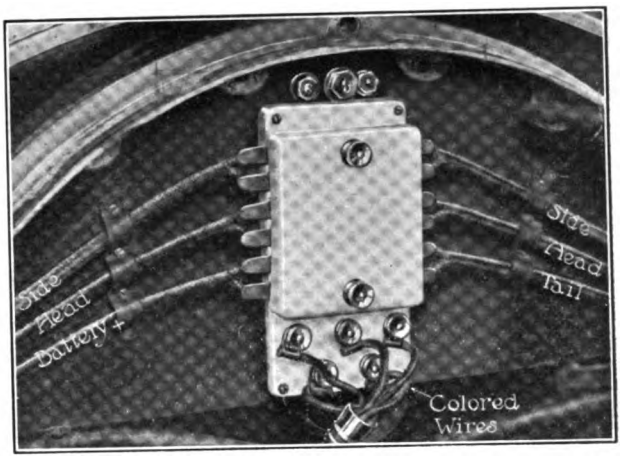


Fig. 37—Distribution Block Installed on Engine Side of Dash with Five-Way Cable Leads Attached.

is, the armature of the electro-magnet will pull down or overcome the resistance of the spring normally holding the member up when there are eight amperes flowing through the series coil. When these discs are in a normal position or compressed together there is little if any resistance to the current flowing, but when the pressure is released and the discs separate, the amount of resistance increases proportionately, this action being similar to that in a telephone transmitter.

The carbon discs are in series with the field winding of the magneto, and whenever the current through the field winding is decreased the magnetic flux is weakened, thereby reducing the electricity generated. The action is that of a field magnet, the field being weakened whenever the output reaches eight amperes. Should the motor of the car be throttled down below a speed sufficient to generate eight amperes, the electro-magnetic pull on the armature lessens, increasing the pressure on the discs. This makes a

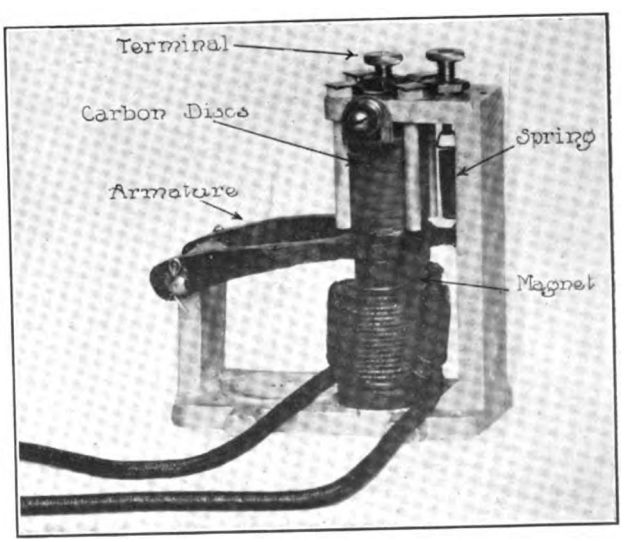


Fig. 38—Automatic Regulator Which Holds Current at Eight Amperes and Which Is Located Inside of Coil Box.

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closer and closer connection until the carbon is practically a solid conductor, carrying all the field current. The instant the output of the magneto is not sufficient to carry the load, the storage battery supplies the required current, and this battery is automatically charged when the motor is running.

Storage Battery.

A six-volt, 120 ampere-hour storage battery is a part of the quipment, and this member is specially designed to meet and withstand successfully the hard service required of it on an automobile. It is adapted to the magneto and is constructed in two sizes, and may be placed upon the running board or suspended under the seat. The dimensions of the smaller member are, approximately, 10 by 7.5 by 14 inches. Those of the larger battery are 15 by 7.5 by 9.5 inches.

The dash coil box is of solid mahogany, highly polished and is provided with an ignition kick switch having three positions, namely, starting, off and running. When the lever is thrown into the starting position, current is furnished to the transformer coil through a vibrator and a stream of hot sparks passes between the points of the spark plug in the cylinder about to fire. When the motor is started the lever is moved over to the running position, which disconnects the vibrator, and current is then supplied by the magneto.

On the left hand side of the coil is located the lighting switch. This consists of two rows of three push buttons, the upper members being white and the lower black. The former light the tail, side and headlights and these may be used separately or in groups as desired. To extinguish any group a black button is operated. An individual Yale lock is incorporated in the coil box enabling the operator to lock the ignition securely, and two keys are furnished with each equipment.

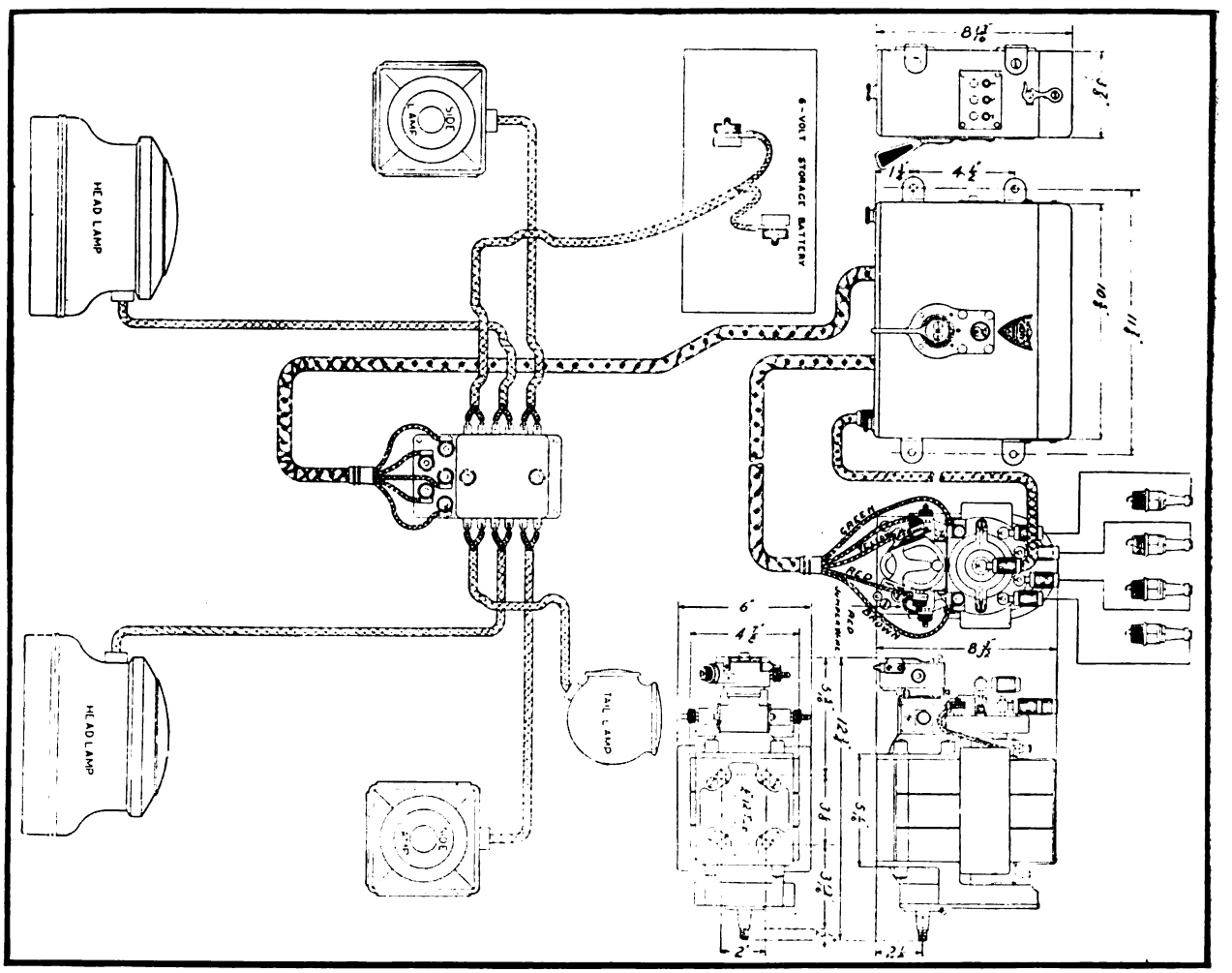


Fig. 30—Depicting Wiring Diagram for Model B Magneto—Each Wire Is Colored and Corresponds with Terminal of Similar Color, Making for Simplicity and Proper Installation of System.

Simplicity of Wiring.

One of the features of the Remy combined ignition and lighting system is the simplicity of the wiring. All of the leads are colored differently as are

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the connecting terminals and it will be seen that it is impossible to install the system incorrectly. Where there is a multiplicity of wires these are conveyed in cables and one of these members leads from the coil box to the magneto and another to the distribution block. The latter is installed on the engine side of the dash and its terminals are so plainly marked that proper connections are made easily. This member is depicted at Fig. 37 and it will be noted that it is substantially constructed and occupies but little space.

As previously pointed out, the magneto may be operated in either direction, clockwise or anti-clockwise, this arrangement also simplifying installation. The magneto is gear driven, and a feature emphasized is that it has only one adjustment, that of the contact screw of the timer, which is so designed that an accurate adjustment is made easily, and it will not jar loose from its position.

Care and Attention.

The cams are constructed of chrome nickel steel, ground accurately to size, both inside and out, and fit the shaft perfectly. They are hardened in a special furnace equipped with a pyrometer. All cams are uniform in weight, size, shape, strength and wearing ability, and with a few drops of oil are claimed to possess enduring qualities. The cam and cam plate are lubricated by means of a felt wick and this requires attention but once a season. Four oilers are fitted to the magneto and these require but a few drops every 1000 miles.

At Fig. 39 is presented the wiring diagram for the model B magneto and the best cable is employed throughout. The connections are clean, neat and firm, insuring reliability. The output of the magneto is such that in addition to furnishing current for ignition it permits the use of lamps of large candlepower. The use of 16 candlepower lamps, of 2.5 amperes each, is recommended for the headlights and two candlepower bulbs for each of the side and tail members. An auxiliary fuse block for connecting leads for horn, speedometer or other lamps or electrical devices is furnished if desired.

The Remy magneto light is absolutely guaranteed as to the service it will render and the quality of materials used in its construction. Every machine is tested before it leaves the factory and a feature of the Remy Electric Company is its service department with its corps of specially trained experts. Branch houses are established in all of the leading automobile centres enabling the user of Remy products to receive prompt and efficient attention, and these stations also carry a full line of parts and supplies.

(To Be Continued.)

NEW ENGINEERING FIRM.

Announcement is made that Henry F. Donaldson, president of the Society of Automobile Engineers, and Joseph Tracy, a well known consulting engineer in New York City, have associated themselves as automobile engineers to undertake consultation, research and development work, design and construction, laboratory and road tests. For the present headquarters will be maintained in the office already established by Mr. Tracy at 116 West 39th street, New York, and the testing laboratory in New Jersey will be retained as heretofore.

SUCCESS WITH LENOX CARS.

Few young men have had better success in the sale of automobiles than William Blanchard, who has just been promoted to become sales manager for the Lenox Motor Car Company, 3368 Washington street, Boston, Mass., maker of Lenox cars. He has been associated with this concern less than a year, and during that time has demonstrated his remarkable ability along this line.

Mr. Blanchard has been connected with the motor car industry for the past five years, and has a wide circle of friends and acquaintances, particularly in the New England states. Undoubtedly, a large measure of his success is traceable to this fact, although he possesses personal qualities which make him one of the best salesmen in this district.

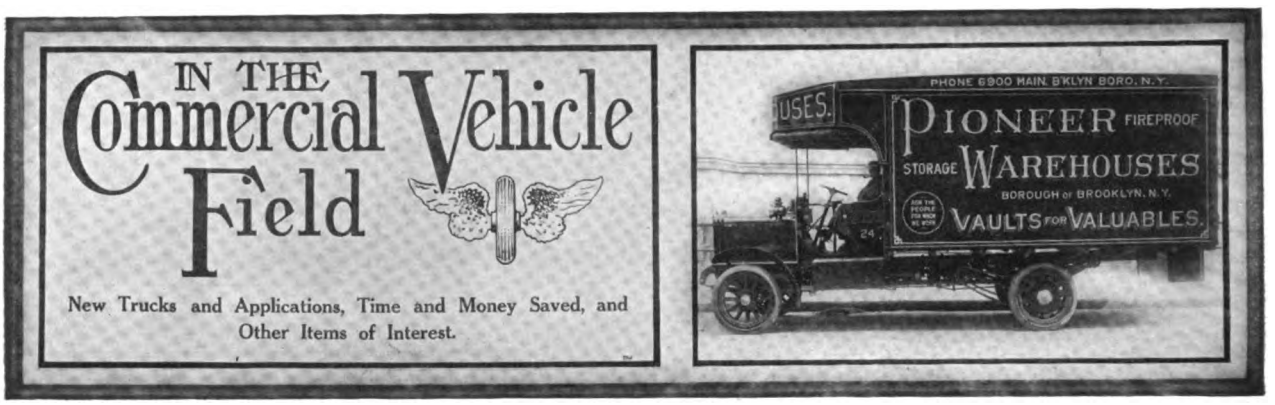


William Blanchard, Sales Manager, Lenox Motor Car Company.

Perhaps the greatest secret of all is his thorough familiarity with the construction of an automobile. He gained his rudimentary knowledge of motor cars with the Easton Machine Company, Easton, Mass., maker of the Morse car. Here he worked in every department, serving his full time at the bench and in the shop. It was while acting as salesman for Morse cars that the Lenox company induced him to undertake the exploitation of the Lenox line.

Peoria Club Organized—The motor car owners of Peoria, Ill., have organized the Peoria Automobile Club, with the following officers: President, E. J. Case; vice president, W. C. Collins; secretary and treasurer, Charles E. Ulrich; directors, W. E. Hull, H. C. Roberts, R. H. Johnson, Carl Block, Dr. F. B. Waugh, H. B. Pinkerton, H. G. Herget, S. K. Hatfield and S. L. Nelson.

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THE HANSEN GAS TURBINE.

In an effort to secure more power, less weight, elimination of noise and reduction of complications several inventors have been engaged upon the problem of the gas turbine for some time. The progress has been rather less noticeable in America than abroad, but it is worthy of mention that some degree of success has been attained. This is particularly true of the design perfected by Friedrich Hansen of Hamburg, Germany, who feels justified in announcing that he soon will be able to offer to the automobile industry a thoroughly tested, practical motor of this type.

It will be understood in the first place that there

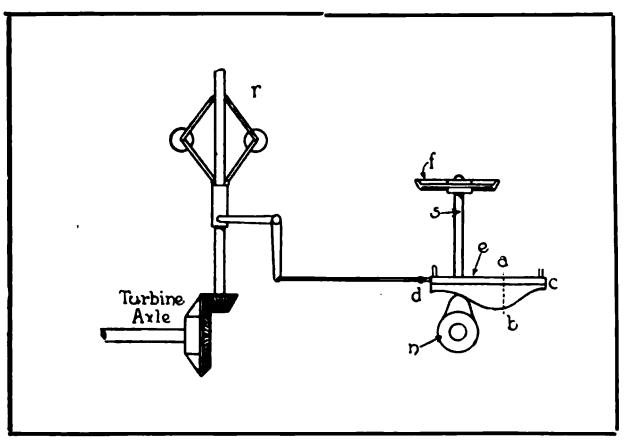


Fig. 1—Regulator for Controlling Charge in Gas Turbine.

are several difficulties to be overcome in the construction of a practical gas turbine. The experiments thus far made may generally be classed under two somewhat distinct branches of design, one based upon the principle of a continuous burning of the gas and air mixture within a closed chamber, by means of which the gases are expanded and forced to and through the turbine wheel, and the other on the principle of the explosion chamber, in which the mixture is exploded at rapid intervals. The first is the simpler and has been the subject of much study, although the second appears to have been the more successful.

The Hansen turbine, shown in accompanying illustrations, is of the latter type and is of what is known as the multiple explosion chamber design, in which the three cylinders are assembled in such manner that they constitute one revolving chamber. Among the difficulties presented with this type is that of the rapid valve action necessary immediately after the explosion, and it has been found that only the automatic inlet valve can be used.

How It Operates.

The operation of this type of gas turbine is as follows: By turning the turbine wheel by hand a number of times, air is forced through the explosion chamber, valves and flanges of the turbine wheel. After a sufficient number of turns, the gas valve will open and fuel will be drawn into the chamber, forming an explosive mixture. Immediately after the gas valve is closed the spark plug will ignite the mixture, which expands and closes the air valve. The two valves are located one within the other, and as soon as the pressure of the expanded gas has left the cylinder, they will open again and a new charge of gas and air is taken in. This fresh charge not only possesses the advantage of driving the remainder of the old charge into the wheel, but it also has the effect of cooling the chamber and valves, which otherwise would become too hot for continued use.

It will be seen that the conditions surrounding the use of the automatic inlet valve here are much different than in a gasoline motor of the piston reciprocating type, since in that case it is closed by the compression stroke of the piston. In the turbine, this compression does not exist, and the valve must be closed entirely by the pressure of the explosion, and the greatest difficulty lies in that these valves generally are too heavy and complicated in design to be able to close with a speed equal to that of the exploded gas.

Engineer Hansen claims to have overcome this difficulty, as well as to have solved the problem of proper regulation of the gas and air mixture with reference to the different speeds of the motor. In this latter device, Fig. 1, a sliding member e with a cam shaped lower face is interposed between the valve spindle s and a cam n. This sliding member is operated by the regulator r, which is in turn driven by the turbine shaft.

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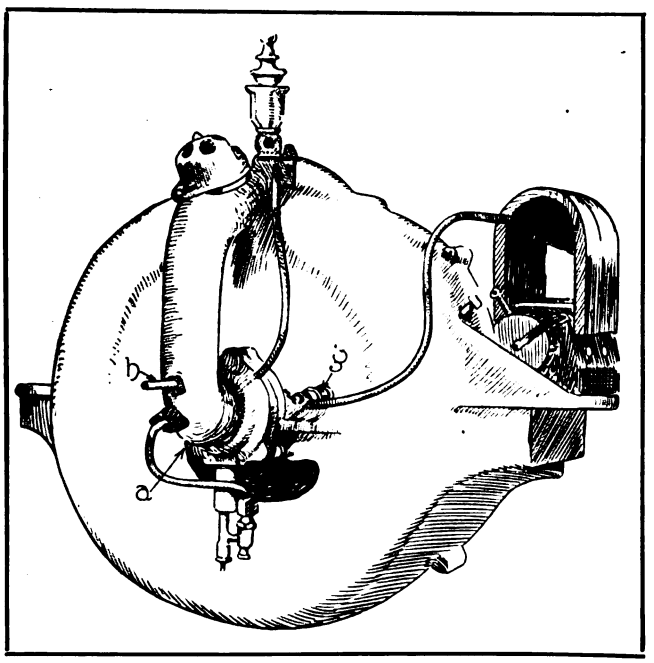


Fig. 2—Inlet Side of Gas Turbine Constructed by Friedrich Hansen of Germany.

The proportions of cam surface on the member e represent the different openings of the valve. The portion of this cam to come between the spindle and cam n at the highest speed of the motor and therefore at the greatest opening of the valve, is represented by the dotted line a-b. From b to c represents a movement of the sliding member when the speed of the turbine has exceeded the normal, in which case the valve opening would be reduced or entirely closed. The curve from b to d indicates the various openings for empty running and for normal revolutions.

Details of Construction.

Referring now to Figs. 2 and 3, it will be seen that provision is made for the admission of air and fuel, the latter being either gasoline or kerosene, through the specially contrived valve in the axle of the turbine, this mixture being forced into the explosion chamber through a spray pump a. The explosion operates in reaction valve reversing chambers, passing through the flanged wheel to the open air at the exhaust tube e, seen at the bottom of the casing in Fig. 3. The spark plug f is used for firing any gas which may escape in the casing of the flanged wheel when the turbine is being started. Spark plug g constitutes the point of friction contact which conveys the firing current to the friction points of the spark plugs fixed to the explosion chambers, as they revolve with these chambers past the plug g.

The rapid revolutions of the chambers, assisted by the ventilator which also revolves with the main axle, generates a forceful air current which has proven sufficient to keep the power plant cool and in good working condition. The cooling air, which has a pressure of a 24-mm (.94-inch) water column at a turbine speed of 1200 revolutions a minute, is exhausted from the tube h. For the purpose of allowing this cooling air to circulate through the parts, the axle is hollow and connected with the explosion chambers at three points only.

At first, the air which was heated by its circulation through the turbine, was used for the fuel mixture as well, but it was found that cold air must be employed for this purpose, owing to the fact that the hotter was the air the lighter was the fuel mixture. The much greater expansion of the cold air on entering the chambers added materially to the power of the engine, and it was only after making use of this that practical results were attained.

It is anticipated that this type of gas turbine will find its utmost practicability in heavy duty vehicles, and the fact that it will operate on kerosene as well as gasoline is expected to make its success even more assured. The matter of transmitting energy will have to be given serious consideration before the gas turbine will be accepted generally, but it is suggested that this may be overcome by the use either of electricity or oil hydraulics.

AVAILABLE FOR LIGHT DELIVERY.

Among the manufacturers of commercial vehicles who have turned their attention to the production of light delivery wagons is the Available Truck Company, Chicago, which makes the Available truck in two sizes, of 1500 and 2000 pounds capacity, respectively, and with a wide variety of body designs. An accompanying illustration presents the larger of these two chassis fitted with open grill body.

Particular attention has been paid to the matter of power plant, the motor in each of these models be-

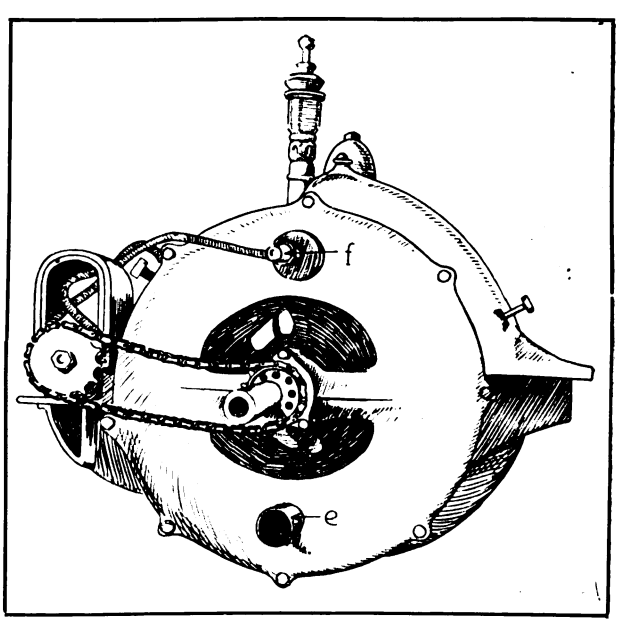


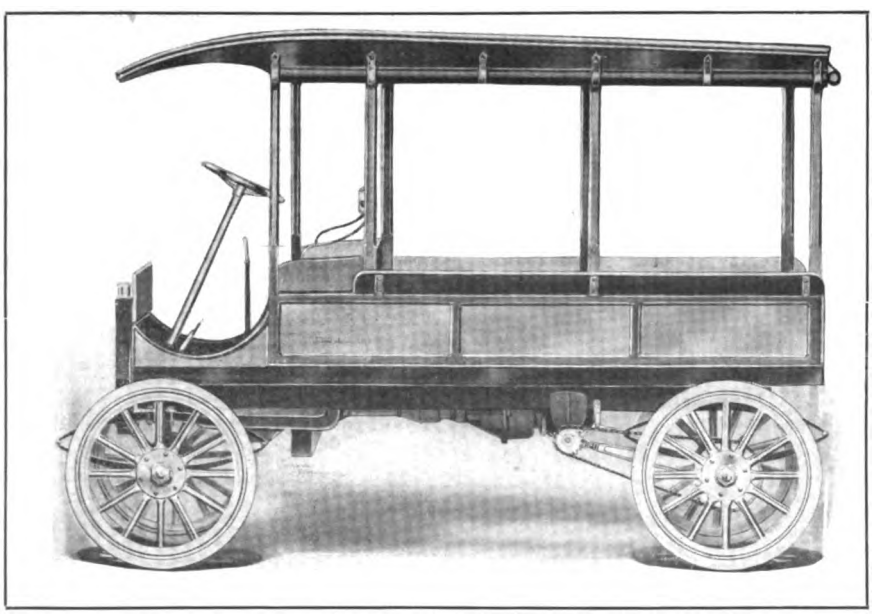
Fig. 3—Exhaust Side of Hansen Turbine of the Multiple Explosion Chamber Type.

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ing designed especially for the work which it is called upon to accomplish In the smaller car, the engine has a bore of five inches and a stroke of four, being of the water-cooled, two-cylinder, four-cycle type. The connecting rod bearings are of brass, babbitt lined, while the other bearings are of Parsons' white brass.

The oiling system comprises a reservoir of 2.5 gallons capacity, located in the crankcase, from which the lubricant is circulated by means of a centrifugal pump driven by the camshaft. The radiator is of the square tube type, extra large, and is guaranteed to keep the motor cool at all times. The drive is by shaft to the jackshaft, thence by two Diamond roller chains to the rear wheels. The transmission is planetary, and is a unit with the jackshaft. Both sets of brakes are located in the rear wheels, the emergency members being of the expanding type and the service, contracting.

The larger model is similar in design, but is made heavier throughout. The motor has a bore of 3.25 inches and stroke of four, and employs the same circulating oiling system. The brakes consist of 10-inch service members on the jackshaft and 12-inch emergency brakes on the rear wheels.



Available Light Delivery Wagon of One Ton Capacity, with Open Grill Body.

In keeping with the demand for some method of regulating the speed of the truck in the hands of the operator, a centrifugal governor is fitted on both models. This is directly connected with the butterfly valve in the intake valve just above the carburetor, and when set to any certain speed it is impossible for the driver to exceed that limit without the knowledge of the owner.

A particular feature of the Available equipment is in the matter of tire size. Wheels are 34 inches in diameter and solid rubber tires are fitted. On the smaller vehicle an option of two or three inches is allowed as to cross section. With the larger model this choice is from 2.5 inches to four.

The maker has found that the vehicle shown herewith has made a decided appeal with the furniture concerns, and has arranged to provide a standard body for this purpose. This has a loading space of 44 by 108 by 24 inches, with a 22-inch tail gate, which extends the available length to 10 feet 10 inches.

MOTORS IN PATAGONIA.

Those who are interested in the exploitation of southern Patagonia, which has been developed as a rich farming country, are deeply concerned with motor haulage, although it has been difficult to find machines that were thoroughly suitable for the work. Unfortunately, the first American machines which were taken to this country proved too light in construction to make their service satisfactory over the rough roads. Four other machines, all of foreign construction, are employed as tractors with fair success. The Sociedad Explotadora de Tierra del Fuego is utilizing steam vehicles on its Ultima Esperanza section and one steam and one gasoline machine are operating between the ranch and Rio Gallegos and Guer-Aike, a distance of 21 miles, the first hauling seven tons and the second, loads up to 25 tons.

It is said that this field offers an excellent market, inasmuch as it is impossible to employ bullock teams, owing to the scarcity of grass. This condition seems strange, when it is learned that other crops grow easily, and the farmers of that section are anxious to obtain some satisfactory means of hauling their products to market. Road conditions offer the principal obstacle to satisfactory motor haulage.

PEERLESS TRUCK PROVES SATISFACTORY.

An excellent example of efficiency in a commercial vehicle has been demonstrated by the Peerless three-ton truck, made by the Peerless Motor Car Company, Cleveland, O., and in service with the M. Sweeney Company, Fall River, Mass. This machine has been operated practically night and day with two shifts of men for more than a year, and has travelled over 9000 miles.

During the day it is employed in general trucking and moving household goods. On Sundays, in the summer, passenger seats were fitted and it took excursionists to beach resorts. During the strawberry season it regularly carried two truck loads of berries to Providence, R. I., each night.

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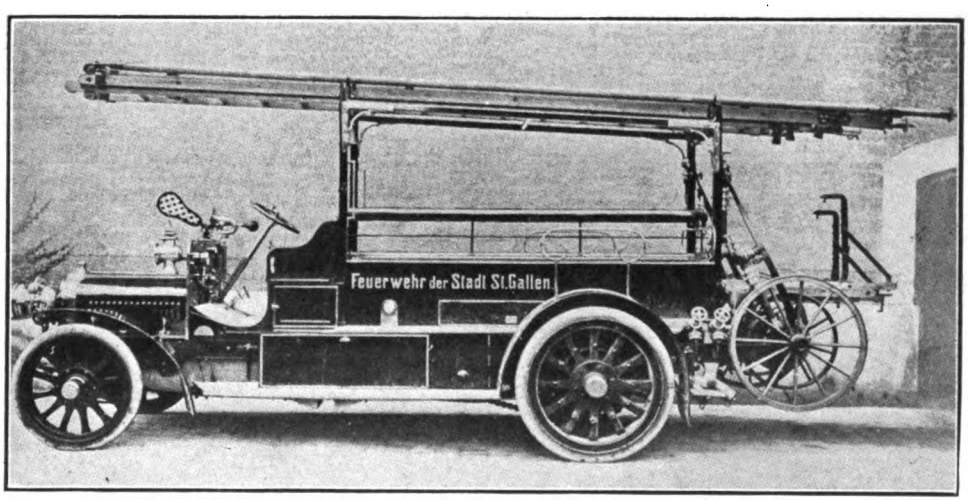
It is claimed that the first tire renewal was a new rear set at the end of 9100 miles. The owner is so well suited with its performance that a duplicate order has been forwarded to the Peerless company.

SAURER FIRE APPARATUS.

During the progress of the commercial vehicle show in the Madison Square Garden, New York City, the International Motor Company of that city announced that the Saurer fire apparatus, which has given excellent satisfaction in Europe, would be manufactured by it at the Saurer plant in Plainfield, N. J. The vehicle on display at that exhibition was a combination wagon carrying a pumping engine, similar to that shown in the accompanying illustration and in service at St. Gallen, Switzerland.

Since the show, this vehicle has been subjected to numerous tests in various parts of the country. In one of these tests at Broad Brook, N. J., recently, it was called upon to deliver water through six lengths of fire hose in competition with the steam fire engines in use there. When connected to a city hydrant, where the water pressure was about 65 pounds, the pump drew down to less than 30 and raised the pressure at discharge to 136 pounds.

The vehicle is propelled by a 60 horsepower motor. The pump is of the centrifugal type, and is said to be capable of delivering 500 gallons of water a minute at a pressure of 150 pounds. Two suction connections are provided for the purpose of taking water either from a hydrant or a stream. The pump is located at the rear of the chassis and is controlled by a hand lever.



Saurer Pumping Engine in Service at St. Gallen, Switzerland, Duplicates of Which Are to Be Constructed in This Country.

CARTERCARS FOR FIRE CHIEFS.

Inasmuch as Detroit is regarded as the centre of the motor vehicle industry, it follows when a manufacturer sells a motor car in that city it must be sold on its merits. The competition is keen, and those whose plants are located outside the city are forced to produce machines which are able to withstand severe tests if repeat orders are to be expected.

Seven years ago the Detroit fire department selected two friction driven Cartercars, made by the Cartercar Company of Pontiac, Mich., for the use of its district chiefs. They have been employed steadily for seven years, being subjected to severe usage, and have fulfilled every requirement so well that the department has purchased five more for same purpose.

INTERESTING KNOX FIGURES.

An instance of a six-ton Knox truck, made by the Knox Automobile Company, Springfield, Mass., paying for itself in less than a year is cited by Charles F. Barrett, assistant sales manager of that concern. The owner was a large trucking concern in a western city, which had a contract for the removal of the city garbage, refuse, etc., three miles outside to a reduction plant in the outskirts.

For five years this work had been done by horses, and as the company was contemplating the installation of mechanical transports, accurate account of the cost of operating was kept. It was found that in order to do the work successfully with horses, it was necessary to employ five two-horse teams each of three tons capacity. Four of these teams made three round trips daily, or 18 miles, while the fifth made four trips or 24 miles. Each of the five teams alternated in making the extra trip. With this arrangement, which was found to be the most economical, the daily cost, including drivers' wages, repairs, depreciation, interest, etc., averaged $6, or a total for the five teams of $30.

The company purchased a Knox six-ton truck, fitted with 50 horsepower motor, and was able to move the entire 48 tons of refuse in a working day of 10 hours, supplanting the five two-horse teams and their drivers. Very liberal allowance was made for tire repairs, depreciation, wages, etc., and the daily cost figured out close to $15. It thus effected a saving of $15 a day, without any loss in efficiency, or actually paid for itself in 347 working days.

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A LIBERAL GUARANTEE.

Prospective purchasers of motor trucks are much interested in the written guarantee supplied by the maker when making a sale, and it may be said that many manufacturers have given this subject extended study. Naturally, the tests to which the vehicles are subjected before being placed upon the market enter into the consideration of this feature. The Jarvis-Huntington Automobile Company, Huntington, W. Va., maker of the Jarvis-Huntington line, has gone a step further than some manufacturers in this regard, and presents the following guarantee, which is expected to make an appeal to the man who is investigating the subject of motor haulage:

"We guarantee our trucks against defective material and workmanship for 10,000 miles, to the extent that we will furnish, free of charge, new parts in exchange for defective parts, provided said defective parts are returned to us, charges prepaid. This guarantee does not apply to tires, electrical equipment, wear and tear, accidents or misuse of trucks.

"JARVIS-HUNTINGTON AUTOMOBILE CO."

SELLS TAXICAB BUSINESS.

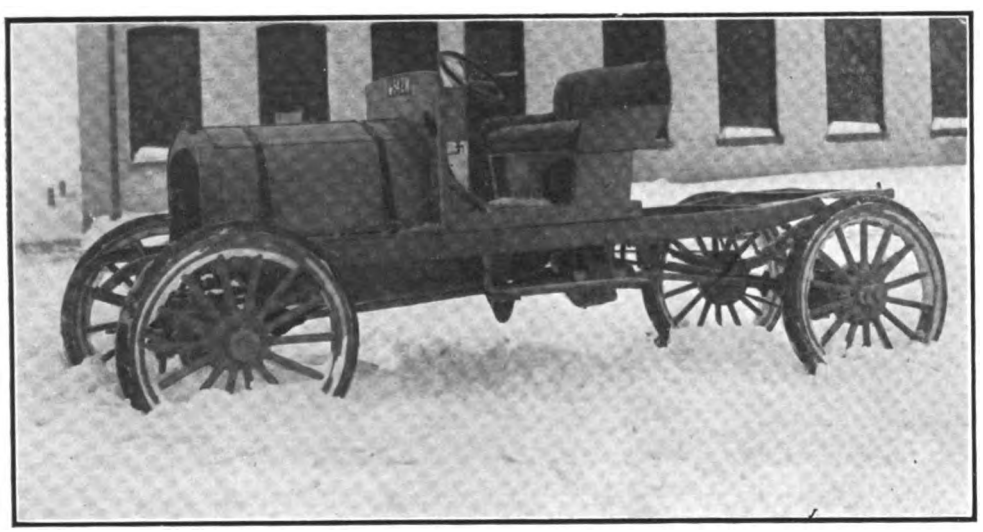
The New York Transportation Company, New York City, has sold its taxicab business to the Conneticut Cab Company of that city, which has had a large number of cabs in service for a number of years. The purchasing company will take possession June 1, adding to its already well equipped line, more than 600 vehicles, the stations and good will of the former concern. The statement of President W. R. Meade of the New York Transportation Company, in this connection is of special interest, as follows:

"Since the adoption of the motor omnibuses on Fifth avenue, that branch of this company's business has developed with amazing rapidity. We have for a long time felt the necessity of concentrating our efforts on the Fifth avenue omnibus line, for the benefit both of the stockholders and of the public. Such concentration was manifestly impossible with the attention of the board divided between the omnibus line, the taxicab and livery business.

"While I do not care at this moment to go into particulars as to our arrangement for the development of the Fifth avenue omnibus business, I am willing to say that the improvements made there will, we hope, within the next few years be even more important and noticeable than the change from horse to omnibus traction. The advantage, both to the stockholders and to the public, will be marked and important."

FOUR WHEEL DRIVE TEST.

During the recent tests conducted by the United States government to determine the value of commercial vehicles for army service, a Four Wheel Drive truck of 2500 pounds capacity, made by the Four Wheel Drive Auto Company, Clintonville, Wis., was among those entered. The entry was made upon order from the War Deparament, a special representative of which visited the factory for the purpose of investigating the merits of the machine. Owing to the limited time allowed in complying with this order the chassis was fitted with a remodelled touring body, as shown in an accompanying illustration.



Four Wheel Drive Truck Which Competed in Recent United States Army Manoeuvres.

The vehicle is equipped with a four-cylinder, four-cycle, water-cooled motor having a bore of 4.75 inches and stroke of 5.5 inches, rated at 45 horsepower. A multiple disc clutch is employed, as well as a sliding gear transmission, back of which is a sub-transmission consisting of Morse silent link chain and gears. Inside of the driven gear is placed a differential, from which two shafts drive to bevel gear differentials on both axles, all four wheels being driving members.

On the shafts and near the sub-transmission is a patented locking device, one for each member, these being utilized in an emergency for operating an opposite pair of wheels in the event of serious damage to either shaft or axle. Both axles are of the full floating type, and the front member is fitted with the Four Wheel drive patent device, with ball and socket steering joint enclosed. The universal joint permits the machine to be driven and steered by the front axle.

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PRESIDENT SPEARE ON REGISTRATION FEES.

IN RESPONSE to a special message sent to the Massachusetts legislature by Governor Foss, the subcommittee of the committee on roads and bridges in that body has prepared a bill, which will increase the registration fees for motor cars in that commonwealth very materially. The Massachusetts State Automobile Association has undertaken the matter of procuring a more favorable measure before final action is taken. President L. R. Speare of that organization has addressed an open letter to the various automobile clubs throughout the state, in which he sets forth the following:

The bill which has finally been reported by the roads and bridges committee to the Massachusetts legislature in regard to the increase in registration of automobiles and commercial vehicles contemplates the following for automobiles: Five to 19 horsepower, 30 cents a horsepower; 19 to 29, 40 cents; 29 to 39, 50 cents; 39 to 49, 75 cents; 50 and over, $1.

It will be evident to all automobilists that this is absolutely ridiculous. In Col. Sohier's letter accompanying the governor's message (House Bill 1784) he states that a fee of 50 cents a horsepower graded in multiples of 10 horsepower would have raised on last year's registrations $176,373 more than was raised. He also says the net amount available from all sources in the automobile department was $504,162, and this would have made a total net amount available for roads of $680,535.

Now then, the actual rate of 50 cents a horsepower, with a minimum of $5 as the lowest fee, would amount to a great deal more money. It can be fairly assumed that on this year's registrations it would amount to approximately $1,000,000. That is, under the suggested rate of 50 cents a horsepower, at actual horsepower, instead of being graded in multiples of 10, a 40 horsepower car would be the same as it is now, $20; a 48.6 horsepower car, if rated at 48 would be $24, if at 49, $24.50. Of course there is a large number of cars that would grade at 35 horsepower, which would figure out at $17.50, as against the present rate of $15. It is impossible for us to see any reason in grading any car at a different rate a horsepower, and there is no other state in the Union that has done this. It is absolutely unique. In consultation with the highway department officials they tell me that some low powered electrics would figure out under the graded rating at $1.80, where they are now paying $5, and, as a matter of fact, the net amount received by the state under this new bill, according to the highway commission would be less than that received last year under the existing fees.

The directors of the Massachusetts State Automobile Association consider this an absolutely impossible proposition, and it should never become a law. After consultation with representative motorists all over the state we found that there was a feeling that the higher priced cars should pay a little more than they have been charged, and therefore we suggested that if the present law were to be changed at all the fee be made 50 cents a horsepower, figured on the universal rating, with a minimum fee of $5 per car. This, it seems to me, would be much fairer than the present jump in multiples of 10 horsepower. Under this arrangement the larger cars would pay a great deal higher price than the small cars.

We really do not believe that horsepower designates the amount of damage done to the roads, but perhaps it is the fairest method that can be devised. Up to last year, in Connecticut, the rate of taxation was 50 cents a horsepower for all cars up to 25 horsepower, and 60 cents beyond. Realizing the unfairness of such a law, it was changed in 1911 and is now 50 cents a horsepower.

We believe that if the proposed bill should become a law it would work great injury to the automobile interests in this state.

In regard to commercial motor vehicles, we are informed that the same scale is to apply to these. This is manifestly unfair. After a great deal of consultation with different manufacturers of motor trucks, we do not believe that horsepower is a fair scale to work on in regard to commercial motor vehicles. The proposition is different from that covering pleasure vehicles. For example, some five-ton trucks have 35 horsepower, some have 40, and some 48.6. Each is carrying the same load and at the same rate of speed. Manufacturers agree that 12 miles an hour is the speed that a truck should make, and it should not be driven at a higher rate. If the 48.6 horsepower truck were rated at 49, the fee would be $36.15, the 40 horsepower would pay $30, and the 35 horsepower would pay only $17.50, less than half the registration of the 48.6 truck, while doing equal damage to the road in every respect.

In other words, the 48.6 horsepower motor truck is obliged to pay more than twice as much as the 35 horsepower truck simply and purely because it has a larger engine. It goes no faster, carries no larger load, and does no more damage to the road.

We have suggested the following scale for motor trucks, which would make an enormous increase in the amount of registration, and it seems to us would be fair: One-ton, $5; two-ton, $7.50; three-ton, $10; four-ton, $12.50; five-ton, $15; six-ton, $17.50; seven-ton, $20; eight-ton, $22.50; nine-ton, $25; 10-ton, $27.50; over 10-ton, $50.

It is doubtful if a motor truck would be built that would carry over 10 tons, but if the manufacturers should conclude to put a jumbo on the road we believe that they should pay for it, as the roads are not fit to carry over a 10-ton load at the present time. The fee would be based on the tonnage guaranteed for the truck. He could not guarantee it to carry a small amount as he would not be able to sell the truck, and the tax would not be so large that that there would be any object in so doing.

Please take this matter up immediately with all members of your association, and create a vigorous opposition to the bill when it comes up in the legislature for action. The registration of pleasure vehicles should arouse the keenest interest among all members, and in fact, among all automobilists throughout the state, while the motor truck registration, being included in the bill, should be looked after with equal care.

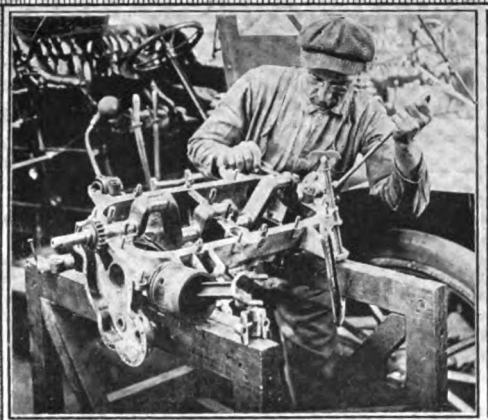
GOODYEAR TIRE HAS BIRTHDAY.

It is maintained that two out of every three automobiles in service in the United States are equipped with tires made in Akron, O. The Goodyear Tire & Rubber Company, one of the best known of the Akron tire concerns, celebrates its 13th anniversary this month, and since its formation 1,000,000 of its automobile tires have been placed in the market.

The development of this concern is of interest. In 1907, it made only 28,685 tires, but that year marked a new era in the demand for its product and the output has been doubled each year, until in 1911, 409,521 pneumatics were manufactured. The present year marks another epoch in its history, and although 1,000,000 shoes have been produced by it, Factory Manager B. W. Litchfield says it will be necessary to turn out 1,000,000 tires during 1912, in order to meet the increased demand.

Form Corning Club—Fifty motor car owners in Corning, N. Y., met recently to organize the Corning Automobile Club, and were addressed by A. J. Deer, president of the state association, and Charles L. Bowers, county supervisor of highways. The officers of the club follow. President, H. H. Kendall; vice president, R. E. Gregory; secretary, Winfield P. Sleight:

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

FITTING FENDER BRACES.

Vibration has a deteriorating effect upon sheet metal if the material be not fastened securely, such as with fenders of the motor car. At Fig. 1 is illustrated a device fitted by a motorist to prevent the fenders from vibrating. It consists of two braces, one on either side, made of .3125-inch round rods. These

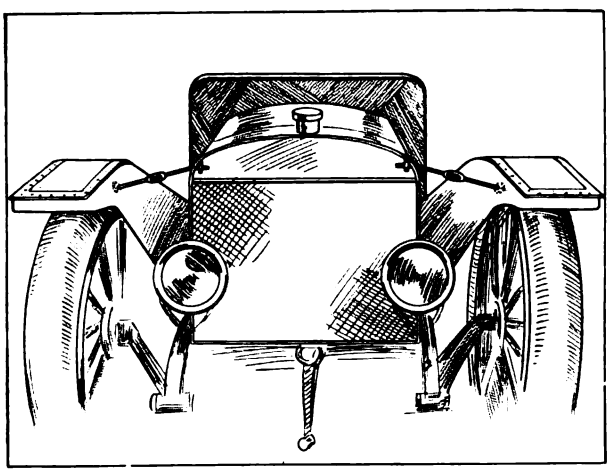


Fig. 1—Easily Constructed and Fitted Device for Bracing and Preventing Fenders from Rattling.

were made in two pieces and threaded at both ends. A turnbuckle was utilized to connect the sections and for adjustment. One end of the rod was passed through the fender and secured by a locking nut while the other extremity was similarly attached to the radiator.

FITTING WITH SPARK PLUGS.

The average motorist who purchases new spark plugs to replace old or faulty members does not take into consideration the fact that to obtain the greatest efficiency from the motor the plugs should fit properly. Usually if the plug be gas tight and ignites the mixture the automobilist is satisfied. The construction and location of these members are of vital importance and engineers and designers have given a considerable amount of study to the subject.

It is well known that spark plugs are subjected to great changes in temperature and consequently those of expansion and contraction. The distance of the so-called spark gap must be maintained in accordance with the engine requirements and with the current with which it is used.

With the introduction of the high-tension magneto it was found necessary to design a plug to meet the peculiar requirements of this current. Ordinary spark plugs when utilized with a high-tension magneto gave trouble, owing to the intensity of the current burning the points and increasing the gap, and heat resisting materials are employed in the construction of the electrodes.

With the magneto plug two or more electrodes are fitted, each having approximately the same sized gap. The current will invariably pass across the gap presenting the least resistance and should its electrode burn away slightly it would offer greater resistance so that the current would seek one of the other gaps.

Location Is Important.

The best and most scientifically designed plug will not give satisfactory results if its location in the cylinder be incorrect. In order to obtain the greatest efficiency from the motor the time required for the spread of the flame through the charge of mixture should be as brief as possible, and to secure this end the spark plug gap should be located in the combustion space, and not in a pocket or recess. If the latter conditions exist, such as shown at Fig. 2 A, dead gas will accumulate about the electrodes, causing slow combustion and missing.

The action of the motor may be improved considerably by boring out the valve cap, allowing the plug to set down so that the points of the member will project into the combustion chamber as depicted at B. The spark will then come in direct contact with the clean and fresh mixture and the flame will spread with maximum rapidity. The plug should preferably be located in the immediate neighborhood of the in-

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take valve and in such manner that it will be surrounded by the fresh gas that enters on the inlet stroke. If the plug be located on the exhaust side there is a liability that dead gas will collect around its points causing faulty action.

Obtaining Best Results.

In order to obtain the best results the plugs should be so set in the cylinder that cooled metal is in proximity to the sparking points, as in this manner possible overheating of the points will be eliminated. A plug that is not cooled properly will overheat and the points will become incandescent, creating trouble. The plug should not extend too far into the combustion chamber as in this position it would be subject to undue heating.

If, on the contrary, the desired length of the plug is made up by extending the barrel, or that portion above the thread, the metal of the electrodes will be adjacent to the cooled metal of the engine and the heat will be transferred readily. On some motors the plug is set in the cylinder wall in such manner that

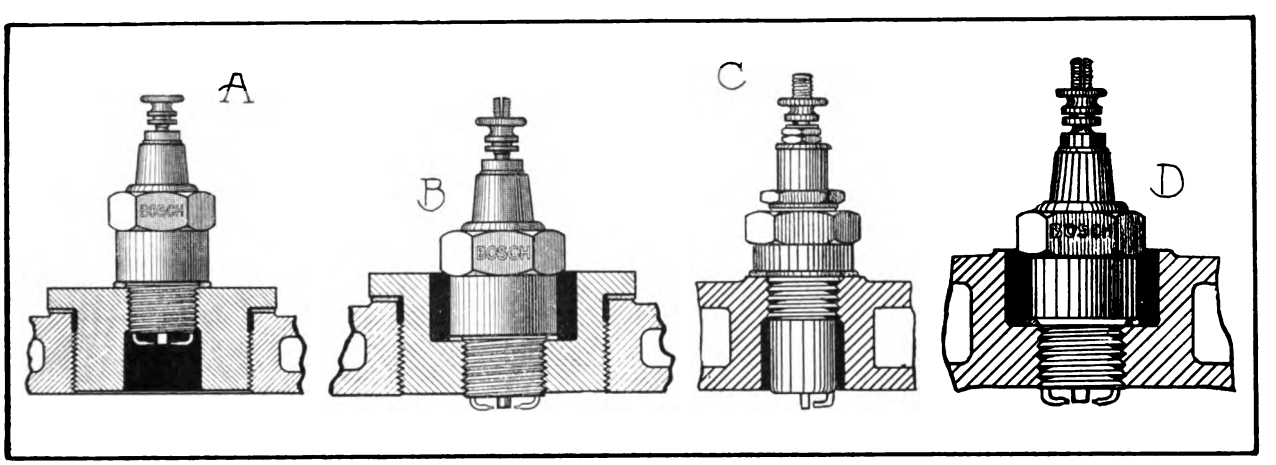


Fig. 2—Outlining Positions of Spark Plug in Cylinder: A, Poor Location, Creating Pocket for Dead Gas; B, Proper Position, with Points Extending into Combustion Chamber; C, Faulty Design, Exposed to Heat; D, Showing How Same Valve Cap May Be Bored to Obtain Correct Location of Plug.

it must project through the water jacket, and extension plugs are required in order to prevent the pocketing of gas.

At C is depicted a plug so located that a pocket is provided. Considerably better results will be obtained on engines of this type if the spark plug hole be made large enough to permit the thread to be cut at its very bottom, as shown at D, for in this manner the plug will be cooled properly.

IMPROVING ACETYLENE LAMPS.

Owing to the spaces provided to carry off the heat in gas lamps more or less dust and dirt finds its way into the members and after long service the black paint becomes shiny, especially if it be cleaned frequently with a stiff cloth. This paint is utilized to absorb certain rays of light and may be renewed easily by using a dead black.

CASTOR OIL AS A LUBRICANT.

There is considerable controversy in progress in England over the efficiency of castor oil as a lubricant for the internal combustion engine, some claiming that in road and track contests it improved the motor action, as well as lubricated its working parts much better than the usual oil. In view of the argument the report of an authority who conducted elaborate tests with castor oil appearing in the Autocar recently will prove of interest.

A series of tests were made on systematically varied oils, each being for 1000 miles under definite conditions. The report concerning the use of castor oil, after the engine had been disassembled, was as follows: "After this test all four pistons looked very much alike; each one had a thick, hard, shiny and fairly smooth deposit on top, and very little on the sides. All rings were quite free, and well lubricated. The cylinder heads had a thin, hard deposit all over, and the valve caps had more deposit than with any other oil. The valve pockets also contained an exceptional amount of carbon."

This report gives the impression that castor oil leaves perhaps rather an exceptional carbon deposit as compared with other oils and this is emphasized by the actual weights of the deposit, which are given below. The cylinders were very carefully withdrawn, and a special slotted tray fitted around each connecting rod under each piston in turn. The whole of the deposit was carefully scraped into the tray and removed with a camel's hair brush into a receptacle to be weighed. The deposit from each piston was weighed separately, but the total weight on the four pistons is given for the castor oil C, which was the finest quality obtainable; for pure mineral oils A, B and F, prepared from the highest class crude, but differing in viscosity, and for mineral oils H and G, prepared from inferior crudes. The relative viscosities at 140 degrees Fahrenheit, are placed against each in the table on the following page:

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Table of Comparative Results.

	Viscosity	Weight of Deposit Grams*
A—Pure mineral oil	1.0	5.12
B—Pure mineral oil	1.5	6.57
F—Pure mineral oil	2.3	9.54
H—Inferior mineral oil	1.1	8.82
G—Inferior mineral oil	2.2	13.55
C—Castor oil	4.4	14.08

*Metric system—One gram equals 15.438 grains, Troy.

From this it will be seen that the carbon deposit is greater with castor oil than with even a low grade, heavy bodied mineral oil as G. In the opinion of the expert, castor oil can only be used with impunity in fixed cylinders, for short distances, and with repeated cleanings between runs, although on rotary motors of the Gnome type cleaning is almost unnecessary. The

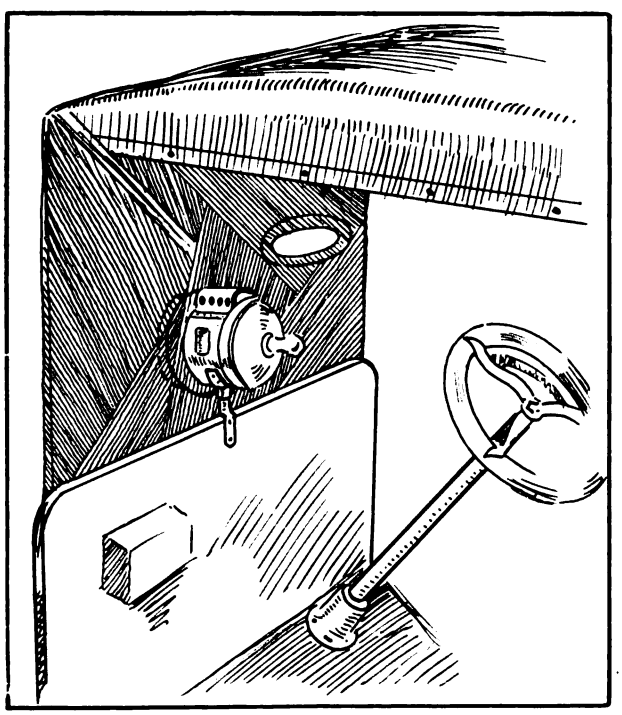


Fig. 3—Depicting How a Dash Searchlight May Be Utilised with a Storm Curtain.

reason is that one cannot consistently use castor oil over and over again, for the fact is indisputable that it has a far greater tendency than mineral oils to absorb oxygen, and so gradually to increase in body, and finally to gum. When it once commences to gum, the carbonization becomes more rapid, because the thickened and pitch-like oil acts as an insulating covering on the top of the pistons and of the cylinder, and cannot get away with sufficient rapidity to avoid decomposition and baking to a coke.

If castor oil is to be utilized on the ordinary stationary cylinder type of engine, it is necessary to wash out the crank chamber and to replace with fresh oil at frequent intervals. On a rotary engine such as the Gnome this cleaning is unnecessary, because there is a continuous stream of fresh castor oil brought into the crank chambers and then thrown by centrifugal force past the pistons and through the cylinder into the exhaust. Thus the stream of oil never has sufficient time to oxidize fully, gum or decompose.

This action of centrifugal force accounts for the large consumption of oil on rotary engines, and also for the fact that the pistons and cylinders keep comparatively clean. It is noticeable in this connection that the castor oil from the exhaust of a rotary engine is pale yellow in color, and shows practically no change from its original condition, whereas castor oil which has been run some few hundred miles in the crank chamber of an ordinary non-rotary type motor is almost black, and considerably more viscous than new oil. It will also be found to have undergone considerable chemical change; its specific gravity will have increased, and iodine value decreased. This combination indicates that oxidization or gumming has occurred.

Viscosity of Castor Oil.

In criticising the use of castor oil the authority states that he does not wish it to be inferred that it is not an excellent lubricant, but suggests that in the case of an internal combustion engine it must be used with discretion. A point in favor of castor oil is the fact that it maintains its viscosity in a remarkable manner under high temperatures, and at these it has a peculiar creeping or capillary action which enables it to spread uniformly over the whole of the metallic surfaces, whereas under the same conditions a similarly bodied mineral oil would be unevenly distributed in patches. Another point is that the specific heat of castor oil is considerably higher than that of a pure mineral oil. This is in its favor, insomuch that it shows castor oil to be a better heat remover than a mineral oil.

"Motorists and aviators have from time to time informed me that they have been using castor oil, but have apparently been under a misapprehension," says this authority. "I find that they have been using a brand of prepared oil under the impression that it is a specially refined castor oil, or that it is a blend of castor oil with a pure hydrocarbon oil in which blend the office of the latter is supposed by them to be one of protecting the particles of castor oil from oxidation. This ingenious idea, however, would not appeal to a chemist or physicist.

"Some time ago, being myself under the impression that this particular brand of oil, on account of its name, had some kind of relationship to castor oil, I purchased samples A, B and C, from ordinary sources and analyzed them. I found one and all to be simply ordinary refined mineral oils, free from any trace of castor oil. Below I give some of the tests of these brands, as compared with cold drawn castor oil at D:"

It will be noted that the viscosity of castor oil at 140 degrees Fahrenheit was nearly 50 per cent. in excess of that of the other samples and even at 200 degrees it was higher.

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	A	B	C	D
Viscosity at 70 F.....	1080	1530	2340	3810
Viscosity at 140 F.....	129	147	198	370
Viscosity at 200 F.....	55	55	64	88
Flash point, open.....	405	371	475	480
Flash point, closed.....	396	364	460	450
Saponifiable matter.....	*0.24	*0.27	*0.28	*99.74
Unsaponifiable matter...	*99.76	*99.73	*99.72	*0.26
Iodine values.....	17	11.4	20.4	83

*Per Cent.

The low figure for the flash point, open test, occasioned three similar tests and these showed the same result. The above viscosities were taken on the standard Boverton Redwood instrument, and the figures denote the time occupied for 50 cubic centimeters to flow from the instrument at the temperatures stated.

Saponifiable and Iodine Value.

By the term saponifiable is meant the property of essentially separating mineral oils from fatty, or from oils of animal and vegetable origin. An oil to resist saponification must resist the action of an alkali such as soda or potash. Fatty oils do not resist such action, but are split up, yielding glycerine and a soap. Mineral oils, on the other hand, might for all practical purposes be called unsaponifiable, and are generally only affected by the action of alkalies to the extent of one per cent. or less.

The iodine value of an oil may generally be taken as an indication of the extent of its "unsaturation," or perhaps one might say more simply that it is an indication of the amount of oxygen which that oil is capable of absorbing. It may be taken as a universal rule to which there is but one exception (which is not castor oil) that commercial fatty oils have iodine values between 25 and 205, while mineral oils vary from four to 21, according to their state of purity and origin. The purer and more highly refined a mineral oil is the less will be its iodine value.

"In conclusion," says the expert, "I would call attention to the essential difference which exists between mineral oils and castor oil in the chemical tests; that is, saponification and iodine values as distinct from physical tests, for although it is possible to manufacture mineral oils having the same viscosity and specific gravity as castor oil at given temperatures, yet it is quite impossible to imitate in them saponification and iodine values."

A SEARCHLIGHT SUGGESTION.

Searchlights of the dash type are favored by some motorists as these lamps may be adjusted instantly and without the operator leaving the seat. They are at a disadvantage, however, when the use of the storm curtain is desired. At Fig. 3 is presented a method adopted by an automobilist who drives considerably at night, and who also uses the storm curtain for protection against the wind.

A hole slightly larger than the diameter of the lamp was cut in the celluloid and the edges of the latter bound with leather. The front of the light projected through the opening, which was large enough to allow the lamp to be moved as desired. At the right of this was cut another opening for use during stormy weather.

MISS KNIGHT IN NEW YORK.

Miss Margaret Knight of South Framingham, Mass, inventor of the Knight-Davidson silent type motor, which was exhibited for the first time during the recent Boston show, has been in New York City during the past week. It is understood that her visit was for the purpose of meeting a firm of automobile manufacturers which was interested in securing the right to produce this engine in its cars, although the name has not been made public.

ROCHESTER CLUB HOLDS ELECTION.

Nearly 600 of the 1537 members of the Automobile Club of Rochester, N. Y., attended the annual meeting of the organization in the Hotel Seneca, March 25. The election of officers resulted as follows: President, Charles J. Brown; first vice president, W. W. Hibbard; second vice president, W. W. Dake; secretary and treasurer, Bert Van Tuyle; directors, R. M. Searle, George Dietrich, C. F. Wray and William Bausch.

BIG SALE OF HUPMOBILES.

The Pillsbury Flour Mills Company, Minneapolis, Minn., recently decided to supply its salesmen all over the country with automobiles, for the purpose of making their regular trips, and after extensive investigation of the cars on the market, decided upon the Hupmobile, made by the Hupp Motor Car Company, Detroit. Seventy-five machines have been ordered by this concern, and deliveries will be made direct to the various headquarters of the big milling corporation.

The first car was placed in service some little time ago, and an accurate account of its work was kept by the Pillsbury company. As a result, it was found that the salesman could cover three towns in the time formerly consumed in visiting one by train, and without any increase in expense.

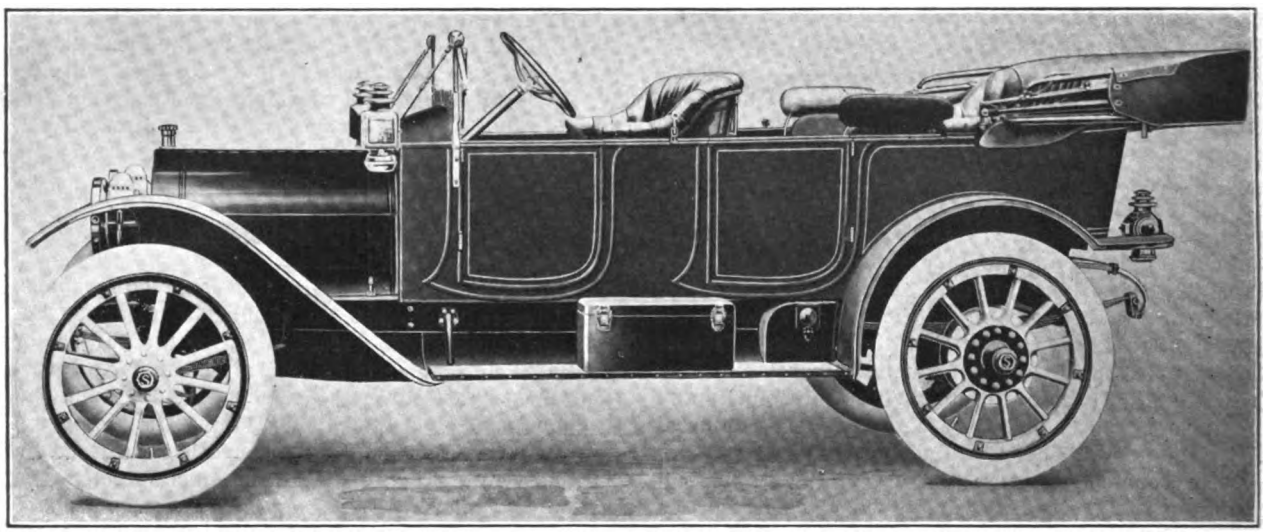
E-M-F BREAKS MAINE ROADS.

James G. Tibbetts of the Bath Automobile & Gas Engine Company, Bath, Me., holds the honor of taking the first motor car through from that city to Boston this year. The machine was a 30 horsepower E-M-F, made by the Studebaker Corporation, in its E-M-F factories at Detroit, and it was forced to negotiate snow drifts three feet deep, washouts and mud. Several times it was necessary to take to the fields. The start was made from Bath at 2 in the afternoon and Portland was reached that night, although it had rained all day. The trip was resumed from Portland at 3 in the morning and the arrival in Boston was at 5 in the afternoon.

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1912 SELDEN CHASSIS AND BODY TYPES.

CONFORMING to its policy to produce but one chassis, and to develop this to the greatest degree possible, the Selden Motor Vehicle Company, Rochester, N. Y., has but one type of machine, which is equipped with five styles of body, these being a two-passenger roadster, a four-passenger torpedo touring car, a five-passenger touring car, a seven-passenger touring car and a seven-passenger limousine. The chassis follows the same general lines of earlier productions, but several changes have been made that are regarded as mechanical improvement, insuring greater efficiency and a larger measure of satisfaction. Among the changes that are noticeable may be instanced the use of a multiple disc clutch of dry plates and a full floating rear axle, both of which have been adopted after careful experiment and continued observance.



Selden 1912 Model 47 S, a Seven-Passenger Touring Car Body Installed Upon a Standard Chassis.

The development of the chassis has been with the purpose of standardization and the refinements have been determined with the knowledge that there has been nearer approach to the ideal. Selden cars have been held to be unusually noiseless and smooth in operation and these qualities have been maintained, the new form of clutch affording a degree of flexibility that is especially desirable. The rear axle was decided on with a view of securing increased strength and endurance and an accessibility that will economize work for examination or repair.

The Selden motor has four cylinders that are cast in pairs from a fine grade of gray iron. They are of the T type with the valve pockets at the left side. The bore is 4.75 inches and the stroke five inches. The engine is rated at 36.1 by the S. A. E. formula, and by actual brake test it will develop 48, but 40 horsepower is conservatively claimed by the maker. The cylinders are cast with water jackets integral, the water spaces being ample in size, and the units have large openings at the head by which the core is thoroughly cleaned, this insuring against obstruction of the water circulation. Baffle plates in the water jackets direct the water against the exhaust valve pocket walls before the top of the cylinders is reached, this making for certain and effective cooling of the valves. These holes in the cylinder units are closed with large plates and are fitted with gaskets to make a perfect water tight union.

The pistons are of the same material as the cylinders. The cylinders are bored, aged and ground to accurate size, and the pistons are turned and ground to fit. The piston rings are ground and fitted with equal care. The engine base is an aluminum casting, in two sections, the upper portion having four arms cast integral which serve as supports for the power plant in the sub-frame. The main section carries the main bearings, the camshaft bearings, the water pump housing, the timing gears and the cylinders. The lower part of the case contains the oil reservoir, the compartments containing the lubricant, and the mount for the oil pump. This is bolted to the upper section and it may be removed without disturbing the engine bearing for work on the crankshaft, camshaft, connecting rods and the bearings.

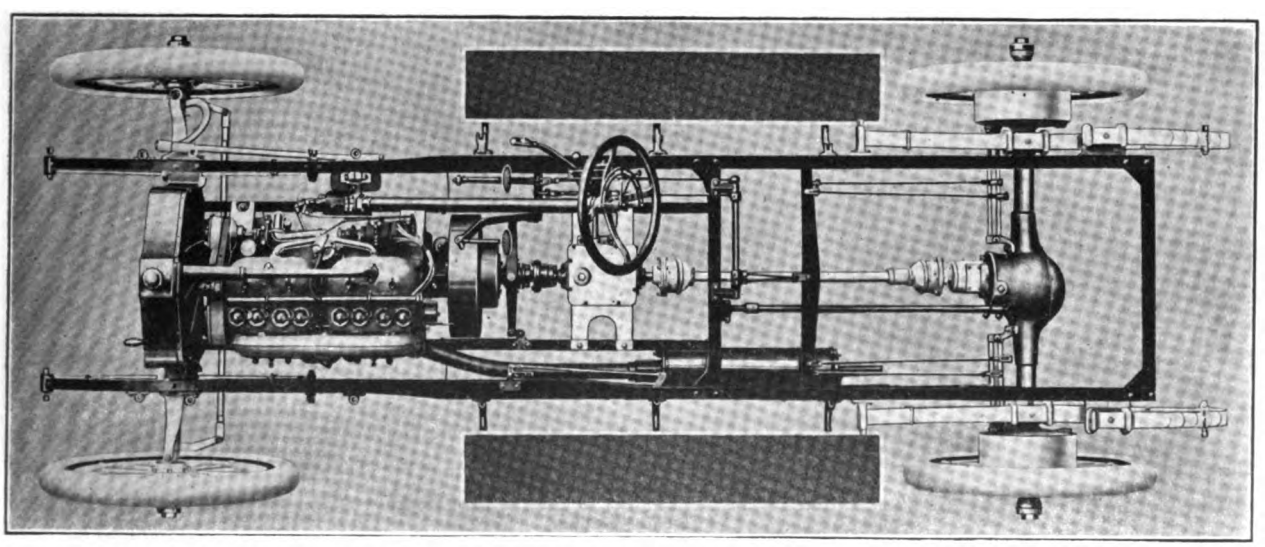
The crankshaft is large in diameter, is drop forged from nickel steel, and is heat treated to increase its strength. It is carefully ground to size. The main bearings are of a high grade of die cast bearing metal and have extreme endurance. The camshaft is of liberal proportions and is ground and hardened. Cams are made separately and after hardening and grinding they are keyed to the shaft, this insuring a more uniform tempering of the cams, while in the event of wear the cams may be replaced without sacrificing the shaft. The bearings are of die cast metal and are of large

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size. The connecting rods are steel drop forgings and are I section. The wristpins are steel, carefully hardened and ground to size. The crankpin and wristpin bearings are generous and of die cast metal.

The valves are of steel with nickel steel stems, the heads being 2.25 inches diameter, electrically welded. The interchangeability of the valves is a desirable quality. The pushrods are a mushroom type, operating directly between the cams and the valves. The rods revolve in the guides to minimize wear and noise and, being very light, insure a quick valve action. These rods may be adjusted to compensate for the wear of the valve stems by adjusting screws and nuts. The design is such that the pushrods and the guides may be removed without disturbing either the valves or the cylinders. The valves lift .3125 inch, insuring thorough exhaust of the products of combustion from the cylinders and the inspiration of complete charges of fuel, no matter what the speed of the motor. The valve stems, springs, pushrods and guides are hose that has unusually long life. A draft of air is forced through the radiator by a fan mounted on a bracket in front of the forward cylinder, the fan shaft revolving on an annular ball bearing that is automatically kept at exact tension by a spring. The fan is driven by a flat endless belt off a pulley mounted on an extension of the water pump shaft. The belt may be replaced when this is desirable by the removal of a coupling in the shaft without taking down any other parts of the engine.

The engine is lubricated by a combination mechanical feed and splash system that is in every way efficient. The oil reservoir, having a capacity of six quarts, is cast integral with the lower section of the engine case, and a float gauge indicates the quantity of lubricant available. The float is of the metal type and it operates a steel ball, the position of which may be felt if necessary, so that the oil supply may be replenished by dim light or at night without need of bringing a light near the motor. A gear-driven paddle pump on



Top View of the Selden Standard Chassis for 1912, as Ready for the Body Installation.

thoroughly protected from abrasive substances by the use of aluminum plates that are fitted to cover the web extensions of the cylinders that enclose these moving parts.

The timing gears are made with wide faces and are a spiral type to insure noiseless operation. The camshaft gear is bolted to a flange made integral with the shaft, there being two series of bolt holes, these being spaced differently with relation to the gear teeth, so that an adjustment of a half tooth may be made in the timing. The timing may be very closely adjusted because of this provision. But six gears are used in the motor and they are all spiral cut.

The motor is cooled by water circulated through a pump of large capacity of the centrifugal type located at the right side of the motor. The water is cooled by a radiator of the square tube design that is carried in a brass housing, connections with the motor being of seamless brass tube and specially vulcanized rubber

the lower end of the time shaft is installed in a well in the reservoir and after filtration through a screen the oil is pumped into the four compartments beneath the crank throws, maintaining a constant level in them, so that there should always be the same quantity of lubricant into which the connecting rods will sweep at each revolution of the crankshaft. A special lead from the pump also supplies the timing gears with ample lubrication. A level cock permits an excess of oil to flow from the case and drain cocks afford complete drainage whenever it is desirable to flush out the case and the oil reservoir.

The fuel is carried in a tank of 17 gallons capacity installed under the driver's seat, and it is supplied by gravity feed to a carburetor of the automatic float feed type that is designed to create a uniform mixture at all times. The carburetor is water jacketed and the fuel is completely atomized and raised to a temperature that insures full vaporization before reaching

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the combustion chamber of the engine cylinders.

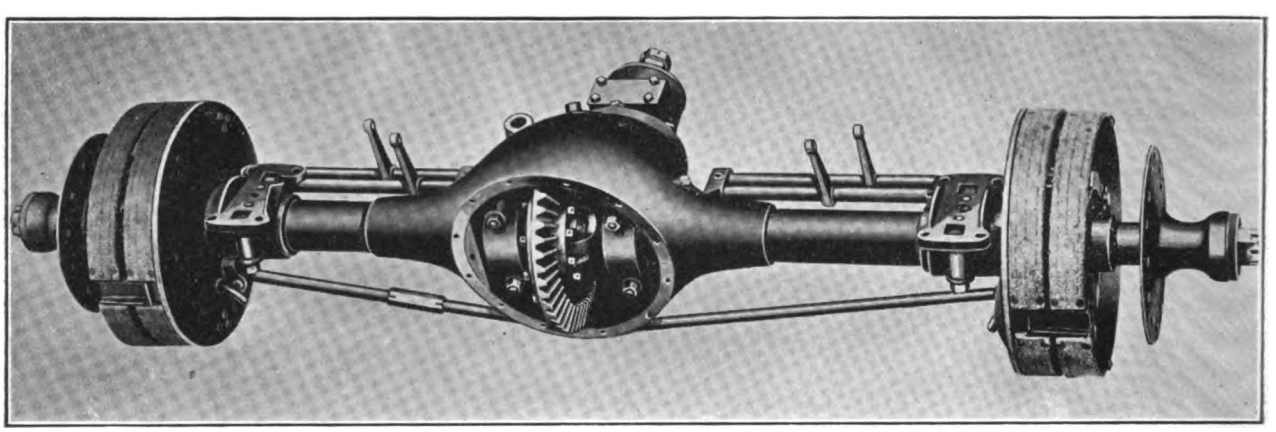
The ignition system, after four years' experience, has not been changed. It is primarily a Bosch magneto, type DR4, that is mounted on a bracket at the side of the motor and is driven by an extension of the water pump shaft. The magneto is strapped to the bracket by metal straps which are retained by a single thumb nut, so that the instrument may be instantly removed without the use of tools. The magneto drive shaft is fitted with an adjustable coupling so that by loosening one bolt the magneto armature may be set to any desired relation with the crankshaft. The wiring system from the magneto is connected with one set of spark plugs. The reserve or starting ignition system consists of a battery of six dry cells carried in a box on the running board, a four-unit spark coil and a master vibrator and timer, the leads of wire from the timer being connected with a second set of spark plugs. The master vibrator insures the creation of a uniform spark in each cylinder from each coil. Cut-out buttons on the coils permit the testing of the coils as desired and each coil unit may be removed from the coil case, which is hinged to afford accessibility. The timer is a roller type and it is mounted on a vertical shaft installed between the cylinder units, where it is always accessible.

The clutch is a dry plate multiple disc type contained in a housing that is bolted to the flywheel. The simplicity and effectiveness of the clutch are two of the factors that dictated its adoption for this car. The clutch assembly consists of 13 discs, seven of which are fixed to the housing attached to the flywheel and revolve with the crankshaft. These driving discs are faced with an asbestos composition, riveted on. The six driven discs, keyed to the clutch shaft, are not faced. The driven discs are contacted with the driving discs by the pressure of two heavy helical springs, the tension being adjustable by a pressure plate that is retained by three studs extending through it, these studs being prevented from loosening by an automatic spring lock.

A universal joint of the gear type, consisting of a pinion on the transmission driving shaft inserted in an internal gear of equal size on the clutch shaft couples the clutch and transmission shafts, permitting sufficient longitudinal movement without lost motion. The thrust of declutching is taken directly upon the transmission bearings. An adjustable clutch brake is mounted on drive shaft and this prevents spinning of the clutch when disengaged and permits speed changes to be made with ease. The clutch pedal is connected through a system of linkage with a large ball thrust bearing on the clutch shaft so that the clutch may be disengaged with very light pressure. The clutch is interlocked with the emergency brake so that when the brake is set the clutch is automatically disengaged. This interlock may be disconnected with ease should there be desire. The entire clutch assembly may be removed from the chassis for examination or adjustment by the removal of a few bolts. It is unusually durable and is exceedingly simple in construction.

There is practically no change in the transmission, which is a selective type, three forward speeds and reverse. The shafts are mounted on Timken roller bearings that are adjustable from the outside of the transmission case without removing the case or disturbing any other parts. The case is an aluminum casting that is attached to the top of the sub-frame by four supporting arms and a large cover plate permits inspection to be quickly made when desired. The driving shaft is of special steel and it is fitted with two Spicer universal joints.

The rear axle is a full floating type with the pinion shaft mounted on New Departure ball bearings. The differential assembly is carried on Hyatt high duty roller bearings with ball thrust bearings and the wheels are fitted with New Departure ball bearings of large capacity. The axle driving shafts are fitted with flanges at the outer ends to which the wheels are bolted, this relieving the hub caps of the strain of driving and eliminating possibility of lost motion. To prevent leakage of oil into the brake drums sleeves are carried on the hubs that conduct any lubricant that may pass along the axle shafts into annular re-



Rear Axle of the Standard Selden 1912 Chassis, Showing the Differential Gears and the Large Internal Expanding Brake Shoes.

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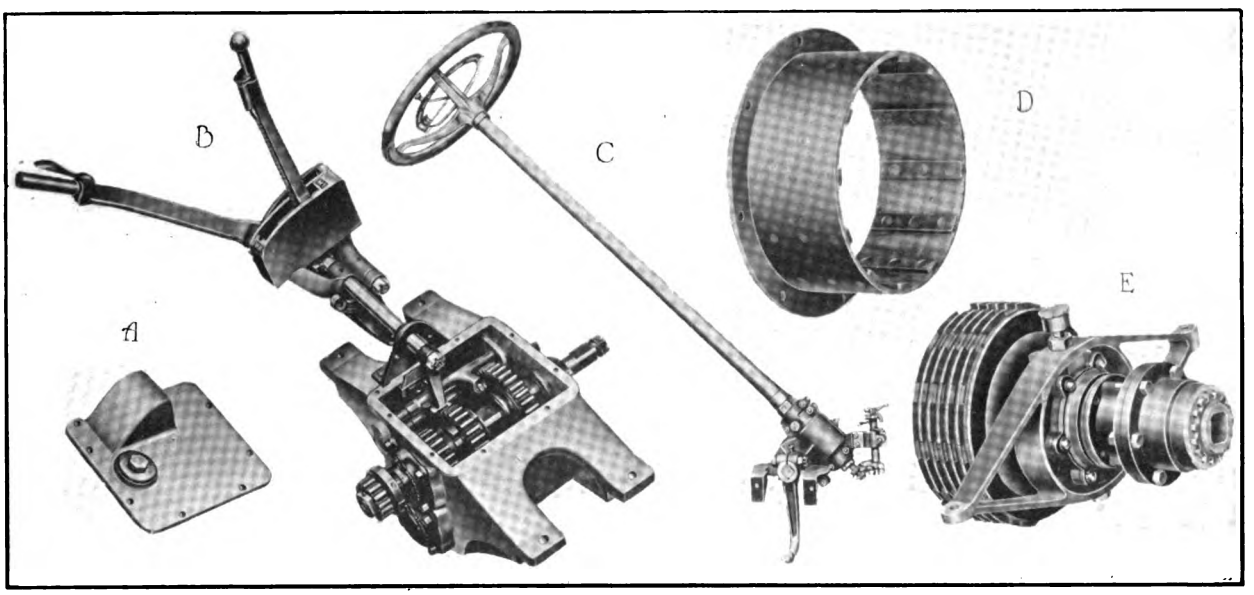
cesses in the brake flanges, from which it is drained into the highway. The differential assembly may be removed from the axle by taking off the cover plate of the pressed steel housing. The front axle is a drop forged steel I section.

The torsion rod is a heavy steel tube with drop forged steel ends. The rear end is attached to the rear axle by two short vertical steel pins, this making a far more substantial connection that one long pin. The forward end of the tube is installed within a housing that encloses a heavy helical spring that takes the road shocks, the housing being attached to the chassis frame cross member by a heavy bracket. The housing is packed with grease and it excludes dust, mud and water.

The chassis frame is a pressed steel channel 4.75 inches wide and .1875 inch thick, having three cross members and a sub-frame supporting the motor and transmission. The frame is cambered at the front and raised at the rear to allow the use of three-quarter elliptic springs. The forward springs are semi-elliptic, 32 inches length and two inches width; the rear springs are 51 inches length and 2.25 inches width. The wheels are artillery type, 36 inches diameter, fitted with quick detachable and demountable rims. The forward wheel bearings are of the cup and cone type and are adjustable. The wheelbase is 125 inches, the tread 56 inches and the road clearance 10 inches.

The steering gear is a worm and sector, a full circular sector giving four distinct wearing surfaces, any of which may be used, affording long life to all wearing parts. The gear housing is bolted to both the sub-frame and the chassis frame, this being an unusually rigid construction. The steering wheel is 18 inches diameter with a cast aluminum spider and wood rim. The ignition and throttle levers are mounted on a stationary quadrant in the centre of the steering wheel and are held by spring catches.

The control is by clutch and service brake pedals, a foot accelerator, a muffler cut-out, and hand levers for the changes of speed and the emergency brake. The brakes are internal expanding, the shoes being 1.75 inches wide, operating within drums 14 inches diameter, on the rear wheels. The speed control is by a single shaft entering the top of the transmission case, the control mechanism being supported by a large bracket attached to the chassis frame and the sub-frame. The muffler is the same size as previously used, but the cut-out valve is larger and the operating mechanism has been redesigned. The lamp brackets are heavy drop forgings set into sockets riveted to the chassis frame and connected by a tie-bar. The side lamp brackets are attached to the dash and carry the front ends of the windshield stay rods. The running boards have been lengthened and they are now carried on three hangers, giving a more rigid construction. The head lamps are acetylene gas burning, but the dash and tail lamps are electric, the current being supplied by an 80 ampere-hour storage battery carried in a box on a running board.



Selden Construction Features: A, Cover of the Transmission Case; B, Transmission Assembly and Speed and Brake Levers; C, Steering Gear; D, Clutch External Member; E, Clutch Plate Assembly.

WEST WANTS GOOD ROADS.

That there is a determined movement on foot for better highways in Missouri, Kansas, Illinois and Nebraska is the report made by Charles P. Light, field secretary of the American Association for Highway Improvement, after a trip through the Middle West. He says he mingled with all sorts of people and found them convinced that road movement was the most important campaign ever undertaken.

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10,000 Michigan Agents Are Back Of This Advertisement

They Are The Living Credentials We Offer In Support of Every Statement We Make.

Thirty years ago we started to manufacture carriages. We commenced with a small factory and no agents.

Today we have increased our factory facilities a hundredfold and we have built up the most efficient vehicle selling organization in the whole world—ten thousand live, active agents to sell our products.

These agents know us and our work. They have confidence in everything we say. They are READY to handle any product of the Michigan factories—and put their individual reputation behind everything we produce.

This enables us to manufacture our goods without selling cost. And thus saves this expense to the man who buys the goods.

THE BIRTH OF THE "MICHIGAN"

In 1909 we started to build automobiles. A simple announcement to our agents disposed of all the cars we could build. No expense.

And thus it has been ever since. Our agents have absorbed our entire product. Thus for representation which has cost other manufacturers fortunes, we have paid not one cent. And that is why we undersell.

THE FACTORY BEHIND THE CAR

Note the picture of the Michigan factories. They are a monument to our dealers. For all our success has come through our dealers—and their efforts in selling. We take to ourselves the credit of choosing these capable men and of being able to build with their help.

OUR COMPLETE LINE

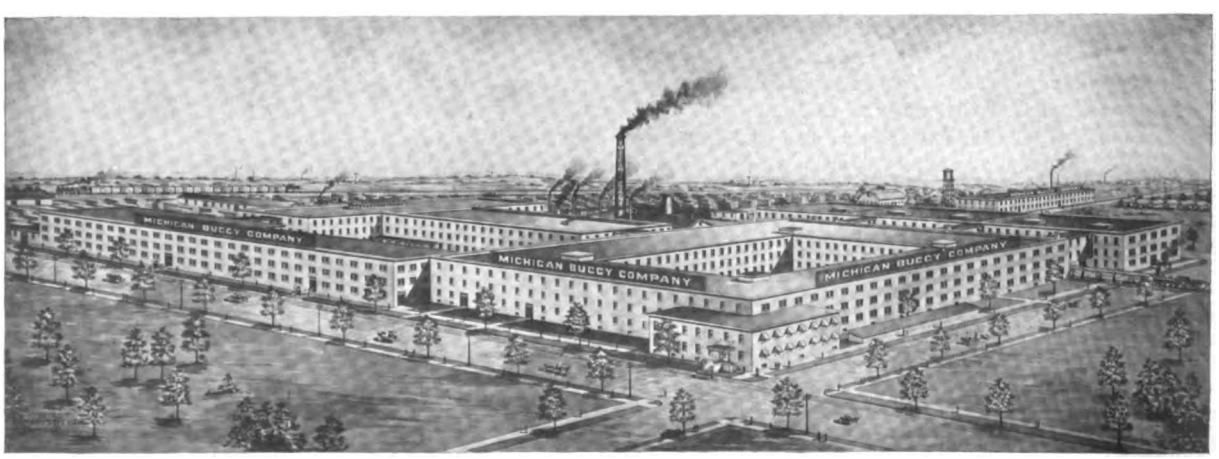
We call attention particularly to our Models K and H here shown.

Each is a masterpiece of its type. Each has met with the unusual favor of motorists and automobile experts.

We cannot in an advertisement do justice to our cars. We can merely note some of the many points. To realize the big values in our machines you must see them for yourself. Or get a catalogue, which describes everything in detail.

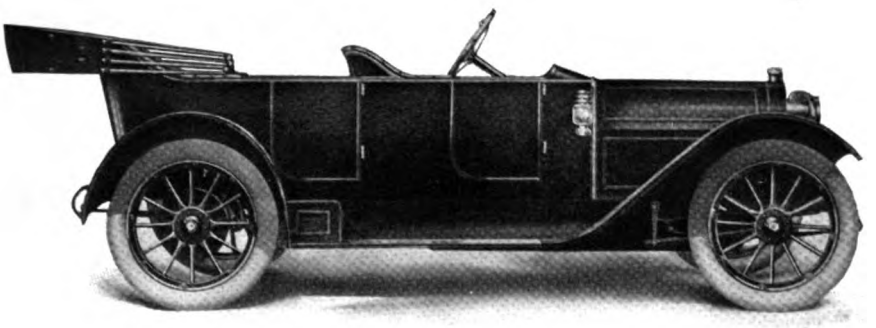
A STRONG GUARANTEE

The Michigan Buggy Company backs up every car it turns out—with the broadest, most liberal guarantee that it is possible to place on a motor car. We do not guarantee the car for one, two or even six months. We simply say that if at any time the car proves defective, we'll make it right. And this guarantee means something backed up by an old line concern of thirty years standing.



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Big Features of Every Michigan Car



MIGHTY MICHIGAN "40," $1,500.

40 H. P. motor 4 1-4x5 1-4", three bearing crankshaft. 34x4 inch tires. Demountable rims. Nickel mountings. 116 inch wheel base.

SELF-STARTER

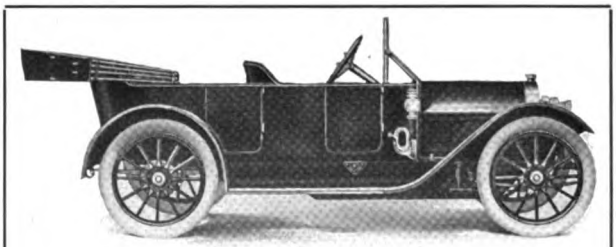
We have tried out nearly every self-starter made. The one self-starter that our engineers found to be entirely practical we have approved for use on MICHIGAN cars. It is simple and easy to operate, nothing complicated. Very light and thoroughly dependable. We gave it thousands of tests under all sorts of conditions, and it proved itself absolutely efficient. Nobody likes to crank a car. What folks will insist upon in six months you get NOW on the "Michigan Forty."

MOTOR

Absolutely noiseless in operation. Dust proof. Every moving part (except fan) enclosed. Long stroke, insuring greatest pulling power at low speeds, and utmost economy of fuel.

IGNITION

Tests of all kinds were made before we finally decided on the Briggs magneto. Not only did we find the Briggs the most efficient but we felt that its strong guarantee gave MICHIGAN agents another big selling recommendation possessed by no other cars of equal price.



MICHIGAN, MODEL H, $1400.

The MICHIGAN "33"—Model H—at $1,400 affords everything that the average family wants in a motor car save the surplus power and the extra room which comes with our Model K, the "Mighty Michigan Forty". It is completely equipped with self-starter,—the best grade Mohair top that we can build together with side curtains and dust cover.—Zigzag Windshield. In fact, everything needed to jump in and drive away. Best materials are used throughout and the same materials go into the machine that we put into our MICHIGAN "40."

WHEELS AND TIRES

We use genuine Shortsville A-grade wheels. Known everywhere for their strength. 1⅛ inch spokes. 12 to the wheel. MICHIGAN cars are overtired also—just to make sure that owners will not be bothered with that big bugbear of Motordom, tire trouble.

BRAKES

One square inch of braking surface for every eight pounds. Brake drums 14 inches in diameter, 2 inches wide. They are lined with raybestos, making it impossible to burn them out.

FRAME

Extra strong, 5-32 inch steel. Four inches deep, 3½ inch flange. Its extreme strength makes impossible accidents due to weak frame construction, and does away entirely with body squeaks.

BODY

Here's where we have made big capital of our vast carriage building experience. Big and massive, yet graceful and wonderfully suggestive of character and power.

COMFORT

Easy riding qualities secured by long wheel base, soft springs and luxuriously comfortable cushions. Appointments are perfect—such as you would expect to find only in cars costing $4000.

CLUTCH

MICHIGAN cars are equipped with clutch of Multiple Disc type. Can't grab—nor slip. A clutch that transmits a greater percentage of power to the rear axle than any other clutch on the market—bar none.

AXLES

Our three-quarter floating rear axle combines all the advantages of both the full-floating and semi-floating types, with none of the disadvantages of either. Hyatt High Duty roller bearings are used throughout.

Motor Car Department
MICHIGAN BUGGY COMPANY
208 Lay Street, Kalamazoo, Michigan.

Information Coupon

MICHIGAN BUGGY CO.,
MOTOR CAR DEPARTMENT,
208 Lay Street, Kalamazoo, Mich.

Please send me catalog describing the "Michigan Forty" and other Michigan cars.

Name .....

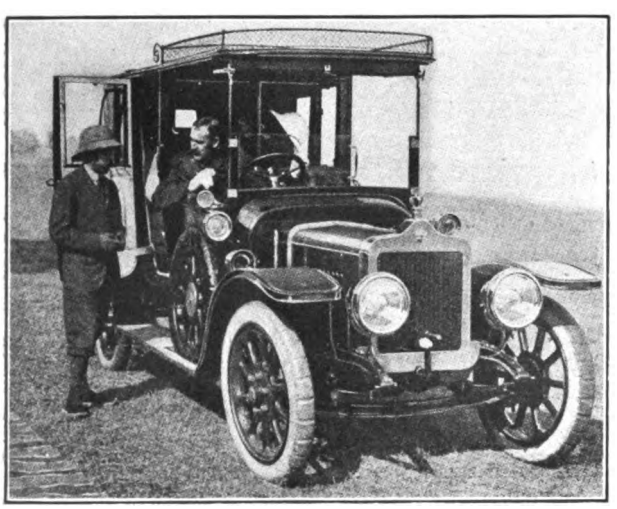
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The much advertised Tour de France, under the auspices of L'Auto of Paris, appears to have been decidedly uninteresting from the standpoint of a contest. The French motoring magazines characterize it as "too easy," and those in England as "of little interest or value as a crucial test." From a selling point of view it may develop that the event was of exceptional value, inasmuch as five days were allowed during the tour for demonstration of cars in the various cities where stop-overs were arranged.

Between Grenoble and Nice in the mountainous country, the Ford entrants changed their rear wheels for others of smaller diameter, in order to gain advantage of the lower gears. It is claimed by Henry Dupasse, the Ford agent in Paris, that the rules did not cover this point, but the three cars of this make were at once disqualified by the committee. They were permitted to continue the tour as non-contestants, however.



King George V and His Six-Cylinder Standard Car During Visit to Nepal, India.

In this connection it is interesting to note that the three cars comprising the Benz team were accompanied by a 40 horsepower touring car supplied with a full equipment of tools, spare parts and tires. Dupasse claimed that this was as much a violation of the rules as the Ford change in wheels, though neither point appears to have been forecasted in the regulations.

The tour came to an end in Paris, March 20, and 37 of the 52 entrants finished without penalization. While the three Fords and one Reo, representing America, finished with others, the Fords had been disqualified as explained above, and the Reo failed to reach one of the controls on time, due to a bad skid on a railroad crossing. The two-seated Hupmobile dropped out after covering about half the distance.

★

One of the results of the recent Durbar at Delhi, India, was the stimulation of interest in the use of automobiles. The Indian government not only engaged a large number of machines for the use of its guests, but the royal party made use of them almost entirely, except on strictly state occasions. An accompanying illustration shows King George V about to enter a Standard car of British make during his visit to India.

The most interesting feature in this connection is the cordial reception given to American machines. Naturally, those utilized by the royal party and the government were of British manufacture, but a large number of American cars were used. One firm furnished no less than 70, and it is claimed that 161 were represented in the grand total. This number was sufficiently large as to occasion wide comment, and it is stated that a greatly increased demand for United States machines has been awakened in India as a result.

★

The tendency toward direct commercial relations between the United States and Servia is steadily developing, stimulated by the advantages which such trading presents and which the Servian importers are not slow to appreciate. During 1911 automobiles to the value of $6600 were imported into that country from America.

★

While the Swiss national government is looking for an excellent tourist season during 1912, and is taking steps to call the attention of tourists to the beauties of that country, it is noticeable that the contention between the peasants and the motorists in

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Switzerland becomes more acute each year as the number of cars on the country roads increases. Local legislation has made motoring difficult in some places and impossible in others. These communities are so distributed throughout the country that they make travel disagreeable, and this situation acts in no uncertain measure to offset the efforts of the national government to attract tourists of this nature.

★

The total number of registrations in London at the beginning of February, according to information issued by the London county council, was as follows: Pleasure vehicles, 49,455; heavy duty cars, 3501; motorcycles, 17,234.

★

The exportation of graphite from Mexico, through the port of Nogales, during the past three years was as follows: For 1909, 1773 tons valued at $18,014; 1910, 2620 tons, $28,828; 1911, 3004 tons, $238,364; a total of 7397 tons, valued at $285,206. This was approximately the same grade of graphite each year, and was the product of several mines near La Colorado, Sonora, which are owned and operated by an American company. The following information is taken from an engineer's report recently published by the concern:

"The graphite bed, as at present mined, reaches from nine to 10 feet in thickness. It is extremely irregular in 'strike,' sharp curves coming close together. Owing to the friability of the bed, almost no explosives are necessary, most of the mining being done with pick and shovel. The analysis of run-of-mine graphite is as follows: Carbon, all graphitic, 86.75 per cent.; silica, 7.6 per cent.; iron, .65 per cent.; alumina, five per cent.

"The graphite is apparently wholly amorphous and shows no flakes like that mined in some sections of the United States, and no fibrous structure like that of Ceylon. After being raised to the surface the graphite is spread out to dry, which it does in a short time, and then is thrown up in piles to await shipment."

★

The local government board in London has prohibited the use of the muffler cut-out on motor cars, the order going into effect April 1. It seems a little strange that the new regulation does not include motorcycles as well, but the wording is very explicit, as will be seen by the following:

"He shall not use any cut-out, fitting, or other apparatus or device, which will allow the exhaust gases from the engine of a motor car to escape into the atmosphere without first passing through a silencer, expansion chamber, or other contrivance, suitable and sufficient for reducing as far as may reasonably be practicable the noise which would otherwise be caused by the escape of said gases.

"Provided that this regulation shall apply only to a motor car propelled by an internal combustion engine and shall not extend to a motorcycle."

★

Automobilists in England are much given to the social side of motoring, frequent so-called "point-to-point" meetings being held each year. This plan appears to be much in the nature of an American picnic, in which all the motorists within a given radius are invited to join. An accompanying illustration presents one of these point-to-point meetings at Highworth, England, in which the party is encamped along the roadside for the inevitable "refreshments," which are a part of every British undertaking.

★

It appears that the Scottish Motor Trade Association was not entirely satisfied with Glasgow as the site for the annual Scottish motor vehicle show, in view of the fact that the Edinburgh city council has granted this organization permission to utilize the Waverley Market for this purpose, during two weeks in January, 1913. Until this year, the shows in Scotland have been held in Edinburgh, but it was announced last fall that it was expected much better facilities for holding a large and representative exhibition could be secured in Glasgow. Undoubtedly, it was found that the latter city was too far from the centre of motoring to attract the crowds which have visited the Edinburgh display in years past. In addition, it may be mentioned, that permission has been secured for the holding of a commercial vehicle show of two weeks' duration immediately following the pleasure car section.



Party of British Motorists Encamped at King's Royal Rifles During Recent Point-to-Point Meeting at Highworth, England.

The Touring Club de France has brought forward a plan for an automobile road about 375 miles long from Lake Geneva through the western Alps to Nice. This route will run through three Alpine passes at the Drance, Arve and Isere valleys, and thus open up some

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of the most beautiful sections of the Alps. At the height of 9000 feet it will pass the Col d'Iseran, and after entering several other minor passes will reach the Car valley, which it follows for about 60 miles to the Mediterranean. It is estimated that the cost of construction will be not far from $800,000.

★

Official reports concerning the automobile industry in France for the year 1911, indicate that the increase in business expected was not realized. This is held to be due largely to the significant increase in importation of cars from America, Great Britian, Germany, Belgium and Italy. The imports from America increased from $146,680 in 1910 to $462,814 in 1911; from Great Britain, $555,454 to $609,301; from Germany, $316,713 to $484,430; from Belgium, $443,128 to $451,813, and from Italy, $207,668 to $234,881.

The exports of French motor cars for 1911 shows a decrease to a number of countries, notably America, England, Italy, Russia and Argentina. These figures show the following:

Country	1910	1911
Great Britain	$13,847,171	$10,635,072
Belgium	6,127,557	7,264,906
Germany	2,697,947	2,854,470
Argentina	2,014,534	1,830,026
Algiers	1,831,763	2,664,172
Italy	1,073,080	921,575
Russia	1,058,026	537,312
Switzerland	960,368	1,129,822
United States	926,207	731,277
Brazil	514,924	1,584,916
Spain	495,238	703,292
Austria	206,124	451,813
Turkey	135,486	332,925
All others	3,139,338	3,644,998
Totals	$35,027,763	$35,286,576

From the above it will be seen that France little more than held its own in the matter of exports. In these figures, it may be mentioned, "industrial motor vehicles" totalled $1,362,966 in 1911 as against $942,-033 the previous year.

★

The annual general meeting of the Institution of Automobile Engineers in England was held at the Institution of Mechanical Engineers, Storey's Gate, S. W., London, last month, at which time the annual reports of the officers were received, and the condition of the society was found to be highly satisfactory. The following elections to the council were made: M. C'Gorman, F. L. Martineau, Max Lawrence, J. A. Wilding, Worby Beaumont, F. C. A. Coventry, D. J. Smith, Prof. A. Sharp, A. S. Hill, G. A. Burls, Col. H. C. L. Holden, M. A. Adam, D. Leechman and L. H. Pomeroy.

The meeting was followed by the reading of an interesting paper on "Aeroplane Undercarriages" by G. de Havilland of the army aircraft school. Cinematograph views of landings of aeroplanes were shown, the author pointing out the difficulties to be met in taking up the shocks of this important part of the work of these machines. The next meeting will be held April 10, at which J. J. Guest will read a paper on "Grinding."

★

Some of the 58 drivers for the French Grand Prix race over the Dieppe course in June have been selected as follows: Free-for-all, Ford, America, Dupasse; Mathis, Germany, Mathis; Fiat, Italy, David L. Bruce-Brown, twice a winner of the American Grand Prize event at Savannah, Ga.; Ralph De Palma, also well known in American racing circles, and Louis Wagner.

In the light car class the following have been named: Lion-Peugeot, France, Boillot and Goux; Gregoire, France, Porporato, De Marne, Romano and Medinger; Vauxhall, Great Britain, Hancock, Watson and Ferguson; Alcyon, France, Barriaux and Page; Vinot-Deguingand, France, Vonlatum, and two Molons; Sizaire-Naudin, France, Sizaire and Naudin; Koecklin, France, Koecklin; Cote, France, Gabriel; Hispano-Suiza, Spain, Derney and Piliverdie.

GRAY & DAVIS INCORPORATES.

Announcement has been made of the incorporation of Gray & Davis, Boston, maker of automobile lamps and lighting dynamos, the capital being $1,200,000. This action was made necessary by the enormous growth of the business during the past year.

With the very inception of the automobile industry came the first Gray & Davis lamps. The old firm was a copartnership and the factory, a modest plant, was located in Amesbury, Mass. With the remarkable growth of the industry, of which this was an adjunct, the production of lamps also increased, until it was necessary to erect a new plant, and later to make several additions to this.

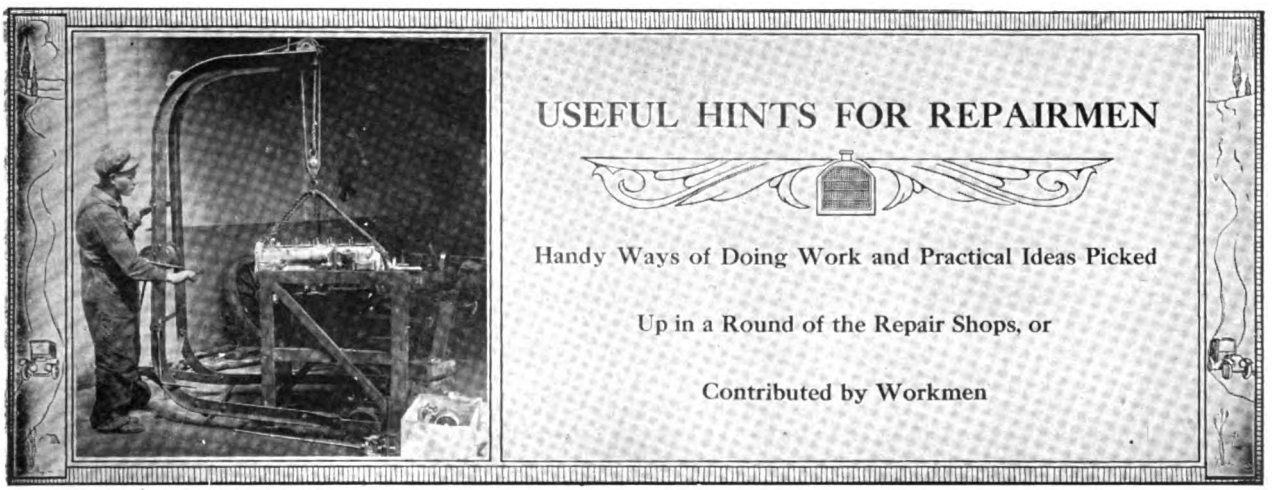
Lamps are still made in the Amesbury factory, but about a year ago the success of the lighting dynamo made it necessary to erect an entirely new building in Boston. It is a new plant, thoroughly modern in every way, and embodies the latest advanced ideas in meeting the increased demand for this product. Thus, the Gray & Davis lamp and dynamo business has actually outgrown its present manufacturing facilities and the incorporation has been decided upon as the best means of increasing its efficiency.

NEW CAR FROM DETROIT.

Announcement is made from Detroit, that a company is being organized for the production of a new pleasure car, to be known as the Thirty Roadster. The name of the concern is being guarded as a secret for the present but will be made public in the near future, it is stated. It will have a capital of $500,000.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

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NEW TYPE OF MUFFLER.

With the agitation against the use of the cut-out it is interesting to note that manufacturers of mufflers are devoting considerable time to the perfection of this device, striving to reduce back pressure to a minimum as well as to eliminate noise. These members are usually constructed circular in shape but a deviation from this form is noted in the Sharpe muffler which is depicted at Fig. 1 A. It comprises three flanged and ribbed globes bolted together and mounted upon a central partitioned tube. These flanges are directly exposed to the currents of air flowing beneath the car and it is obvious that the muffler is kept at a low temperature, thus aiding the condensation and consequent loss of pressure of the exhaust.

In the drawing the upper half of the muffler is shown in section and it will be noted that the gas in entering is immediately broken up into several streams by passing through the first series of holes in the inlet member. A sudden expansion of gas then takes place in the first globe, where a certain amount of heat is radiated, after which the gases pass on through other apertures into the second globe and succeeding members, and into the open air through the perforated outlet tube. It is claimed of the muffler that smoky exhausts are reduced and that the silencer may be disconnected, cleaned and reassembled easily and in a very short time.

SHACKLE BOLT AND LUBRICATOR.

A combined shackle bolt and lubricator has been brought out by a French parts maker named Faudi, and the device presents many practical features inasmuch as it eliminates the screwing of a lubricator with a small threaded neck into the bolt which is sometimes broken easily. At Fig. 1 B is presented a sectional view of the device and it will be noted that one end of the bolt is made to form the body of the lubricator and has a thread formed within it. The lubricator cap has a coinciding thread cut upon its exterior to permit of its being screwed into the body. The cap's outer edge is spun over a plain sleeve which makes a dust tight fit around the body as the cap is screwed home in practise. The bolt is drilled centrally to take the lubricant and is also grooved to allow the grease to spread over the wearing surfaces. At C is shown the bolt with cap in position.

TOOL EQUIPMENT FOR THE SHOP.

Other measuring instruments may be included in the tool equipment of the shop than those previously mentioned, and the list may be augmented by a bevel protractor, bevel, combination square, key seat rule,

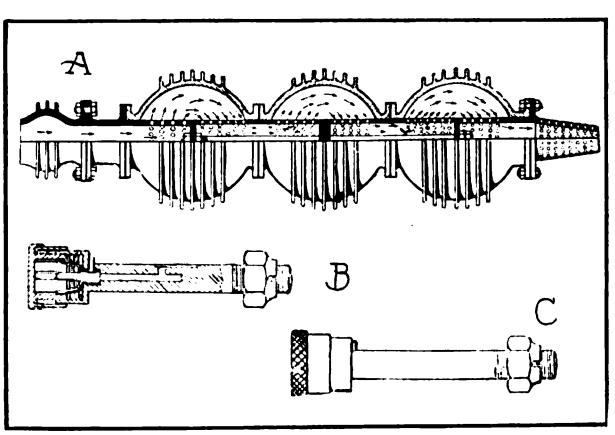


Fig. 1—A, New Type of Muffler Constructed in Two Sections, Which Is Claimed to Obviate Back Pressure; B, Sectional View of New Combined Shackle Bolt and Lubricator; C, Exterior View of Device.

try square, tram points, etc., this depending upon the nature of the work to be undertaken.

Several centre punches should be a part of the equipment and types of these are depicted at Fig. 2 C and D. These are inexpensive and come in convenient sizes having knurled bodies providing a good grip for the fingers. Similar members having smooth ends are valuable in driving out bolts, pins, etc.

At B is shown an automatic centre punch which is adjustable and is more convenient in laying out

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work to be machined or drilled than the common forms. The tool is about five inches in length, .625 inch in diameter and the length of the stroke is adjustable by means of a knurled screw on the top of the handle. To set for fine work, the screw is turned to the right; for coarse work to the left. The points can be removed for grinding and are replaced easily if broken.

The purchase of a plumb bob, which is illustrated at A is optional. The tool is valuable for lining up shafting and is almost indispensable in erecting machinery. A hand vise, such as depicted at E, is very useful. They are made in several forms and so constructed as to hold small work securely.

The plier outfit should include several forms. Those at F are small flat members which may be put to a great many uses, especially when assembling small work. Wire cutters are essential, and in purchasing these members a high grade tool should be selected. Those shown at H have removable and adjustable jaws. Each jaw may be ground away to the extent of .25-inch and when used up new members may be procured. A screw through the jaw engages with a spline in the frame and draws the jaw down firmly to the toothed seat, holding it securely. Another feature in this cutting plier is a flat spring below the cutting edges and over the joint, forming a yielding seat for the end of the wire to press against while being cut. This obviates the danger of breaking the jaws, as sometimes happens with some forms of this instrument, which allow the wire to be inserted against a solid surface.

A good spirit level is important and the instrument depicted at G is so constructed that it can be adjusted accurately, and when so set is not liable to get out of true, as the vial is set in tubes having solid ends which are clamped firmly to the base. The outer tube may be so turned as to protect the glass when not in use, or when carried in the tool kit.

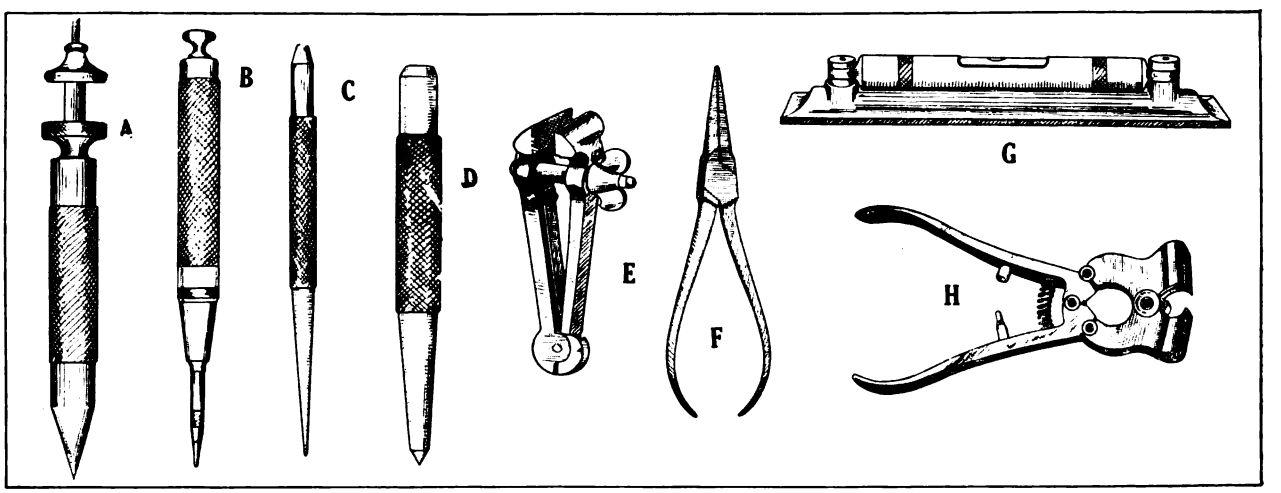


Fig. 2—Tools for the Shop Equipment: A, Plumb Bob; B, Automatic Centre Punch; C and D, Ordinary Centre Punches; E, Hand Vise; F, Small Pliers; G, Spirit Level; H, Wire Cutting Pliers.

A PATTERN MAKING HINT.

A repairman of considerable experience suggests the following method of making a pattern when a patch of peculiar shape is required to fit in an awkardly situated position and he states it will obviate the necessity of making templates: Take a piece of gutta percha, large enough to make up the required pattern. The material is placed in very hot water and allowed to remain until it becomes soft and pliable. When in this condition it is pressed hard on the place which is to be fitted with a patch, and allowed to remain until it has cooled down sufficiently to become quite hard, which will take but a short time.

After the impression has been taken, the outside of the gutta percha is trimmed to the required shape and form, and any little tape intended to allow the withdrawal of the pattern from the sand should be put on. The pattern can then be sent to the foundry, and the casting will fit into place quite snugly, with the least possible amount of filing and chipping.

NOVEL TWO-JET CARBURETOR.

A new and novel type of a two-jet carburetor, known as the Binks, has been brought out by an English concern. It differs from those of usual construction in the controlling mechanism, as the throttling member is a valve of the mushroom type; that is, it is a valve with a cone setting similar to a poppet valve in an internal combustion motor. This mushroom member controls the supply of mixture from the main jet, and one of the features claimed of it is, that leakage can occur only when the supplementary member is in service.

It is stated that when an engine is throttled down there is considerable suction exerted upon the motor side of the throttle valve, and any tendency for this

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to leak is apt to cause erratic running. It is claimed by the maker of the Binks device that with the mushroom type of valve leaks are impossible because the member is held down on its seat by a stiff spring.

At Fig. 3 are presented two views of the carburetor, that at the left showing the supplementary or starting jet within its small choke tube. The mixture passes into the main induction pipe above the mushroom valve controlling the main supply. Within this part of the chamber is fitted the small sliding piston valve, this being indicated by the dotted lines. This valve acts as the throttle of the supplementary mixture supplied by the small jet, and is directly connected to the vertical throttle spindle. The latter in turn is actuated by the bell crank lever which, at its lower end, has three optional points for the engagement of a rod connecting with the lever on the steering wheel.

The main throttle chamber and the mushroom valve contained therein also are operated by the throttle rod and lever, but the first movement of the latter two takes effect only upon the piston throttle previously mentioned. This is in order to give the supplementary throttle its essential lead. After the first quarter of an inch or so of its downward movement the throttle spindle actuates both the main and supplementary members concurrently, and holds the latter wide open. Above the starting jet chamber will be noted an additional air inlet device, a partial rotation of the cover thereof serving to open or close the small orifices depicted in the drawing.

In the sketch at the right is shown the main air intake. A feature in connection with this is the design of the choke tube, which consists of a plug, passing vertically through the air passage, having a large hole bored through it in one direction to allow passage for the incoming air and a small hole from the bottom leading into the main bore and providing for the accommodation of the jet. This plug is held in position by a friction spring and may be rotated by hand if desired. The effect of the movement is to restrict or enlarge the air passage forming the choke tube, and it will be noted that the plug is in such position that less than one-half of the bore of the inlet is utilized.

The plug may be removed easily by pushing the retaining spring out of its place in a groove, which operation will disclose the jet. If the latter require attention it may be displaced with the aid of a small wrench without disturbing the other components of the carburetor.

The top of the float chamber is secured by a spring which can be slipped to one side in removing the lid. The float spindle projects through the cover, but is covered by a thimble member held clear of the top of the spindle by a spring. If flooding the carburetor be desired the thimble is depressed but it is claimed that its construction is such that gasoline will not splash.

The float valve is inverted and direct acting, being at the lower end of the valve spindle. The latter is secured to the float by a split pin passing through an extension, making for easy adjustment.

FILTERING OLD LUBRICANTS.

It is surprising the amount of lubricating oil that is wasted in the average shop during the year and that more is not seen or heard of devices for economizing the lubricant. Many repairmen make it a practise when overhauling a car to throw away the old oil. In the course of a year this amounts to considerable and it could be saved if filtered properly. One owner of a shop who watches small details very carefully to keep down the overhead expense, devised a filter which, he states, proved practical and was the means of saving many gallons of oil during a season.

The device consists of a round tank, two ordinary tin funnels, waste, an extra vessel and some metal tubing. The tank holds several gallons and on the inside are soldered rings, these forming projections on the walls to retain the funnels. A fine mesh brass

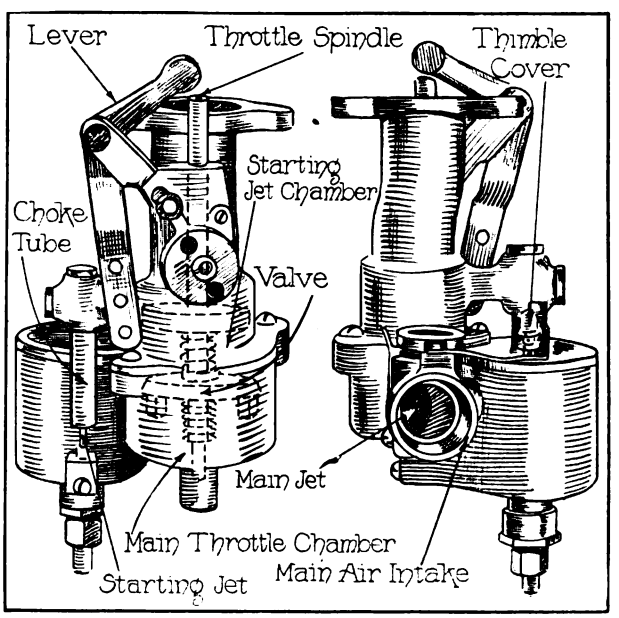
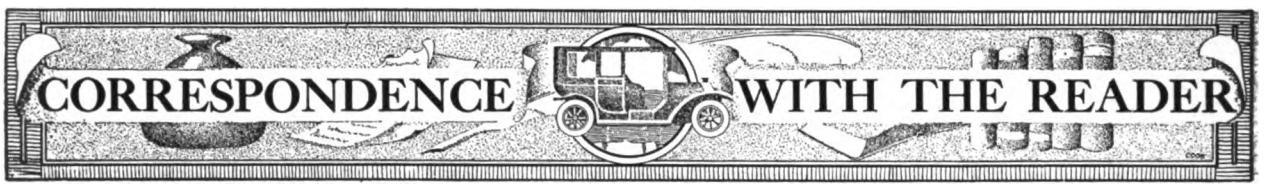


Fig. 3—Novel Type of Two-Jet Carburetor in Which a Mushroom Valve Controls the Supply of Mixture.

screen is fitted to the upper part of the container and so constructed as to be removed, this being necessary when the filtering material is renewed.

The bottom of the tank is drilled, a .25-inch copper tube soldered and led to a container. A pet cock is installed in the line so that the dripping oil may be shut off while the receiving member is being emptied or any part of its contents is being used. The waste is fitted loosely in the funnels and when the old oil is poured in at the top of the strainer the wire screen separates bits of metal and foreign elements. The fluid then passes to the first funnel, is filtered, and thence flows to the second member where the process is repeated. The oil resulting from the process is remarkably clear and the inventor of the device states that he employs it in his car where it has given satisfactory service.

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Gear Ratios and Valve Timing.

(1355)—In different automobile catalogues I find the statement, "gear ratio, standard, 3.5 to one." Will you kindly explain what this means and how it is figured out? I would also like to know how to time an engine when the magneto has been removed and the firing order of the cylinders is 1, 3, 4, 2.

JOHN R. FINGAR.

Red Hook, N. Y., March 25.

By the gear ratio is meant the proportion of the driving gear to that of the driven member; that is, the number of teeth on the pinion and crown gears. The former is a small gear fitted to the end of the driving shaft and meshes with a larger member which transmits the energy of the motor to the driving or rear wheels. The standard ratio of 3.5 to one means that the pinion gear revolves 3.5 times to one rotation of the crown gear. The ratio may be two to one and even direct but these are used only where excessively high speeds are desired, as in racing.

The need for a reduction between the motor and driving wheels in addition to the transmission is obvious. If the road wheels revolved at the same rate as the crankshaft of the motor not only would the machine travel at too high a speed but it would be difficult to surmount grades. For example: If the driving wheels were 36 inches in diameter and revolved at 400 turns a minute, or at the same speed as that of the crankshaft, the machine would travel at about 30 miles an hour. To obtain a speed of 10 miles an hour the motor would have to be throttled so low that its efficiency would be greatly impaired. The power output increases in proportion to the number of explosions; that is, the rated horsepower will not be developed until a stated or maximum of revolutions is reached.

The ratio of 3.5 to one is generally employed and this may be obtained by dividing the number of teeth on the crown gear by those of the pinion. For example: If the latter have 16 teeth and the crown 56 the ratio would be $56 \div 16 = 3.5$.

Regarding the second question relative to the timing of a four-cylinder motor, this was described fully and illustrated in the Sept. 23 issue of The Automobile Journal.

Installing Self-Starter.

(1356)—Can a self-starter be installed on a crank machine so it will be a thorough success? We own a Ford model T car which has been in service one year. I would like to find out if this can be done and whether it would be successful or not. JOHN TORADO.

Superior, Col., March 30.

A self-starter could be fitted to the automobile in question and these may be divided into four classes, electrical, mechanical, explosive mixture and compressed air. There are a number upon the market which appear to be practical and to be giving satisfaction. The explosive mixture, in which acetylene is usually employed, is a simple system to install, and when fitted to the Ford car would require drilling and tapping the cylinder head for attaching the valve or other members utilized to connect the pipes conveying the acetylene to the combustion chamber. Also it would be necessary to employ dry cells or a storage battery in order to produce a spark in the cylinder by retarding the spark lever, which operation is similar to that of starting the motor on the switch.

With the compressed air type the air is introduced into the cylinder for the purpose of exerting pressure against the piston and with this system the cylinder head would have to be altered. With mechanical or electrical systems the crankshaft is rotated until the engine operates. The various systems are described and illustrated in a series of articles now appearing in The Automobile Journal.

Voltage at Magneto Terminals.

(1357)—What is the correct number of dry cells to use with a Bosch double ignition system such as is used on the ——— car and why? What voltage is delivered at the spark plugs by the Bosch step-up transformer with the dry cells reading six volts? What voltage is delivered at the magneto terminals of a Bosch magneto at ordinary engine speed? H. P. LASHER.

Cushing, Ia., April 2.

The Bosch Magneto Company, New York City, advises the use of two sets of five dry cells in series parallel with a dual system. Regarding the voltage delivered at the spark plugs by the Bosch step-up coil with dry cells reading six volts: This is a difficult question to answer, owing to the fact that this being a straight induced current, there are no instruments made for the purpose of measuring the same. The only way that coil voltages and magneto voltages are measured is by the distance the spark will jump across in the open air.

Cylinder Pressure.

(1358)—What is the number of pounds pressure, reckoned according to any standard pressure gauge, of the air in the cylinder of a gas engine like those used on automobiles, when the piston is at its highest point, assuming that there is no leakage? S. O. PITTS.

Archer, Neb., April 5.

The pressure when measured with a standard pressure gauge will vary according to the design of the motor. In some types it may be as high as 75 but this is the exception rather than the rule. From 40 to 75 pounds would be a conservative estimate.

Noisy Valve Tappets.

(1359)—I have a 1909 model ——— four-cylinder car. The valve tappets make a lot of noise and when ad-

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justed up close to eliminate the clatter, the compression is lost. Is there any way to stop the noise?

H. S. TOWER.

Sioux City, Ia., April 7.

The worn parts may be replaced with new members or repaired. On the type of motor referred to the clatter can be eradicated by inserting fibre as shown at A in the accompanying illustration, which depicts a conventional type of adjustable tappet. The plungers should be removed complete, taking care to mark each, unless already so numbered. As the valves will have to be removed it will afford an excellent opportunity to inspect them and grind if needed. Before removing the plunger, however, much time will be saved by measuring the space between it and the tappet. This should be done when the motor is warm to secure accurate results, also to ascertain whether or not there will be sufficient space to insert a reasonable thickness of fibre. All measurements should be taken with the valve seated.

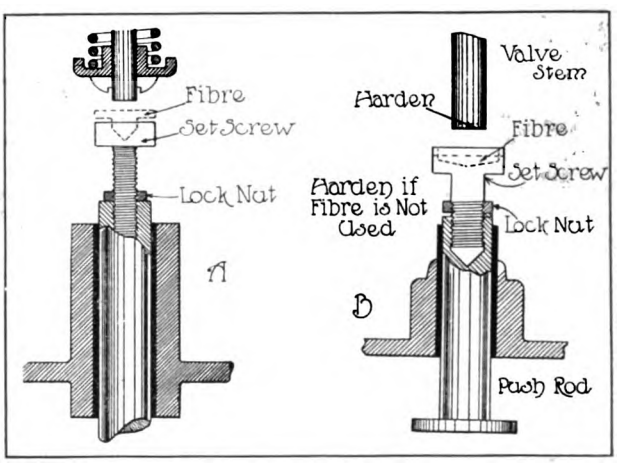
To ascertain if the space between the tappet and plunger will permit of the use of .125-inch fibre or more, the lock nut should be loosened and the set screw turned down as far as it will go. Assuming that the space permits of the use of .25-inch fibre, more or less, the T head, as shown in the sketch by dotted lines, is best, as by using a thin flat file the indentations made by the constant hammering can be removed. Take a piece of fibre, preferably French, .75-inch, which will be large enough to permit of turning down. Next cut out pieces larger than the diameter of the set screw. The latter having been removed from the plunger, the temper is drawn and then placed in a lathe and a bottomed hole drilled .375 inch in diameter and any convenient depth. A better way is to use a regular drill which will necessitate turning a teat on the fibre. The fibre is then placed in the lathe and one end turned slightly in excess of .375 inch in diameter in order that a drive fit can be made in the head of the set screw.

Allowance should be made in turning the stem of the T fibre that fits into the recessed set screw head so that when the drive is effected the fibre will seat firmly at all points. The fibre is next driven in the set screw head, after which it is placed in the lathe and the T section of the head turned to the diameter of the head of the set screw. The latter is then placed in the plunger and inserted in the motor for adjustment.

Another method is shown at B, which also depicts fitting a non-adjustable tappet with means for setting. Here the tappet is drilled out as shown by the dotted lines and the fibre turned for a drive fit and forced in position, after which the material is trued up with a smooth file. This method is preferable where the head of the tappet member is larger than the diameter of the valve stem and where the latter strikes in the centre of the tappet.

While at first glance it would appear that on some types of motors there is not space enough to permit of the addition of a set screw and locking nut it can be accomplished usually by cutting off the pushrod bushing, if it extends above the crankcase wall, or by shortening the valve stem and valve spring. This can be determined by measurement. Assuming that the space permits, the valve and pushrods are removed. If there be space enough to add set screw and lock nut by cutting off pushrod and bushing, it will not be necessary to remove valves. If such prove the case the work is made easier. After measuring the thickness of head of set screw and lock nut to determine how much will have to be cut off the pushrod, the temper should be drawn to permit of drilling the hole as described at A.

The pushrod may be drilled .3125 or .375 inch or more in diameter as it may need. It is then tapped. Care should be observed in drilling the hole that it will be deep enough to allow the set screw and lock nut to be screwed down snugly against the end of the



Quieting Noisy Tappets: A, Fitting Fibre Insertion to Head of Tappet; B, Method of Converting Tappet into Adjustable Member, also Equipping Same with Noiseless Material.

pushrod. The insertion of the fibre can be made as referred to in the description of A. Should it be decided not to use a fibre insert, the head of the set screw must be hardened, as well as the end of the valve stem, provided the length of the latter were reduced.

In adjusting these members, which operate the opening and closing of the valves; that is, timing, it should not be guess work. A common rule is to leave a space between the valve stem and tappet of about the thickness of an ordinary business card, and while this may be practicable with many motors the best method is to time the valves by the marks on the flywheel. The majority of makers indicate the proper opening and closing of the valves upon the periphery of the flywheel, also fit an indicating arrow for checking the marks. The operation was explained fully in the issue of The Automobile Journal for Sept. 9.

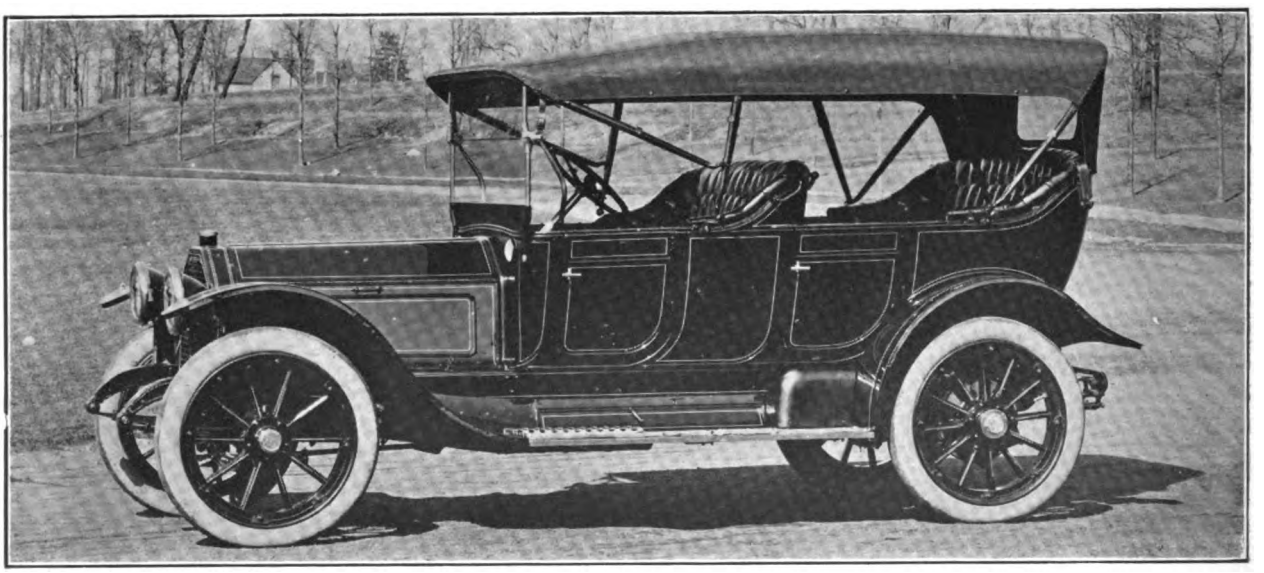
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PEERLESS MOTOR CARS FOR 1913.

THE Peerless Motor Car Company, Cleveland, O., has announced that the cars it will produce for the season of 1913 will be practically a continuance of the type it is now offering in the market, with such refinements as have been dictated by experience and careful experimentation. The Peerless company is one of the best known automobile builders in America and its vehicles have been consistently of high grade. Not often are material changes made in Peerless machines and types produced have been developed and refined with consistent care. The policy has been to practically standardize models, in keeping with which the company will produce five chassis sizes for 1913, of the same dimensions and with power plants of the same capacity as those built by this concern for the 1912 season.

produce power considerably in excess of the standards established by the company. The engine of the "38-Six" has four-inch bore and 5.5-inch stroke, that of the "48-Six" 4.5-inch bore and six-inch stroke, and that of the "60-Six" five-inch bore and seven-inch stroke. The ratio of stroke to bore with these is respectively 1.375 to one, 1.333 to one and 1.40 to one, placing them in the classification of long-stroke motors. The "40-Four" motor has a bore of five inches and a stroke of 5.5, the ratio of stroke to bore being 1.10 to one.

All the motors are powerful and smooth in operation with high efficiency and silence especially desirable. The six-cylinder engines have that extreme of flexibility characteristic of the type, the long stroke and the Peerless construction. The design of the



The Peerless "38-Six" Touring Car, 1913 Model, with Top Elevated.

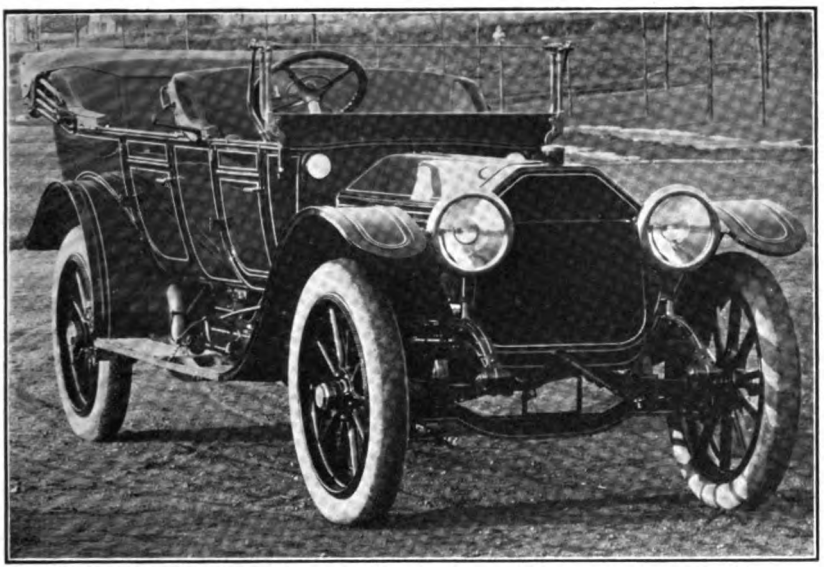
The company by its statement has emphasized the fact that Peerless cars in design and construction have been justified by continued service under all conditions and that in the minor betterments made in machines for next season the purpose has been to harmonize the entire assembly to a larger degree. The fact that there will be no constructional changes may be accepted as evidence of the merits of the machines, for when summarized it may be said that the improvements to be made will be with reference to auxiliaries only.

There will be three six-cylinder chassis, these being designated by the power as "38-Six," "48-Six" and "60-Six," and two four-cylinder chassis similarly defined as "40-Four" and "24-Four." These ratings are the even figures obtained in the horsepower formula of the S. A. E., the fraction being eliminated from the designation. These motors, without exception, will

engines and the installation in the chassis are such as to afford full accessibility that there may be the largest economy of time in giving necessary attention or making repair or restoration. This applies to all components of the power plant assembly. This quality is fully realized by those having experience with motor car operation.

Elimination of possible causes for annoyance and simplification have been the principal purposes in the refining of the Peerless chassis. Conditions that might result in complications have been studied and improvement determined. The Bosch dual ignition system has been adopted and will replace the Bosch double synchronized method, this simplifying the energizing of the motor by eliminating one set of spark plugs, one series of wires in the distributor installation, and the battery commutator, the last being driven by a bevel gear from the crankshaft. With the

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Front View of the Peerless "60-Six" Touring Car, 1913 Model.

spark plugs being supplied with energy from the magneto, or from the battery through the distributor of the magneto, the electrodes are always clear and in condition to fire the engine efficiently.

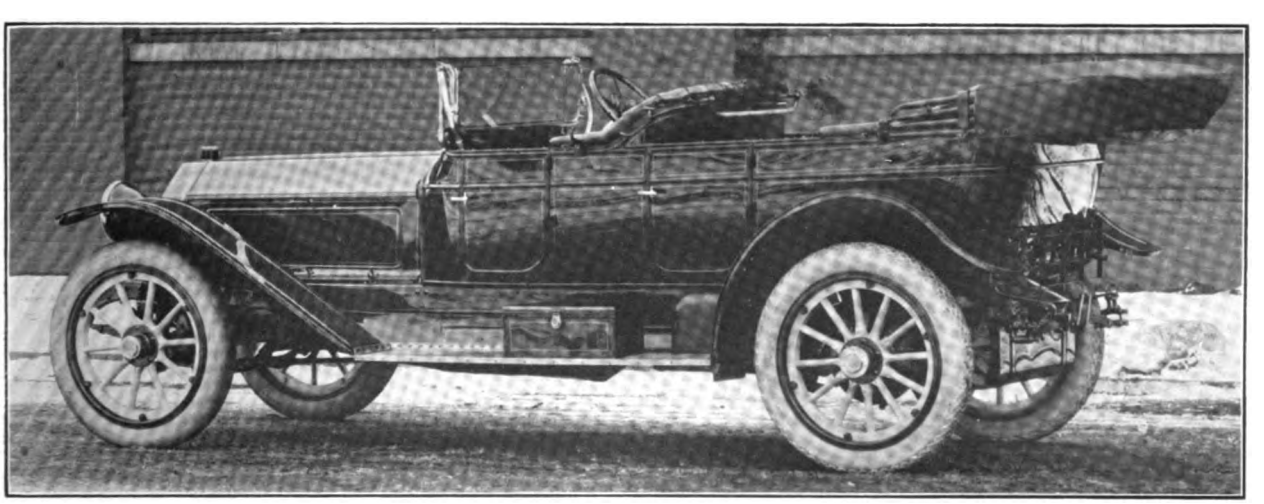
The vulcanized rubber rod in which the wire leads of the ignition system are imbedded, used on the 1912 cars, has been replaced by a made-up wire bar that is more compact, is lighter and permits a mounting that is less conspicuous. The neatness of appearance of the motor is decidedly enhanced and the motor at the intake side is much more accessible. This has made possible the elimination of two connections in each lead from the magneto to the spark plugs, a factor of some importance. The conductors are the more perfectly insulated and have greater efficiency electrically. Each conductor may be removed or replaced without removing the entire unit.

The dynamo of the Gray & Davis lighting system is so installed that it is driven by belt from the fanshaft instead of from the pump shaft. The speed of the generator is greater when compared with the crankshaft and the dynamo can effectively charge the storage battery or supply the driving lights when the car speed is 10 miles an hour.

The system for engine lubrication, by splash, is unchanged. In this a tank of about a gallon capacity is bolted to the engine case. A hand pump attached to the tank affords means for filling the engine case compartments, this supplementing the mechanically driven pump that circulates the lubricant through a tube system and sight feed gauge on the dash from the oil reservoir to the engine case pits. The two drain cocks of the crankcase are linked to a single lever so that both may be opened at once. This lever is so located that it is impossible to lock the hood on its seat when the cocks are open and the car cannot be driven with the oil draining, so that burning a bearing from lack of lubricant is an impossibility.

In the control of the fuel gas supply a damper throttle will replace one of the piston type. The action of the damper form is more positive at slow speed, owing to the fact that an equal movement of the steering column hand lever or the foot accelerator causes a less effective opening or closing of the throttle. At high speeds there is less obstruction to the passage of the gas from the mixing chamber of the carburetor to the explosion chambers of the cylinders. The device is lighter and the parts are less in number.

The radiation is efficient, the water being forced through the water jackets of the motor and the radiators of the Peerless design by a centrifugal pump, driven by herringbone gears that are noiseless in



The Peerless "48-Six" Touring Car, 1913 Model, with Top Lowered.

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operation, and that perform their work well.

Passing from the power plant the practical and satisfactory expanding band clutch, with cork inserts, is contained without change. The Peerless arched rear axle, of the full floating type, a distinct and exclusive feature, has the qualities of appearance, strength and mechanical efficiency. The weight of the car is carried by the outer axle. The cast steel differential case is bolted at either end to the flanges of heavy gauge steel axle tubes that carry the wheels at the outer end. The power is transmitted through live axle shafts operating clutch plates in the rear wheel hubs. The wheels are dished to secure greater strength and minimize the effect of side thrust. Three point spring suspension is the practise, the springs being of special imported Krupp silico-manganese steel.

The bodies for all models save the "24-Four" are touring, torpedo, limousine, landaulet or berline, with the addition of roadster and coupe bodies for the "38-Six." The bodies for the "24-Four" town car are limousine and landaulet. With these dome side lamps set into the dash replace those of the bull's-eye type that were hung on a bracket, this change preserving lines and surfaces that were formerly broken. The lamps are an integral part of the superstructure and being with ground lights are appropriate to any treatment. The stays of the glass front that slanted across and cut the lines of the bonnet are turned back to the body parapet in the latest designs. Shorter and lighter than before, the stays may be used as handles to assist one in entering or leaving the front seat of a car. To these stays the straps of the raised top are attached. The control levers are all within the bodies, which are made unusually wide to insure comfort in driving, permitting the passengers the greatest freedom of movement. The extra tires are carried in recesses in the running boards that drop the tires below the parapet of the body and out of the way of the passengers. The chair seats in the tonneau fold out of sight.

TIRE SHORTAGE POSSIBLE.

According to J. C. Matlack of the Ajax-Grieb Tire Company, Trenton, N. J., maker of Ajax tires, manufacturers are expecting a tire shortage during the coming season. He says: "This condition is brought about not alone by the largely increased number of new automobiles, but also because the old cars need tires, too. Foreseeing this shortage, the leading makers have increased production estimates, but they will be sold out early, in spite of this precaution.

"New territory for the automobile dealers is being opened and exploited every day. The tire dealer must of necessity follow closely. Districts formerly untouched by motoring, have thus become active producing centres for the tire man. It is an easy thing to explain the inevitable tire shortage in 1912."



COMING EVENTS.

April.

April 27—Speedway meet, Los Angeles, Cal.
April 27—Roadability run, Philadelphia, Penn.
April 29-May 4—Show, Burlington, Vt.

May.

May 4—Road race, Santa Monica, Cal.
May 14-17—Commercial car trials, Chicago, Ill.
May 17-18—Track races, Denver, Col.
May 30—Track events, Salem, N. H.
May 30—500-mile race, Indianapolis, Ind.

June.

June 6—Reliability run, Washington, D. C.
June 20—Algonquin hill climb, Chicago, Ill.

July.

July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach meet, Old Orchard, Me.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Road races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.

WOMEN ENJOY NATIONAL CARS.

Women have for some time been a strong factor in molding the design of automobiles, according to George M. Dickson, general manager of the National Motor Vehicle Company, Indianapolis, maker of National cars. The new models of this make, fitted with left hand drive, centre control levers and self-starting device, are making a decided appeal among women motorists. Mr. Dickson explains this as follows:

"With the left hand drive, women are able to drive with more assurance. They are able to get a clear view of the road ahead when desiring to pass other vehicles, and it is possible to take turns in crowded city traffic with much greater safety. The instinct to reach for the control levers with the right hand is not lost with the centre position for these. Moreover, easy access to the front seat is afforded with this construction."

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

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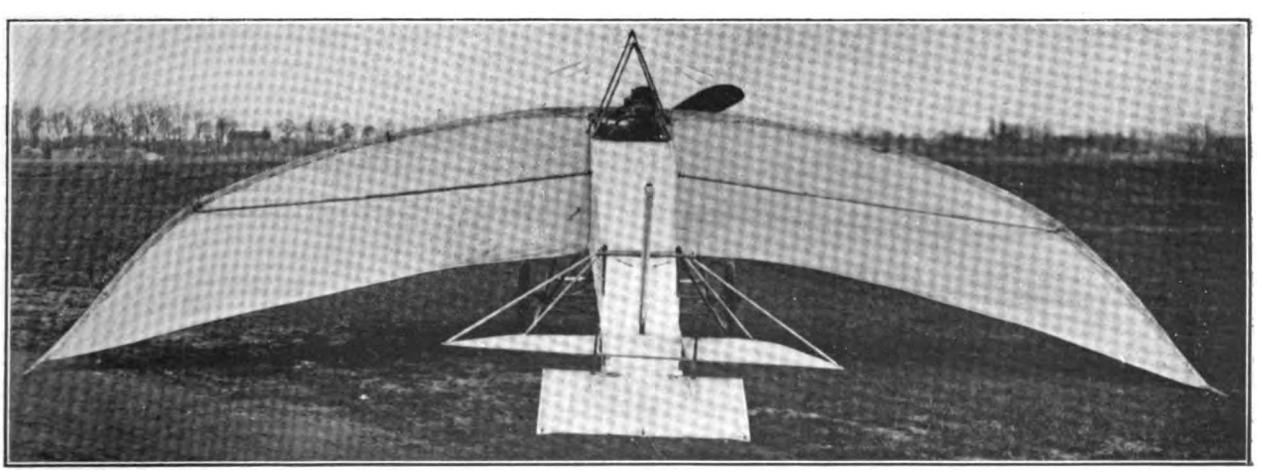
The fourth international race for the Gordon Bennett cup will be flown at Chicago, Ill., Sept. 9, the Aero Club of America having inspected the field selected by the Aero Club of Illinois and decided upon the date. The committee which viewed the course holds it is the best that has yet been selected for this race. The revised list of entries is as follows: France, three; Belgium, three; Holland, one; Switzerland, one; Great Britain, two, besides the three from America, making a total of six countries to be represented by 13 aviators, according to the present plans.

While complete details as to the final outcome of the world's first hydraeroplane meet at Monte Carlo are lacking, it would appear that the Curtiss machines were somewhat outclassed in passenger carrying ability by those of French manufacture, some of which were manifestly redesigned for the occasion. The explanation of the system for marking is somewhat indefinite, but appears to have been based largely upon the number of persons carried as well as the matter of altitude reached and the ease with which the machine started from and alighted on the water.

Pending further details concerning the meet, the following results are somewhat unsatisfactory: Fischer won first place with 48.7 points in a reconstructed Henri Farman biplane; Louis Paulhan was second with 40.8, flying a Curtiss hydraeroplane, while his teammate, Hugh Robinson, was third with 33.9. Renaux in a Maurice Farman was fourth with 33.7; Caudron in a Caudron "canard" was fifth with 30, and Colliex with a Voisin sixth with 28.5. Other aviators who took part were Benoist, Rugere and Cunne, but it is not known what machines they flew.

An accompanying illustration presents a new and rather novel monoplane recently brought out in France and termed the Licat du Breul. It will be noted that an attempt has been made to gain a large supporting surface with corresponding reduction in waste space. The spread of the wings is 35.6 feet and the total length 33.5 feet. The fuselage is completely enclosed and extends beyond the remarkable sweep of the wings to a fixed empennage, with hinged elevator and rudder. The control is assembled in a unique wheel device at the forefront of the main plane. Thus far, little information has been received in this country as to the demonstration of this machine's ability in actual flight.

The Wright brothers have announced their intention of appealing from the decision of the German patent court, which recently held that the Wright patents had been invalidated in that country. Under the laws of Germany, a disclosure of an invention by



Novel Licat du Breul Monoplane Recently Produced in France, in Which the Distinguishing Feature May Be Termed the Exceptional Wing Spread.

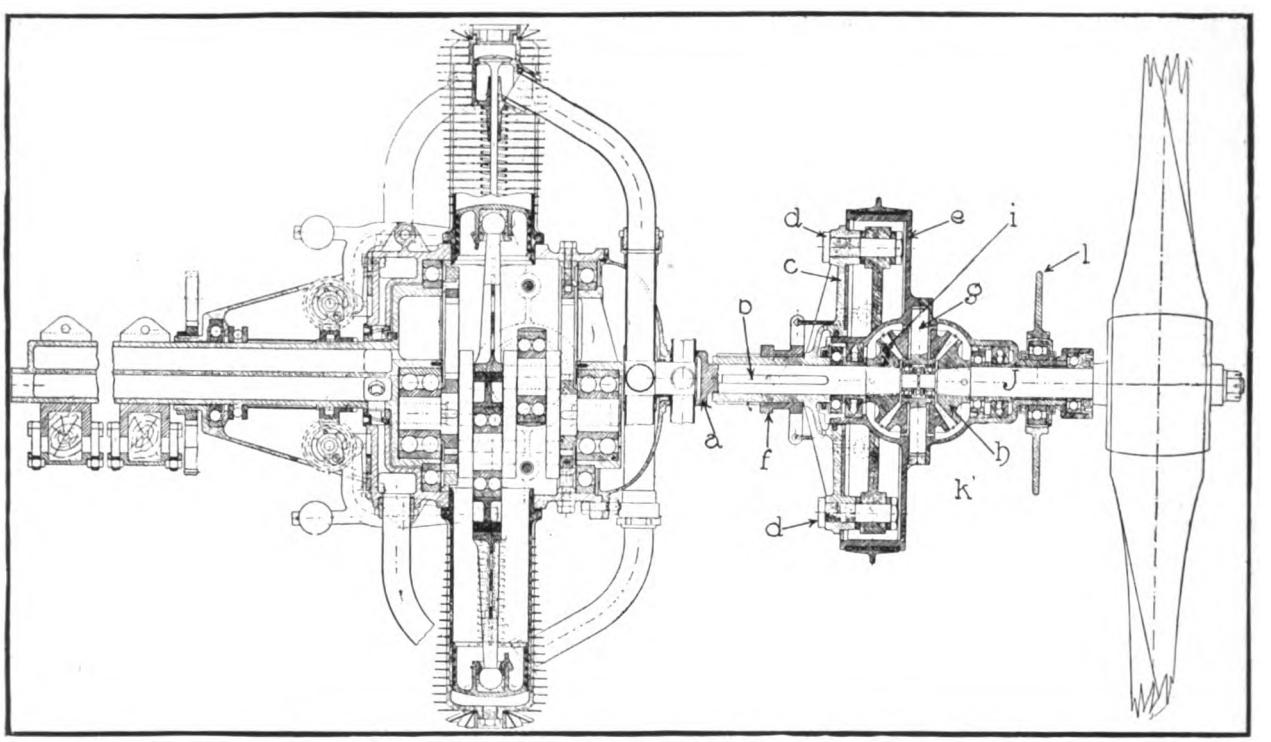
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the inventors, or by anyone else who has knowledge of it, before the application for a patent is filed is sufficient to render the patent void. The evidence before the court showed that Octave Chanute, in an address before the Aero Club of France in April, 1903, made use of the following statement regarding the experiments of the Wright brothers at Kitty Hawk, N. C., in 1902: "To assure transverse equilibrium the operator works two cords which warp the right and left wing, and at the same time adjust the vertical rudder."

The court held this was sufficient to void the patent, inasmuch as the application was not filed in Germany until after this speech. The Wright brothers claim that the decision of the patent court is not based on the proper interpretation of the law, in that it is possible to reduce the speed of the propeller, and if necessary to reverse it, without uncoupling the motor or reducing its speed in any manner.

It will be understood that by the use of this device it is possible to allow the motor to continue running at slow speed while making a descent against the wind, thus having it ready at all times to start the propeller at full speed should it be found necessary to change the course, or to ascend again in order to find a safer landing place. It is further claimed that the ability to drive the propeller backward at any desired speed will permit of retarding the movement of the aeroplane with respect to the wind which is carrying it beyond the point selected for a landing.

The construction of this device is as follows: To the extension of the motor shaft a is connected a



Buchener Brake of German Construction, Designed to Eliminate Danger of Accident in Making Aeroplane Landings Under Difficult Circumstances.

that the disclosure was by no means sufficient to enable anyone to construct a successful aeroplane.

In view of the number of aeroplane accidents resulting from an attempt to make a satisfactory landing under unsuitable circumstances there has been a determined effort upon the part of constructors to bring out some kind of safety attachment in the nature of a brake, which shall act to check the forward speed of the machine without in any way causing additional disaster by tipping it over. An accompanying sketch brings out the details of the braking device produced by M. Buchener, Koln, Germany, and consists of the assembling of differential gearing between the motor and propeller in such manner flange c, by means of its sleeve axle and key b. This flange supports at its outer edge two bolts d d, which hold the two shoes of the expanding brake situated inside the brake drum e. This brake drum also contains an outside brake fixed to a point operated by a lever not shown in the drawing.

The inside or expanding brake is operated by the sleeve f. The casing e carries a differential gearing in much the same manner as the differential casing of an automobile rear axle. The cross shaped bearing g, carrying the smaller differential gears, is fixed to this casing, while the larger differential gears h and i are fixed, one to the propeller shaft j and the other to the extension of the motor shaft a.

To drive the propeller forward: The outside

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brake is let loose, while the inner brake is expanded so that the shoes press against the inner wall of the brake drum, taking this drum and the differential casing around with the revolutions of the motor shaft. The small gears k act as a coupling between the two larger gears h and i and the casing e. As can be seen by the drawing, in this position of the brakes, the propeller shaft must be driven at the same speed as the motor shaft.

When it is desired to run the motor without the propeller, the two brakes are loosened so that the flange c can revolve independently of the casing e. The small differential gears are driven in a waltzing movement around the gear h, which is then stationary, and the shaft of the propeller, by the gear i of the motor shaft. The casing e also revolves around the axle of the main shaft, being carried around by the cross member g.

To drive the propeller backward: The inside brake is loosened, while the outside brake is tightened so that it holds tightly the casing e, to which are fastened the small differential gears. As these gears are held by the casing and cannot revolve around the main axle, but simply turn on their own axle, being driven by the gear i on the motor shaft, they only can serve to drive backward. As this gear is attached to the propeller shaft, the propeller therefore is driven in the same direction.

The flange l supports the differential casing and all shafts turn on ball bearings. The motor, which is connected to the transmission by means of a universal joint, is of the revolving type. It is air-cooled and also turns on ball bearings.

The first hydraeroplane meet in this country will be held on New York bay and the Hudson river, May 4, under the auspices of the Aero Club of America. The events will include a speed contest, which will start at Coney Island, the finish being at Sailors' monument. There also will be bomb throwing contests and a competition for quick getaways. Trophies for the various events have been offered by the club, and a number of entries have been received, although the list will not be made public at present.

Miss Mary Davis of England is the first woman to cross the English channel in an aeroplane, having accompanied Gustav Hamel in a Bleriot monoplane, April 3. The party left Hendon, England, at 9:38 in the morning and landed at Saint Ingelvert, France, at noon, without incident. After a short stop at this point the machine made a second ascent and alighted on the flying field at Issy les Moulineaux at 5:55 in the afternoon.

So far as is known the first use of an aeroplane as an ambulance was by George W. Beatty at Nassau Boulevard flying field, Long Island, March 31. Oliver B. Sherwood, who had been flying a Church biplane, lost control of his machine and was dashed to the ground. The machine was wrecked and Sherwood was severely injured. Beatty, in a Wright biplane, happened to be near, and placing the injured man in the empty seat beside him, flew to the Nassau hospital, where it was stated that the flight through the air had greatly revived the patient.

The District of Columbia court of appeals has reversed the decision of the commissioner of patents, and has authorized the reinstatement of the application of Hugo Mattulath of New York for a patent on a flying machine, filed Jan. 8, 1900. When this application was examined, the official report on its read as follows:

"No successful attempt has yet been made to rise from the earth's surface by means of an aerial vessel unprovided with a balloon," and concludes with the observation that "the practicability of the apparatus is so problematical that actual demonstration of operativeness will be required before the grant of a patent."

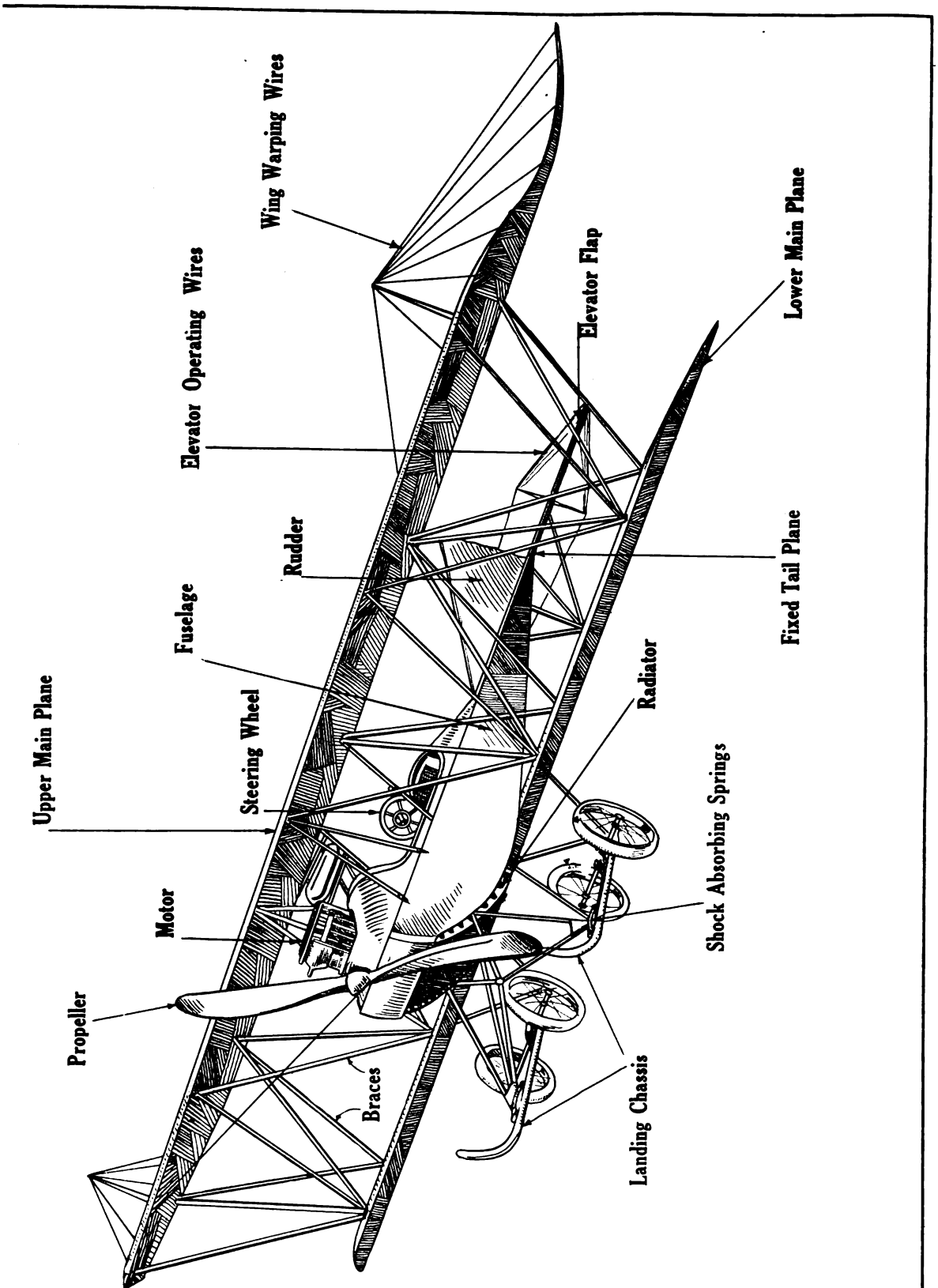
Mattulath died soon afterward and it was not until 1909 that his widow found the application. The Wright biplane was perfected some time after the date on which the application was filed, and it is claimed that the much discussed wing tip flexing device was contained in the Mattulath invention. Suits will now be brought against the Wright brothers, Glenn H. Curtiss and others, based upon a prior right to the inventions patented by them.

Henri Wynmalen of Holland, who is looked upon as a possible representative of that country in the international race of 1912, has been testing out a new Oertz monoplane in Germany with excellent results. It is claimed that during these tests the machine developed a speed of 90 miles an hour.

It develops that the world's endurance record for four passengers, made by Adolf Rentzel at Munich, Germany, Feb. 17, was with an Otto biplane, equipped with an Argus motor and utilizing a Bosch magneto, made by the Bosch Magneto Company, New York City. Rentzel remained aloft with his four passengers 21:45.

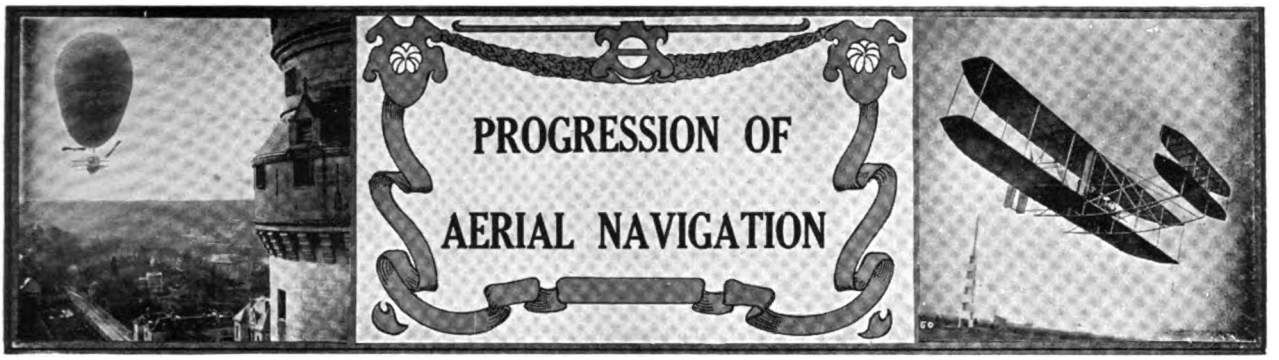
Glenn H. Curtiss has brought out a new double steering wheel for use of instructor and pupil in learning how to operate an aeroplane. The device comprises two wheels attached to one common steering post, controlling the action of the rudder, etc. The method differs materially from that used on most machines, in which the steering wheel is arranged so that it may be swung from side to side, for use by either occupant of the machine as desired. Through the use of the new Curtiss double wheel, it is possible for the instructor to allow the pupil full opportunity to operate the machine, without entirely losing control himself.

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Perspective View of Albatross Monoplane, a German Machine Possessing Several Interesting Features of Design and Construction.

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THE ALBATROSS BIPLANE.

Although America more generally associates aviation in Germany with the dirigible balloon, the fact remains that some very creditable and original aeroplane designs have been produced by German constructors. Not the least interesting of these is the Albatross biplane, constructed along lines somewhat reminiscent of the Etrich monoplane in Austria, although the methods employed are distinctly dissimilar. The initial design was for military purposes only, although it has now been standardized, and it is said that it is possible to secure a monoplane along the same lines, as well.

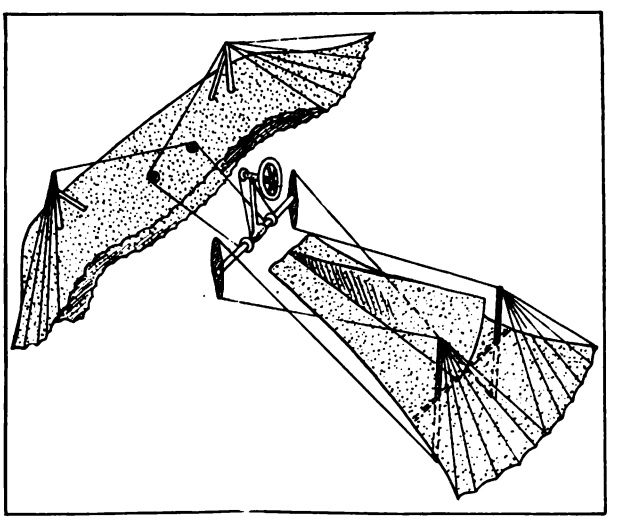
For some reason, the French constructors always have looked upon the Albatross in a spirit of contempt. The name may have occasioned this feeling, although it must be said that it aptly describes its appearance when seen at a distance and from the side. In that case, the flexible end of the upper main plane assumes the outlines of a bird's wing in a very much more suggestive form than with any other machine built.

It should be said at the beginning, that the workmanship on this machine has been very carefully executed. At the recent international salon in Paris, no aeroplane on exhibition displayed a finer attention to detail than the Albatross. It has demonstrated its practicability in extended flight, and there is absolutely no reason why it should not be considered as a thoroughly perfected type.

The main planes are staggered, all the bracing between them being accomplished by ferruled wooden struts, of which there are a large number. The lower plane is somewhat smaller than the upper and slightly shorter. Both are designed along what may be termed Etrich lines. However, the upper plane is of a distinctly original conception, as has been indicated above. Both wings are double surfaced.

No wires are employed for bracing, and the wooden struts are 2.5 by one inch at the middle point and taper to 1.125 inch diameter at either end. Here a round 18 gauge, 1.25-inch diameter tube is fitted, and two .1875-inch rivets hold rigid the 10 gauge tongue plate which acts as the joint to the plane. Wing warping or flexing wires are attached to the top of the upper plane, their operation being explained in more detail later. A and B in an accompanying sketch set forth the method of construction employed in the wings themselves, and it will be noted that the entire trailing edge is flexible, although only the tips are warped.

The fuselage is covered with a thin veneer of wood throughout its entire length, with the exception of the forward end, which is encased in thin aluminum. The radiator is disposed under the front and below the engine mounting, where it is held to secure the maximum amount of cooling air from the propeller, which is at the extreme front. In addition this engine mounting and radiator location add to rather than detract from the graceful appearance of the assembly.

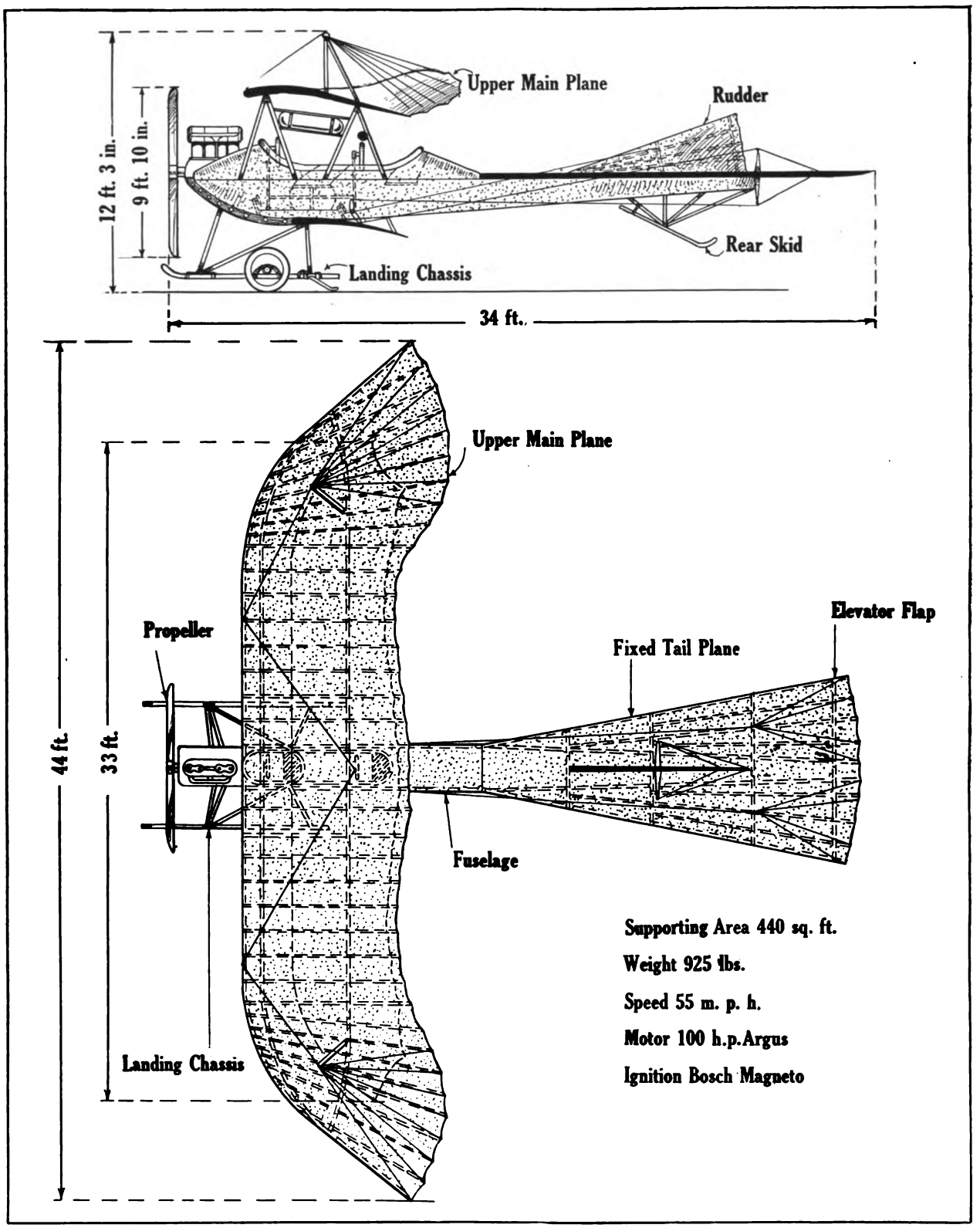


Sketch Indicating Control of Wing Warping and Elevator Wire on Albatross Monoplane.

At the rear end of the fuselage is the non-lifting triangular fixed tail plane, with the unbalanced elevator behind it, still further accentuating the bird-like appearance. Above the tail plane is the triangular balanced rudder. This empennage is protected from landing shocks by a stout curved ash skid, fitted with rubber shock absorbing rings.

The chassis is particularly sound and strong. The struts which carry the skids, on which the wheels are mounted after the plan inaugurated by Henri Farman, are not rigidly connected to the skids, but are

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Plan View and Elevation of Albatross Monoplane, Showing Detailed Dimensions and Principal Features of Design.

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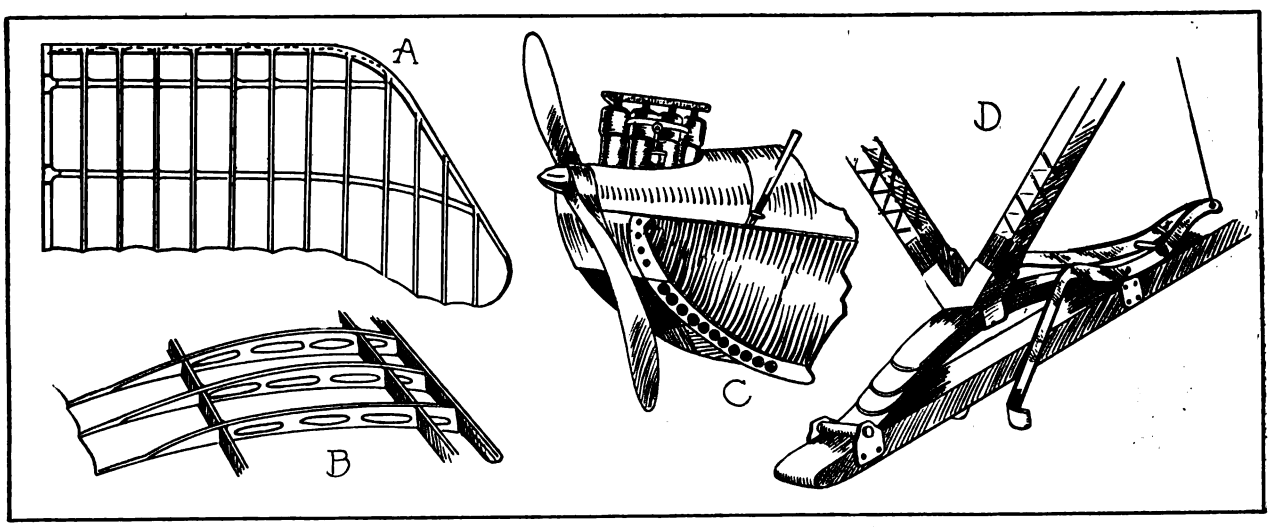
taken to a short laminated spring, thus effectually taking up all direct shock. In addition, it will be noted that each skid is strutted independently of the other, and each is fitted with a landing brake, operated by a separate column.

The slanting struts from the body taper from 2.5 by one inch down to 1.25 inches diameter at the round clip skid fastening. They are bound with 1.5-inch wide linen tape in two layers, these being wound in opposite directions, thus preventing the wood from splitting. The vertical struts are similarly bound and are fitted into steel boxes two by one inch, with a rectangular horizontal slot through the base, .5 inch deep. This takes a four-layer leaf spring, two inches wide, the three lower layers being of 10 gauge and the top of 14 gauge. The end of the front lowest leaf clips around a .3125-inch bolt held at either side of the skid by a 12 gauge steel plate. The other end slides under the clip holding the .625-inch radius rods. The brake is fitted on each skid just in front of the rear struts, and pivots on the .375-inch bolt around which is clipped the front edge of the back springs.

Two seats are provided, and these are arranged tandem. A particular feature is the double control system. The two sets are interlocked, this being accomplished by one universally jointed tube. Elevation and stability are controlled by a rotatable hand wheel mounted at the top of a vertical column. The rudder is operated by pedal.

Lateral control is by warping the wing tips. A vertical pillar one inch in diameter carries the steering wheel, back of which is a seven-inch drum with a .375-inch square groove. The warping cable passes twice around this, and twice around a subsidiary jockey pulley fixed at one side of the vertical column, about six inches above the horizontal 1.125-inch tube into which this pillar is fitted. Two more pulleys are disposed on the main plane before leading to the masts above the flexible wing tips. Two eyes bolted to the longitudinal members of the horizontal tube carry the vertical levers which take the elevator control wires.

The motor is a four-cylinder, water-cooled Argus, rated at 100 horsepower at 1200 revolutions a minute. Ignition is supplied by a Bosch magneto. Directly coupled to the engine is a Chauviere propeller nine feet 10 inches in diameter. The rated speed of the machine is 55 miles an hour.



Some Detailed Features of Albatross Monoplane: A and B, Method of Constructing Wings; C, Propeller, Engine and Radiator Mounting; D, Laminated Spring on Chassis Skid and Landing Brake.

NEW CLUB IN NEWTON, MASS.

The first step toward the organization of an automobile club in Newton, Mass., was taken March 29, when President L. R. Speare of the Massachusetts State Automobile Association addressed the motorists in the rooms of the Newton Club, Newtonville. Forty names were placed on the membership list and the following officers elected: President, Mayor Charles E. Hatfield; vice president, E. Ray Speare; secretary-treasurer, G. A. Strachan; directors, Samuel W. French, Mitchell Wing, Jarvis Lamson, George W. Nash. Herbert D. Forbes will represent the club in the American Automobile Association and George W. MacNear in the state organization.

CARTERCAR'S BOSTON BRANCH.

The fast growing popularity of the Cartercar, made by the Cartercar Company, Pontiac, Mich., in Boston and vicinity has made it necessary to secure a more favorable location, and it is now on display under the agency of Williams & Co., at 998-1000 Boylston street. The friction driven Cartercar has been represented in the East only a short time, but its splendid success during the recent Boston show would seem to indicate that it is to receive the same cordial reception here as has been accorded it for so many years in the West.

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MOTORING NEWS OF NATIONAL IMPORT.

John N. Willys Buys Controlling Interest in Gramm Motor Truck Company---Governor Wilson Signs Reciprocity Bill in New Jersey---New York Acts on Cut-Out Abolition---Minor Show Circuit Is Still Busy.

A transaction of importance to the automobile industry is announced in the statement that John N. Willys, president and sole owner of the Willys-Overland Company, maker of Overland cars, and allied interests, has purchased the controlling interest in the Gramm Motor Truck Company, Lima, O. The amount of money involved in the deal has not been made public, but it is understood to have been one of the largest transactions of this character in the history of the motor car.



John N. Willys, President Willys-Overland Company.

It has been known for some time that Mr. Willys was casting about for a truck plant which was equipped as he thought it should be to meet the requirements and demands of the commercial car users of America, and particularly with reference to the business arrangements of the more than 2000 Overland dealers throughout the country. The selection of the Gramm plant appears to be in keeping with this desire.

Mr. Willys' success in building up the production of Overland cars since he became identified with that company, is ample assurance that the future of the Gramm truck will be along liberal lines. It is understood there will be no change in the policy of the concern, except in the matter of broader production facilities, and in line with this suggestion, B. A. Gramm, one of the most experienced commercial vehicle manufacturers in the country, will be associated with Mr. Willys in working out the problem.

The Gramm plant is said to be the largest truck factory in the world, devoted exclusively to the manufacture of industrial transports. The buildings are located on 22 acres of ground, and 1200 men are employed. All of the equipment is of the very latest and best to be had, and the automatic machinery is the most modern in design. The buildings are of steel and reinforced concrete, and are valued at $1,250,000.

RECIPROCITY WINS IN JERSEY.

After Five Years of Exclusion Motorists Will Be Exempt Fifteen Days a Year.

Governor Wilson of New Jersey signed the so-called Stickel automobile reciprocity bill, April 2, and in the future non-resident motorists will be permitted to operate their cars in that state for 15 days in any one calendar year without paying for the privilege. The bill experienced a stormy time in the senate during the last few days, being defeated once by a vote of 10 to eight. March 27, it was reconsidered and passed by a vote of 11 to nine. The bill takes effect immediately.

This is the result of a campaign which has been waged against the discriminating Jersey law for the past five years, and is a decided victory for organized motorists. One feature of the new statute is not particularly attractive to resident motorists, since by its terms the registration fee is increased 50 per cent. This action was taken in order to arrange for the deficit which is expected to materialize as a result of the abolition of the special touring licenses, which non-resident motorists have had to procure in the past. The vital section reads as follows:

"Any motor vehicle belonging to any person who is a non-resident of this state and who has registered such motor vehicle and has complied with all the laws of the state, territory or federal district of the United States in which he resides with respect to the registration of motor vehicles and the display of registration numbers and who shall conspicuously display such registration number as required thereby, may be driven in this state during a period of not to exceed 15 days in each calendar year or on two or more occasions not exceeding in the aggregate the period of 15 days in any such year, without complying with or being subject to the provisions of sections 15 or 21 of the act to which this is a supplement or either of them, or with any of the preceding sections of this supplement; provided that each day or part of a day during which any such motor vehicle is within this state shall be considered as one of said 15 days; and provided further, that the provisions of this section shall be operative as to any such motor vehicle owned

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by non-residents of this state only to the extent that under the laws of the state, territory or federal district of his residence substantially similar exemptions and privileges are granted to motor vehicles duly registered under the laws of this state."

NEW YORK CITY BARS CUT-OUT.

Board of Aldermen Follows Example Recently Set by London County Council.

Following the example set by the city of London, the board of aldermen in New York City has unanimously passed a resolution prohibiting the use of the muffler cut-out in that city. This action was taken following a hearing granted to all parties interested, in which the Touring Club of America strongly advocated the passage of the ordinance, which becomes effective 90 days after signed by the mayor, and reads as follows:

"Every motor vehicle propelled by an internal combustion engine when such vehicle is on any street, road, avenue, alley, park, parkway or public place within the city limits shall when such engine is running be equipped with a muffler or silencer, through which all of the exhaust gases from the engine will escape into the atmosphere.

"It shall be unlawful for the operator or driver of any motor vehicle to use any cut-out, fitting or other appliance or a device which will allow the exhaust gases to escape into the atmosphere without a suitable muffler or silencer, as described in section 1.

"Any person violating the provision of this ordinance may upon conviction thereof by any city magistrate be fined a sum not exceeding $10, and in default of payment of such fine may be committed to prison by such city magistrate until the same be paid, but such imprisonment shall not exceed 10 days."

WOULD OPEN YELLOWSTONE.

Western States Join American Automobile Association in Petitioning Congress.

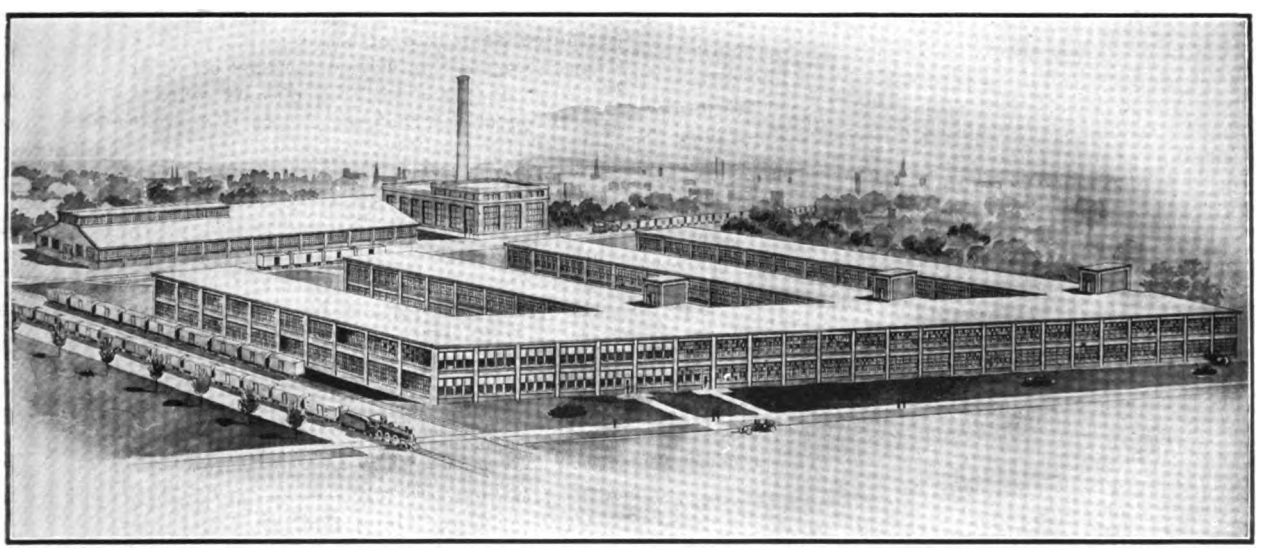
Motorists throughout the country are much interested in the effort to interest Congress in the proposition to open Yellowstone national park and other public preserves to automobile traffic. It appears that they are receiving valuable assistance from the boards of trade and other similar associations in the West, particularly in Utah, Wyoming, Montana and Idaho. These bodies have notified the American Automobile Association of their intention to do all in their power to bring about favorable action, and a decided public opinion has been aroused in consequence. The following is a copy of the resolutions from Salt Lake City:

"Whereas, the neighboring states of Idaho, Montana and Wyoming, through their commercial organizations, are now working for, and in some instances have requested, the opening of the Yellowstone national park to automobiles; and

"Whereas, the same request has been made by the American Automobile Association, an organization of thousands of American citizens residing all over the country, proving the desire is not local but general; and

"Whereas, the Yellowstone park can be seen with less expense, more comfort and less loss of time from an automobile than in any other manner; and

"Whereas, the park belongs to all the people, is kept open and maintained by the people, for all the people; and



Plant of the Gramm Motor Truck Company, Lima, O., the Controlling Interest in Which Was Acquired by John N. Willys, Recently.

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"Whereas, the opening of the park to automobiles would induce thousands of our citizens to 'See America First', by coming west instead of annually going abroad where the countries of Europe give automobiles free access to all points of interest, thereby enriching themselves by millions of American dollars every year; therefore, be it

"Resolved, that we hereby request Utah representatives in Congress to urge upon the proper authorities of the national government to take such steps as are necessary to at once give automobile access to the Yellowstone national park."

WATERBURY'S FIRST SHOW.

Naugatuck Valley Sees Thirty Different Makes of Pleasure and Commercial Cars.

The first organized showing of automobiles in Waterbury, Conn., was held in the Auditorium, March 27-30, under the direction of Frank Copithorn and John M. Sweeney. Flags, bunting and flowers were used in the decorations, and potted plants set off the various exhibits. It was a thoroughly representative showing of cars, and the business transacted was quite in keeping with the importance of the undertaking, many people in the towns throughout the Naugatuck valley taking advantage of the opportunity to examine and make selection from the season's models.

Thirty different makes of machines, represented by 50 pleasure cars and trucks, were on display. Several sales were announced during the opening evening and this example was followed throughout the remainder of the exhibition. The success of the venture was such as to indicate that the Waterbury show will be an annual feature.

Exhibitors of pleasure cars were as follows: Taber & Humprey, Reo; Waterbury Automobile Company, Overland; Blue Ribbon Garage, Packard; Field's Garage, Ford, Cadillac; Erwin M. Jennings Company, Alco, American, Stevens-Duryea, Hudson; B. W. Johnson, Brush; G. Irving Lake, Moon; Maltby Garage, Buick, Oldsmobile; E. H. Towle Company, Maxwell, Franklin, Locomobile, Columbia-Knight; Bristol Auto Company, De Tamble; Miner Garage, Pierce-Arrow; Turrell Garage, Rambler; State Garage, Regal, Abbott-Detroit; Boulevard Garage, E-M-F, Flanders; Saxe & Floto, Everitt; Jefferson Garage, R-C-H, Jackson.

Commercial vehicles were shown by: Maltby Garage, G. M. C.; Blue Ribbon Garage, Packard; Erwin M. Jennings Company, Lippard-Stewart.

Other exhibits included: Brass City Cycle Works, Merkel motorcycles; J. B. Ells, Pope motorcycles; A. B. Bentley, supplies; Waterbury Welding Company, welding; Carroll & O'Brien, accessories; Todd Rubber Company, Kelly-Springfield tires; Apothecaries Hall Company, supplies; Standard Engineering Company, fittings; Judd & Puffer, insurance.

BUSINESS AT MANCHESTER.

New Hampshire Citizens Visit Annual Display Prepared to Purchase Machines.

Strictly in keeping with the business possibilities demonstrated in other sections of the country, the second annual automobile show of the dealers in Manchester, N. H., March 25-30, started early with the sale of a Ford car. Other sales followed in quick succession, and the report of the exhibition may be summed up largely in the statement that it was the best show for business that has been held in northern New England. The management was in charge of J. H. Graham of Old Orchard, Me.

The event was staged in Mechanics Hall, which was completely transformed by a liberal use of bunting. The ceiling was hidden by a delicate pink and white, while the side walls were trimmed with red and white, rosettes of red, white and blue being distributed at points of vantage around the hall. The various exhibition spaces were set off by potted plants.

Among the exhibitors of cars were: A. C. Pollard, Stevens-Duryea, Chalmers, Modern truck; Howard Lamphrey, Firestone-Columbus, Stearns-Knight; Stewart & Fletcher, Elmore; Red Arrow Garage, Cadillac; Brodie Electric & Auto Company, Speedwell, Everitt, Ford; W. G. Spear, Hudson; Grout Automobile Company, Grout; E. Ray Shaw, Bergdoll; Concord Auto Sales Company, Cole; Georgi & Smith, Maxwell; C. R. Sawyer Company, Reo; Frank N. Young, Oakland; New Hampshire Auto Company, Knox, Velie, E-M-F, Flanders, Franklin; Smith & Ramsey, Overland.

WATERTOWN'S EXHIBITION.

Weather Conditions Fail to Discourage Visitors at Third Annual Event.

Despite the very poor weather conditions, the third annual show of the dealers in Watertown, N. Y., in the armory drill shed, March 26-30, exceeded in attendance any display of this nature held in this section of the state. The event was under the direction of President L. G. DeCant and Secretary Arthur E. Sherwood of the Watertown Automobile Association, and was a success from every viewpoint. In number of sales, it exceeded even the fondest expectations.

The interior of the hall was decorated with white and yellow bunting, and made an attractive picture when the thousands of electric lights were turned on. More than 50 cars, six makes of motorcycles and a large number of accessories made up the display. The list of exhibitors follows:

Cars—H. H. Babcock Company, Babcock electric; Watertown Automobile & Supply Company, Overland, Oakland, Mitchell; C. R. Wise, Cole, American; Gould Automobile Company, Buick; Edwards Automobile

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Company, Stoddard-Dayton-Knight, Maxwell, Columbia-Knight; Leon Quick, K-R-I-T, Cadillac; Nellis & Smith, Reo; Frank L. Massey, Marathon; Warner Automobile Company, Ford; A. E. Christopher, Hudson; W. P. Smith, E-M-F, Flanders; George H. Baltz, Hupmobile, R-C-H, Jackson.

Motorcycles—C. O. McCarty, Emblem; Thomas H. Merritt, Harley-Davidson; Bents, Bushnell & Co., Pope, R-S; Syracuse Rubber Company, Indian; Barter & Co., Excelsior.

Accessories—F. A. Empsall & Co., gloves; J. C. Perrault, tops; G. C. Martin, Kelly-Springfield tires; E. Q. Williams, ignition equipment; C. R. Eggleston, oil tanks and pumps; Andrew Bolger, lighting equipment; Syracuse Rubber Company, rubber goods; Utica Auto Supply Company, full line; Syracuse Auto Supply Company, general line; Leon Enos, storage systems; Standard Oil Company, Polarine oils.

BELFAST JOINS SHOW CIRCUIT.

Opportunity Afforded for Those Unable to Witness Displays in Larger Cities.

Although affording but limited space, the Read garage in Belfast, Me., was utilized by the dealers in that city for their first annual automobile show, March 27-30. It proved an admirable opportunity for those who had been unable to visit the Bangor, Portland or Boston displays to examine the season's models, and numerous sales are expected to result.

The list of exhibitors was not large, but practically all of the makes represented in Belfast were on display as follows: Read Garage, Haynes, Mitchell, White, White truck; Carle & Jones, Ford; C. L. Wilband, Metz; S. A. Parker, International wagon; W. H. Hall, National; S. M. R. Locke, Maxwell; C. E. Read, Overland.

ANNUAL DISPLAY AT LEWISTON

Auburn, Me., Assists Sister City in Presenting Season's Models for Inspection.

The second annual show in Lewiston and Auburn, Me., was held in Auburn Hall, April 4-6, the management being under the direction of J. H. Graham of Old Orchard, Me., as was the case last year. The decorative scheme was simple and effective, and the number of cars on display was large augmented by a number from Boston, represented by the agencies in that city.

Local exhibitors were: Fred L. Blinn, Case; Webber & Webber, Elmore; J. F. True & Co., Metz; Nelke & Partridge, Nyberg, Winton; J. H. Stetson & Co., Stutz, Stoddard-Dayton-Knight; Jonas Edwards & Son, Buick, Oakland; R. S. Whitney, Paige-Detroit; Darling Auto Company, Reo, Maxwell; Auburn Garage Company, Penn, Marmon; Brown & Bosworth, accessories; Standard Oil Company, Polarine oils.

Cars which were shown by Boston agents included: Pathfinder, Grout, Marion, Speedwell, Mora, Firestone-Columbus, Stanley steamer, Velie, Cutting and Teel-Woodworth truck. The following accessories also were shown by Boston houses: Eagleine No-Karbon oil, Vacuum oil, Federal, Goodrich, Diamond and Imperial tires.

EXHIBIT IN NEW BEDFORD.

Local Dealers and Boston Agents Join Forces in Making the Event a Success.

About 30 different makes of cars were represented at the first automobile show held in New Bedford, Mass., March 27-April 2, under the direction of O. G. Corbett of New York City. The event was staged in Elm Rink, which was liberally decorated with bunting and potted plants for the occasion. Several exhibits were brought over the road direct from Boston, and the people of New Bedford and vicinity gave every evidence of being well pleased with the showing made. Several sales were reported.

Included among the exhibitors were the following: William H. Bassett Company, Lenox; S. C. Lowe Supply Company, Chalmers; Wm. G. Robert & Son, Michigan; Bristol County Auto Company, Abbott-Detroit, K-R-I-T, Austin, Auburn, Cutting; Bert A. Vance, Cole; A. L. Bradley, Overland; Central Garage, American, Oakland, White. Guy Murdock, E-M-F, Flanders; Borden Service Station, Maxwell; F. H. Betmore, R-C-H; W. H. Stevens, National; Roy Wells, Penn; Watuppa Auto Company, Crawford.

FOR HIGHWAY IMPROVEMENT.

Good Roads Organizations Throughout the Country Assemble in Washington, D. C.

A hearing on the joint resolution of Congress for the appointment of an investigating committee to consider federal participation in good roads construction at Washington, Began April 10. Of the members of the rules committee, before which the hearing takes place, several have announced themselves as favorable to the proposition, which is receiving the hearty endorsement of the American Automobile Associaton.

Among the co-operating good roads bodies which are expected to be represented at the hearing are the following: National Grange, Farmers' Union, American Road Builders' Association, Ohio Good Roads Federation, Alabama Good Roads Association, Indiana Good Roads Association, Michigan State Good Roads Association, Florida Good Roads Association, Illinois Association for Highway Improvement, Missouri Old Trails Association, New Santa Fe Trail Association, North Carolina Good Roads Association, Southern Appalachian Good Roads Association.

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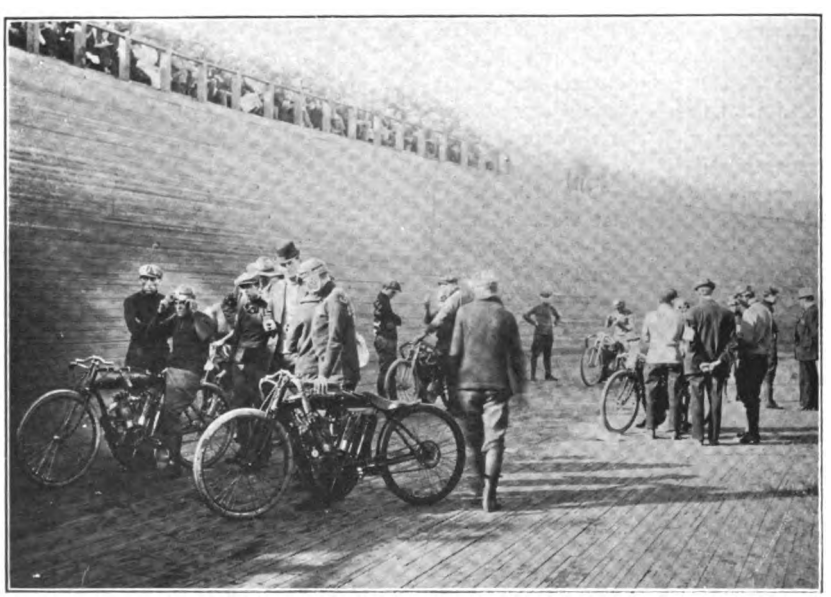
ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



Selecting Convention Seat.

Thus far no less than five cities have announced their intention of securing the honor of holding the annual national assembly of the Federation of American Motorcyclists. The list includes Columbus, Cleveland, Chicago, Indianapolis and Detroit. All are centrally located, and each has some special reason why it should be selected. It would appear that decision will be made in the near future, in view of the following official announcement to those interested issued by President G. H. Hamilton of the federation:

"According to the constitution and bylaws of the F. A. M., not more than 90 nor less than 60 days' notice of the annual meeting must be given in the motorcycle papers, and in order to comply with these provisions it is necessary that all cities desiring to bid for the 1912 F. A. M. meet should be notified relative to the time that applications shall be received.



Scene on the Los Angeles Stadium During a Recent Race Meet.

"This notice is to the effect that all applications for the 1912 meet to be acted upon by the board of directors of the F. A. M. must be filed with the president prior to April 25, 1912.

"In making applications it is requested that the dates on which the meet is to be given, also a complete programme of the entertainment to be offered, together with the names of the hotels and rates of each, be furnished."

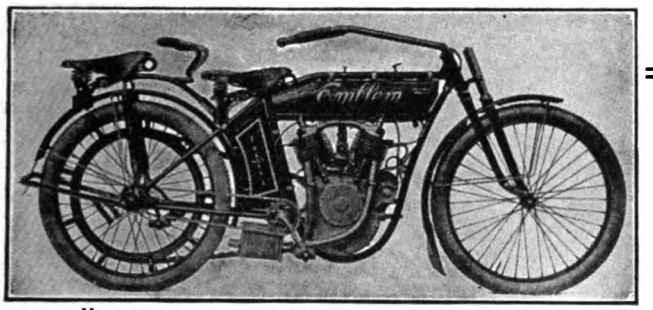
Dr. Thornley's Prize Money.

Several years ago there was considerable trouble about the collecting of prizes won in contests, and so many well founded claims of fraud were brought to the attention of the chairman of the competition committee of the Federation of American Motorcyclists, that Dr. J. P. Thornley, who then held and still holds this position, established a prize fund for the benefit of riders, so that they would be quite sure they would get what was promised them on the entry blanks and programmes. This scheme worked out as follows:

If after a promoter had published an entry blank giving the cash value of the prizes, the rider was not satisfied that the prize was of the same value as stated thereon, he could insist that the money be sent to Dr. Thornley, where it would be credited to his prize account in that office. Since that time Dr. Thornley has handled a great deal of money for the riders. They have been allowed to buy prizes with this money whenever they chose. All that was asked was that the bill be sent to him, and a check was mailed immediately to the dealer without question. Dr. Thornley now asks that the motorcycling publications assist him in cleaning up his accounts for the year, so that he can begin anew for the coming season.

He holds money for riders as follows: J. U. Constant, $85; Walter Goerke, $2.67; William Kreiger, $5, W. J. Tuebner, $29.25; William Major, $5; C. H. Thompson, Jr., $5; Epstein, $2; Thomas Rice, $2; Frank Hart, three cents; H. Klebes, $3; H. W. G.

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EMBLEM STURDINESS IS AN INTERNATIONALLY KNOWN FACT

Here's Another Sample of the Sort of Letters We Receive Every Day:

"In March last I bought one of your 5 H. P. Emblem Motorcycles for use in my work as manager of the Gowanda District of the Federal Telephone and Telegraph Company. This territory covers the hills of Cataraugus and Chatauqua counties and between March and October I covered some 6,500 miles. The machine carries me where it would be impossible to make any time with an auto as the roads are hilly and rough but I have not had the slightest trouble getting over them, my only outlay aside from regular wear of parts such as tires, etc., being 40 cents for a spring to hold the stand up. I heartily recommend the Emblem for Reliability and Standupness, especially for the hard work done in the telephone business.

Signed L. W. SHIPMAN, Gowanda, N. Y."

EMBLEM BICYCLES AND MOTORCYCLES "ARE READY FOR GREATER SERVICE TO YOU" Write today! Why Delay?

EMBLEM MANUFACTURING COMPANY
DEPARTMENT D.
ANGOLA ERIE CO. NEW YORK

Cox, $20, making a total of $158.95. He also holds for delivery, subject to demand of the owners, three bronze medals, one won by F. Fredericks and two by George Haas. Concerning these sums, Dr. Thornley says:

"These men must one and all immediately buy prizes with this money sending me the bill for whatever they want, whereupon, it will be paid at once. If by the 15th of next month (April), there are any names left on the list who haven't bought their prizes, I shall proceed to buy prizes for them and forward the same to them at once. In the case of Frank Hart, who has only three cents, I don't know what I can send him, unless it is a handsome steel engraving of George Washington on a postage stamp."

Los Angeles Track Abandoned.

According to the latest information from Los Angeles, it would appear that the racing season was over. The Indian machines were withdrawn after a spirited discussion at the track. Other riders have refused to take part in future events, and have gone to other cities. Dr. Thornley of the F. A. M. competition committee says there always has been a lot of trouble since racing was first begun in California and he doesn't know what can be done to straighten things out. Everybody seems to have been to blame in a measure. Those who have attempted to referee the contests have found it a decidedly unpleasant task. It seems too bad, but if the information at hand be true, the Los Angeles stadium appears to be abandoned, at least until some different arrangement can be made.

New Members for March.

Six hundred and twenty-five new members were added to the rolls of the Federation of American Motorcyclists during March, according to the figures announced by Secretary-Treasurer G. B. Gibson of Westboro, Mass. Divided as to districts, the following results are obtained: Atlantic, 169; Lake, 133; Southwestern, 97; Central, 68; New England, 56; Peninsular, 35; Pacific, 34; Gulf, 29; Canadian, four.

Classified according to states, the result is as follows: California, 94; New York, 66; Pennsylvania, 55; Massachusetts, 48; Kansas, 41; Ohio, 38; Michigan, 32; Indiana, 30; Illinois, 28; New Jersey, 27; Washington, 27; Texas, 25; Georgia, 14; Minnesota, 14;

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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District of Columbia, 13; Florida, nine; Connecticut, Maryland and Iowa, six each; Alabama, Nebraska, West Virginia and Oregon, five each; Tennessee and



Joseph Wolters, the Champion Excelsior Rider and His Racing Mount.

Canada, four each; Wisconsin, three; Rhode Island, North Carolina, Missouri, Kentucky and Colorado, two each; Mississippi, Louisiana, Arkansas, South Dakota, North Dakota, Montana, Idaho and Nevada, one each.

New Records at Los Angeles.

Before the final curtain was drawn on the races at the Los Angeles stadium, two more new records were made March 25. Balke on an Excelsior cut the time for three miles from 2:01.6 to 2:00.6, and Graves on another Excelsior rode seven miles in 4:47.2 as against De Rosier's mark of 4:54, also made on an Excelsior, Feb. 7. The summary of the meet follows:

Five miles, amateurs—First, Montgomery, Excelsior. Position awarded by referee after machines had been broken in collision. No time taken.

Four miles, class B, professionals—First, T. Samuelson, Excelsior; second, Humiston, Indian; third, Kittle, Indian; time, 3:05.4.

Three miles, Class A, professionals—First, Balke, Excelsior; second, Graves, Excelsior; third, Wolters, Excelsior; time, 2:00.6.

Three miles, class B, professionals—First, Peck, Excelsior; second, T. Samuelson, Excelsior; third, Albright, Indian; time, 2:05.

Three miles, class A, professionals—First, Graves, Excelsior; second, Balke, Excelsior; third, Wolters, Excelsior; time, 2:01.

Four miles, class A, professionals—First, Balke, Excelsior; second, Graves, Excelsior; third, Wolters, Excelsior; time, 2:43.4.

Seven miles, free-for-all—First, Graves, Excelsior; second, Balke, Excelsior; third, Wolters, Excelsior; time, 4:47.2.

Five miles, class B, professionals—First, Humiston, Indian; second, Kittle, Indian; time, 3:56.4.

Two miles, invitation—First, Peck, Excelsior; second, Kittle, Indian; time, 1:35.6.

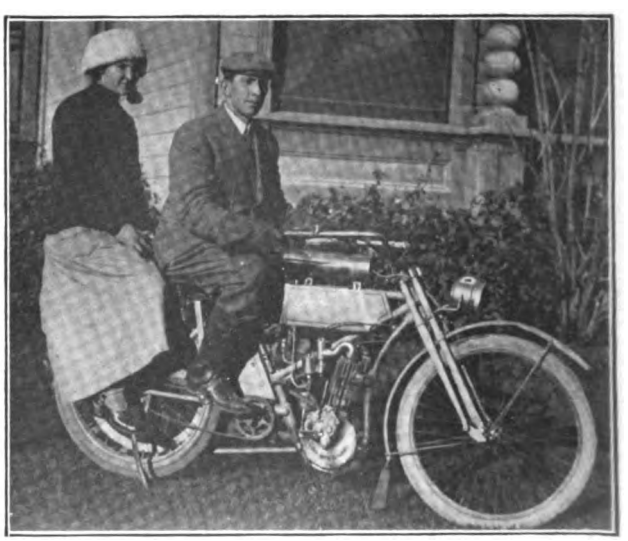
Providence Motorcyclists' Home.

The new Swenson building, which B. A. Swenson, the Indian agent in Providence, R. I., is constructing at Blackstone and Broad streets in that city, will be completed about May 1, and the Providence Motorcycle Club, which has engaged quarters therein, is planning a big house warming soon after that date. The new club rooms are to be known as the Motorcyclists' Home, and visiting riders, when in Providence, are invited to call around and see how well this club carries out the name in every appointment. Besides the regular meeting room and a room for social festivities, a thoroughly equipped repair shop will be maintained.

Recent Affiliations.

In the spring, when the thoughts of the motorcyclists turn to long distance tours, club runs and contests of all sorts the work of E. M. Estabrook, chairman of the F. A. M. membership committee, becomes even more burdensome. The list of affiliations is beginning to show the result of the labor expended by Chairman Estabrook during the winter season. Recent additions are as follows:

Washington Motorcycle Club, Washington, D. C., 232; G. C. Billard, secretary, 736 14th street, N.W., 14 members. Plainfield Motorcycle Club, Plainfield, N. J., 234; W. De W. Miller, secretary, 33 Somerset street, 17 members. St. Cloud Motorcycle Club, St. Cloud, Minn., 235; H. E. Scharenbroich, secretary, 617 Third avenue, South, 15 members. Columbus Motorcycle Club, Columbus, Ga., 236; J. B. McCullom, secretary, 13th street and First avenue, 12 members.



Mr. and Mrs. W. D. Price of Los Angeles, Cal., on Their Wagner Mount.

Motor Club of Modesto, Cal., 237; J. J. O'Keefe, secretary, care Fire Department, 35 members. Lemoore Motorcycle Club, Lemoore, Cal., 238; C. R. Fox, sec-

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retary, care Clifford Cyclery, 14 members. Muskegon Motorcycle Club, Muskegon, Mich., 239; F. A. Meeker, secretary, Heights street, 20 members.

The Queen City Motorcycle Club, Cincinnati, O., which bears the fated No. 13, has decided to try again, and this number has been reissued to it. Clarence Rossiter of 2272 Adams avenue, is secretary.

A Club of Boosters.

The Will County Motorcycle Club, Joliet, Ill., is composed entirely of boosters, by which is meant that there is nothing which comes to the attention of these members which will aid the cause of the F. A. M. and the great body of riders which the federation represents, in which they do not take a decidedly active part. In addition, the club finds time to take up much effective local work. Recently, it has been issuing a circular to all operators of motor vehicles and the public generally, which bears the heading, "Obey the Law of the Road," and reads as follows:

"Walking or driving, pass to the right of those coming toward you. Turn to your right, let those behind you pass to your left. Never turn to the left before looking to see if some one desires to pass. Let the one behind pass to your left. Turn corners slow, don't sprawl all over the street.

"In walking, cross a street on the cross walks. Don't stand on road or street crossings to visit or transact business. Before you cross a street, look to the right, left and ahead. The lack of a few seconds' hesitation may mean a life or a cripple. A street car, motor vehicle, horse and buggy, bicycle or perhaps the fire department or a runaway may be coming down the street. Be safe.

"All vehicles when stopping on street must do so with right side to curb. Watch out. Neither yourself or let others throw nails, bottles or wire in the roads.

"These are the laws, made for the benefit of you and us. Do your duty and few accidents will happen."

This sounds like good, wholesome advice, and the campaign certainly ought to be productive of much good, among all classes of highway users.

Club Organizers.

The following men are interested in the organization of affiliated clubs in their respective districts and are entitled to all the aid and encouragement that riders in these sections can give them: R. Walker, 132 Manor road, West Brighton, Staten Island, N. Y.; William J. Rehrig, 47 East Main street, Somerville, Mass.; Hans F. Neil, 208 Taylor street, Findlay, O.; C. C. Vaughn, Brunswick, Ga.; M. A. Kilpatrick, Stamford, Tex.; Herbert L. Fisher, Beardsley, Minn.; William Maresh, 212-214 Washington street, Iowa City, Ia.; L. W. Conly, Herkimer, N. Y.; Edwin A. Hall, 76 Main street, Dansville, N. Y.; Samuel A. Hemm, 2520 North Broad street, Philadelphia, Penn.; Garwood Storer, Bedford, Ind.; William Demler, 18 Kennedy street, Bradford, Penn.; Stuart Tracy, Graves, Cox & Co., Gulfport, Miss.; G. F. Hodgman, 14 School street, Concord, N. H.; C. D. Bremer, 538 Muskego avenue, Milwaukee, Wis.; E. S. Henderson,



Lee Humiston, Who Has Been Doing Good Work on the Pacific Coast with an Indian.

153 Thatcher street, Hornell, N. Y.; John Wolf, lock box 754, Sparta, Wis.; J. Lem Titworth, Wolfe City, Tex.; William H. Houts, Aneheim, Cal.; Louis W. Burkhardt, West Palen Beach, Fla.

New Club in Maryland.

A number of riders in Orangeville, Md., and vicinity met recently and organized the Orangeville Motorcycle Club, which has elected the following officers: Captain, Porter C. Bond; first lieutenant, George Hoffenberger; second lieutenant, William Gambrill; color bearer, Albert Lehmann; tour master, Joseph Hartley. For the present all unattached riders in the vicinity will be invited to accompany the club on its Sunday

ATTENTION MOTORCYCLISTS

Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

B. A. SWENSON

298 Blackstone Street, Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00
(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY **Boston, Mass.**

Branches: 49 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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runs, the idea being to show these what good times are planned by the new organization.

Rides with One Arm.

Ernest Sonnenberg of Gaylord, Kan., is an enthusiastic motorcylist although he has been deprived entirely of the use of his right arm. An accompanying illustration shows him with the fourth Emblem mount, made by the Emblem Manufacturing Company, Angola, N. Y., which he has owned and ridden with success.

Mr. Sonnenberg writes that he experiences no trouble whatever in riding through sand and overcoming many obstacles which bother riders possessed of both arms. The machine is a regular stock model, the



Ernest Sonnenberg of Gaylord, Kan., and the Fourth Emblem He Has Owned.

only change being the fitting of all controls to the left handlebar.

Club Notes, Here and There.

The Topeka Motorcycle Club, Topeka, Kan., is considering the proposition of building a three-lap track at Garfield Park.

A series of races will be held in Milwaukee, Wis., early in June, under the auspices of the Wisconsin Motorcycle Club of that city.

The Kings County Motorcycle Club, Hanford, Cal., promises to increase its membership to 100 during the coming season.

The Motorcycle Touring Club of Chicago has elected the following officers for the ensuing year: President, M. Stuhlfaut; vice president, Norman Bach; recording secretary, A. Born; financial secretary, C. R. Schwartz; sergeant-at-arms, William Reder; captain, John Herman; first lieutenant, B. Stechbart; second lieutenant, E. Born.

At the recent annual meeting of the Louisville Motorcycle Club, Louisville, Ky., all the offices were filled by new men, who have never before held official position in the organization, as follows: President, C. R. Gilmore; vice president, P. J. Kuhn; secretary-treasurer, P. H. Kline; directors, Frank Marshall and R. J. Buxe.

The Wichita Motorcycle Club, Wichita, Kan., has voted an honorary membership to Motorcycle Patrolman C. M. Tucker.

The Boston Motorcycle Club, Boston Mass., will hold its first official run for 1912 on Patriots Day, April 19, following a custom that has been in vogue among the riders in that city since the days of the bicycle. Present plans indicate that the objective point will be the Dead Horse hill course in Leicester, just beyond Worcester.

A new club has been organized at Lexington, Ky., which will be known as the Bluegrass Motorcycle Club.

The Poughkeepsie Motorcycle Club, Poughkeepsie, N. Y., is composed of a lot of hungry riders, judging from the fact that it held its annual banquet April 1, and followed this by a chicken dinner run, April 7.

Following the annual banquet of the Binghamton Motorcycle Club, Binghamton, N. Y., March 25, the election of officers resulted as follows: President, Walter J. Lyon; vice president, W. Hemstraught; secretary, E. Sirowatke; treasurer, C. F. Goetchens; captain, B. C. Race; first lieutenant. G. Bracio; second lieutenant, Lester Rugg; delegate to the national assembly of the F. A. M., Robert Morris.

The annual smoker of the Rhode Island Motorcycle Club, Providence, R. I., will be held in Palestine hall, 266 Weybosset street, that city, April 17.

Board Track in Detroit.

Jack Prince, the well known motorcycle track builder, has been busy in Detroit during the past month, and has decided to construct a half-mile board track in that city. This will have banks of 60 degrees and it is anticipated it will be able to make 100 miles an hour on it without difficulty; that is supposing a machine can be found to travel that fast.

Indian Maiden Rides Motorcycle.

According to the Galveston News, Galveston, Tex., Minnie Skey Eagle, a full blooded Pawnee Indian maiden, has purchased a motorcycle, with which she makes long trips from the government reservation at Geronimo, Okla., to Bliss Olla ranch 101. She says the new steed is much more to her liking than the Indian ponies of her forefathers.

Handsome Wall Souvenir.

The Emblem Manufacturing Company, Angola, N. Y., maker of Emblem machines, is sending to the trade a handsomely framed picture of its factory, suitable for display on the walls of the salesroom.

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

C. A. Scott Company, Portland, Me.; capital, $10,000; incorporators, Hugh Lawless, Charles A. Scott.

The Porto Rico Motor Company, Greenwich, Conn.; capital, $150,000; incorporators, Milton A. Mills, Jr., Loring J. Whiteside, Edward J. Ryan.

The Burrough-Morse Company, Providence, R. I.; capital, $25,000; incorporators, Howard D. Burrough, E. H. Morse, Howard Sheffield.

The Sutherland Automobile Air Appliance Company, Louisville, Ky.; capital, $10,000; incorporators, Luke Sutherland and others.

Morrow-Mercury Motor Car Manufacturing Company, Los Angeles, Cal.; capital, $20,000; incorporators, J. B. Morrow, Samuel Brown, Jr., O. B. Hutchings, J. R. Fouch.

The Auto Sales Company, Boston; capital, $25,000; incorporators, E. Leroy Pratt, George E. Golding, George M. Faulkner.

Morris Motor Sales Company, Indianapolis, Ind.; capital, $10,000; incorporators, Theodore H. Morris, Paul H. Krauss, Fred C. Krauss, Paul H. Krauss, Jr., Otto Krauss, Donald S. Morris.

Rudolph Aeroplane Company, Newark, N. J.; capital, $125,000; incorporators, Frank Baur, Bertha Baur, F. W. A. Rudolph.

Victor Automobile Company, Evansville, Ind.; capital, $8000; incorporators, P. P., W. E. and J. F. Fellwock.

The Postles-Prouse Company, Willimington, Del.; capital, $50,000; incorporators, G. P. Postles, Shanley D. Prouse, John H. Willet.

Alpha Rim Company, Brooklyn, N. Y.; capital, $125,000; incorporators, L. Kreielsheimer, A. S. Friend, H. W. Stowell, L. E. Swarts.

Buffalo Electric Vehicle Company, Buffalo, N. Y.; capital, $1,000,000; incorporators, W. J. P. Seipp, W. C. Feuchter, T. R. Wheeler.

The Seabury-Carson Company, Logan, Ia.; capital, $48,000; incorporators, D. H. Seabury, C. W. Carson, A. W. Gainess.

Kelly, Damon Auto & Supply Company, Brockton, Mass.; capital, $25,000; incorporators, George E. Damon, Stephen H. Kelley, George F. Damon.

The Tucker Garage Company, Inc., Middletown, Conn.; capital, $12,000; incorporators, Willard D. Tucker, G. Howard Tuttle, Clare H. Blatchley.

Omaha Motor Car Company, Augusta, Me.; capital, $1,000,000; incorporators, R. S. Buzzell, L. J. Coleman, C. L. Andrews.

Grant Motor Truck Company, Cambridge, Mass.; capital, $100,000; incorporators, Frank S. Corlew, Harry F. Grant, George L. Ellsworth.

Staunton Motor Company, Staunton, Va.; capital, $4000; incorporators, J. W. H. Pilson, G. A. Allen, J. L. Baugher.

Salt Lake Automobile Company, Salt Lake City, Utah; capital, $25,000; incorporators, J. E. Langford, Ashby Snow, A. L. Taylor.

Standard Auto Renting Company, New York City; capital, $10,000; incorporators, David C. Goodman, William Machol, Edwin B. Koenig, 1190 Madison avenue.

Steinbock Engineering Company, Edgewater, N. J.; capital, $1,000,000; incorporators, E. J. Forhan, F. B. Knowlton, J. MacLaren.

Dennis Motor Company, Toledo, O.; capital, $25,000; incorporators, H. H. Dennis, G. W. Close, Allen E. Reid, R. S. Woodrow, John C. Meister.

The Williams Auto Company, Boston; capital, $2500; incorporators, William T. Hanley, James Hanley, Frederick W. Ryan.

Gray & Davis, Inc., Amesbury, Mass.; capital, $1,250,000; incorporators, William Gray, Alexander Churchward, David B. Kerr, William B. Moses, D. Henry Elkins, William H. Gray.

Union Gear & Machine Company, Boston; capital, $10,000; incorporators, Jay D. Benton, George A. Kearsley, Francis D. Harrigan.

GARAGE AND DEALER.

Le Hardy & Lindsay, Rochester, N. Y., agent for the Marmon car, made by Nordyke & Marmon Company, Indianapolis, Ind., has moved to new quarters at 1189 University avenue.

G. C. Hobson, formerly in charge of the promotion department of the Henderson Motor Sales Company, Indianapolis, Ind., has become cashier of the Cole Motor Company of Atlanta, Ga.



Showing Two New Additions to the Plant of the K-R-I-T Motor Car Company, Detroit—Another Building Is in Process of Construction, Which When Completed Will Give the Company an Output Four Times That of 1911.

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S. J. Wise & Co., New York City, has opened a branch house at Boylston and Fairfield streets, Boston, where a full line of the King car, made by the King Motor Car Company, Detroit, will be carried.

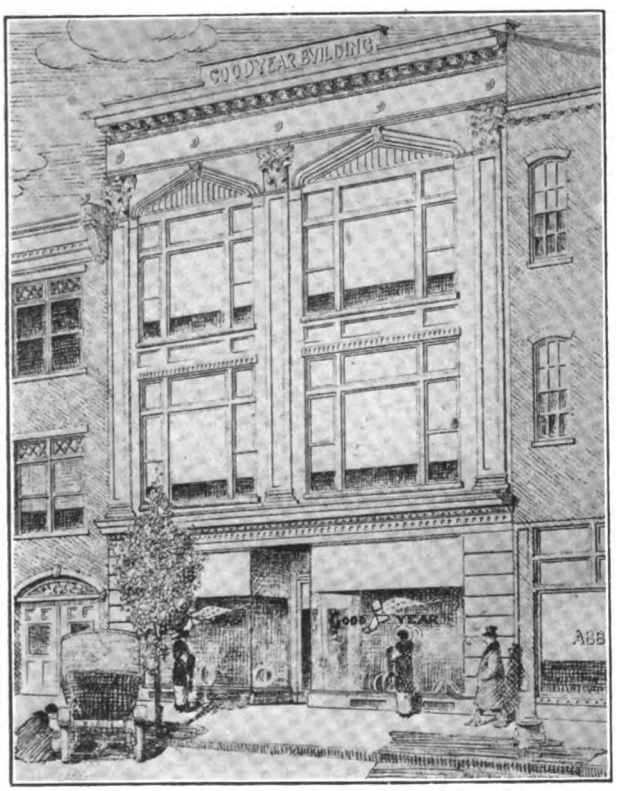
Albert Bale, Hinckley, Ill., has been appointed agent for the Velie line, made by the Velie Motor Vehicle Company, Moline, Ill. He will maintain a service department. His territory includes De Kalb, Lee, Ogle and Kane counties.

William B. Kershaw, 44 Hicks street, Pawtucket, R. I., announces that he is prepared to handle all kinds of repairs to automobiles tires and inner tubes.

The Kokomo Auto & Machine Company, Cole agent at Kokomo, Ind., will be known as C. F. Seward & Son hereafter.

Mueller Bros., Pittsburg, Penn., representative for the Alco line, has taken over the agency of the Haynes car, made by the Haynes Automobile Company, Kokomo, Ind.

The White Automobile Company, Pittsburg, Penn., has broken ground for a new garage and salesroom at the former site of Luna Park. The new building will



New Home of the Philadelphia Branch of the Goodyear Tire & Rubber Company, Which Is Equipped with Modern Conveniences.

be completed in June, will be of concrete and terra cotta, and will cost approximately, $100,000.

The Federal Motor Car Company of Pittsburg, Penn., who until recently represented the Ohio car, made by the Ohio Motor Car Company, Cincinnati, O., has been appointed distributor for western Pennsylvania and northern West Virginia. J. H. McClarren is president and general manager.

J. A. Birch, Placerville, El Dorado county, Cal., is building a modern garage to accommodate the large number of tourists who pass through that place.

The New York Auto Exchange, Norfolk, Va., has taken quarters in the Flatiron building, Grant and Charlotte streets. The concern has the agency for the White car, made by the White Company, Cleveland, O.

Green & Swett, Boston, will open a branch house at Manchester, Mass, having taken a lease of the Wonson building on Central street.

The Des Moines Rambler Company, Des Moines, Ia., was formed recently and will handle the Rambler line, manufactured by the Thomas B. Jeffery Company, Kenosha, Wis.

Perkins & Corliss, Gloucester, Mass., has made arrangements for the erection of a modern brick garage on Western avenue. It will be one story, 40 by 92 feet, and the front will be utilized for a show and salesroom.

Adams Bros., Hickman, Ky., has purchased from Hale & Caruthers, the Hickman Motor Works, which concern conducted a garage and machine shop.

The Waterville Motor Company, Waterville, Me., is occupying its new garage which is of brick, steel and concrete, two stories in height and modern in every respect.

The Burd Auto Company, Waterloo, Ia., moved into its new garage at 420 Seventh street recently. The structure provides 6000 square feet of floor space. New machinery is being installed for a repair shop.

Wilcox Bros., formerly of Chicago, has opened a tire repair shop on Broadway street, Fort Wayne, Ind. The new concern is agent for Fisk tires, made by the Fisk Tire & Rubber Company, Chicopee Falls, Mass.

The Etchells Auto Company, Biddeford, Me., will erect a new garage at Five Points. The building will be one story, 50 by 80 feet, and will contain all modern conveniences. The officers of the company organized recently consist of: President, Arthur L. Roberts; treasurer and manager, Joseph Etchells.

Fred B. Williams has acquired the garage of the Worcester Motor Company, Worcester, Mass., the property consisting of a two-story brick building and 6500 square feet of land.

William S. Mathews and Charles S. Langley have formed a partnership under the firm name of The Mathews & Langley Auto Company and will handle the Abbott-Detroit, made by the Abbott Motor Company, Detroit. The new concern will have as territory, York county, Me.; Strafford county, and Portsmouth and Newmarket in Rockingham county, N. H. Headquarters will be at Somersworth, N. H.

A. L. Alexander, Waterloo, Ia., is planning the erection of a new garage at the corner of Sixth and Franklin streets. It will be two stories, 40 by 80 feet, and will be ready for occupancy in the near future.

Schipper & Block, Peoria, Ill., will build a garage on Fulton street. It will be constructed of fire proof material, two stories in height and will include a fully equipped repair shop.

The Warren Garage Company, Worcester, Mass., has removed to new quarters, having leased the entire building at Vine and Franklin streets.

The C. W. Bowles Automobile Company, Evansville, Ind., is seeking a new location having outgrown its present quarters.

H. N. Stackpole and T. C. Luce, Pittsfield, Mass., have formed the S. & L. Company and will have headquarters at Lowe's garage, 241 South street, where they will conduct a general repair business.

WITH THE MANUFACTURER.

Charles A. Trask has resigned as chief engineer of the Cartercar Company, Pontiac, Mich. He was identified with the company for over five years.

The Abbott Motor Company, Detroit, has appointed the following concerns to handle the Abbott-Detroit: D. B. Hoffer & Sons, Reading, Penn.; The Heathman-Solliday Motor Company, Dayton, O.; John Deere Plow Company, Dallas, Tex.; W. S. Bruce & Co., Memphis, Tenn.; Abbott Motor Sales Company, Toledo, O.

The K-R-I-T Motor Car Company, Detroit, maker of K-R-I-T cars, is occupying the two new buildings added recently to the plant, which is depicted in the accompanying illustration. Another building is in the course of construction, which, when completed, will give the company a capacity for an output four times that of 1911.

The Findeisen & Kropf Manufacturing Company, Chicago, maker of the Rayfield carburetor, is issuing a booklet describing and illustrating a 3200-mile pathfinding trip undertaken in the interests of the Transcontinental Touring Club of America which took the machine equipped with a Rayfield over what will be known as the Panama-Pacific trail or Southwestern route.

The Stephney Tire & Rubber Company, New York City, is issuing a notice calling attention to its product, also quoting prices of tires and inner tubes.

The Goodyear Tire & Rubber Company, Akron, O., announces that its branch at Birmingham, Ala., is occupying its new quarters at 420-422 South 20th street.

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The new location is in a two-story building, 48 by 90 feet and constructed on the same lines as all of the Goodyear branches.

O. M. Crawford, formerly manager of the advertising and service departments of the Colby Motor Company, Mason City, Ia., is now with the Zenith Carburetor Company, Detroit.

The Goodyear Tire & Rubber Company's Philadelphia branch is occupying its new home at 207-209 North Broad street which was opened to the public recently. In the accompanying illustration is presented the structure which is three stories in height, and the windows are so distributed that there is an abundance of light. The front of the building is of terra cotta, adding to its attractiveness. In the arrangement of the basement special thought has been given to motor truck tires due to the rapid development of this industry. Spaces are provided for the storage of heavy steel bands, rims and other necessary equipment. The first floor is devoted to the show room, offices, salesrooms, ladies' retiring room, etc. The woodwork is of highly polished oak, as is the furniture and furnishings. An electric lighting system, similar to that utilized at the Chicago branch, is employed for lighting in the evening. To the rear of the salesroom is the adjusting department fully equipped for this work, also a ladies' retiring room for the use of touring customers. The shipping room is at the rear and from it elevators lead to all floors. On the second floor is located the stock room for pleasure car tires, these being carried in the latest design of racks.

The Empire Tire Company, Trenton, N. J., maker of Empire tires, is mailing a novel folder, inasmuch as the cover is so cut that it represents on open door and a machine entering from the road. The inside page shows the car approaching the open door.

The Motz Tire & Rubber Company, Akron, O., maker of Motz tires, announces the appointment of the Standard Tire & Rubber Company, 104-106 Portland street, Boston, as New England agent.

The Havers Motor Car Company, Port Huron, Mich, will be represented by new Havers agents as follows: B. A. & R. Cunningham, Hackensack, N. J.; H. M. Andress & Co., Elyria, O.; Winnipeg Garage, Ltd., Winnipeg, Man.; Coleman Bros. & Dillon, Bedalia, Mo.

The Ford Motor Company, Detroit, entertained another large delegation of Ford dealers recently these agents arriving at Detroit from Grand Rapids, Mich., in a special train. The accompanying illustration shows the visitors, who were escorted to the Hotel Normandie for breakfast after which they visited the factory where groups of 20 were shown through the immense plant. At noon the visitors lunched at the Log Cabin Inn with the executives of the company, and in the afternoon listened to an address by N. A. Hawkins, the commercial manager, afterwards visiting the plant of Dodge Bros. In the evening a banquet was served at which Mr. Hawkins was toastmaster.

The Cork Insert Company, Boston, is mailing the trade a folder dealing with costs of cork inserts in practise, also a diagram curve of different types of pulleys.

The Henderson Motor Sales Company, Indianapolis, Ind., distributor for the Cole car, made by the Cole Motor Car Company of that city, announces the following new agencies: Z. C. McIntire, Montgomery, Ala.; Northern Automobile Agency, Talladega, Ala.; H. C. Dunlap, Napa, Cal.; Patterson Motor Sales Company, Hamilton, Ont., Canada; Fleming & Brown, Kankakee, Ill.; A. L. Alexander, Waterloo, Ia.; E. B. Elliott, Audubon, Ia.; W. F. Peterson, Sibley, Ia.; E. E. Freeman, Oakland, Ia.; C. F. Welmerling, Storm Lake, Ia.; E. D. Blaisdell, Dexter, Me.; Arthur P. Libby, Fort Fairfield, Me.; J. H. Penniman, Kalamazoo, Mich.; Johnson Motor Car Company, Duluth, Minn; J. H. Brown, Eveleth Auto & Repair Company, Eveleth, Minn.; Crescent Garage Company, Ogdensburg, N. Y.; George Leonard, Auburn, N. Y.; C. R. Wise, Watertown, N. Y.; Loyd's Garage, Oneida, N. Y.; Cole Motor Sales Company, Peebles Corner, Cincinnati, O.; C. H. Schubert, Barberton, O.; Ernest K. Hoge, Martins Ferry, O.; G. E. Sullivan, Oregon City, Ore.; Central Garage, Williamsport, Penn.; Chas. E. Barkl, Aberdeen, S. D.; R. L. Holcomb, Rapid City, S. D.

Lucius E. Wilson, former secretary of the Detroit board of trade, has entered upon his new duties as vice president and general manager of the Warren Motor Car Company of that city, maker of Warren cars.

The Pope Manufacturing Company, Hartford, Conn.; is contemplating a four-story addition to its plant, furnishing 60,000 additional square feet of floor space.

The Van Motor Car Company, Grand Haven, Mich., has been purchased by H. M. Pierce, J. A. Owen and Mrs. L. M. Strong of Grand Rapids, Mich. Mrs. Strong is president; M. M. Pierce, vice president, and J. A. Owen, secretary and treasurer. They will build the Pioneer roadster.



Delegation of Ford Dealers Who Visited the Plant of the Ford Motor Company at Detroit Where They Were Royally Entertained by the Company.

The Oakland Motor Car Company, Pontiac, Mich., announces that a branch house will be established at San Francisco, Cal., which will be utilized as a distributing point for Oakland cars in the western territory. A large stock of parts, etc., will be carried and a service department established. Henry L. Hornberger will be manager.

The United States Tire Company, New York City, has opened a state branch at Des Moines, Ia., at 406 West Ninth street. W. H. Mesenbrink, who has represented the company in Iowa and Nebraska for eight years, will manage the branch which will devote its efforts exclusively to the wholesale distribution of the various tires made by the New York concern.

The Peerless Motor Car Company of New England, agent for the well known pleasure vehicle of that name, announces the opening of a branch and service station at 773 Broad street, Providence, R. I., which will be in charge of J. W. Breese, a factory representative.

The Standard Woven Fabric Company, Worcester, Mass., maker of Multibestos, has increased its selling branches, having closed with Petry-Cassidy, Inc., 1416 Vine street, Philadelphia, as agent in Pennsylvania and the South, also James G. Barclay, 720 Main street, Buffalo, N. Y., the latter to act as sales agent through central and western New York State.

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RECENT MOTOR VEHICLE PATENTS

Case Terminal.

Frank E. Case, Schenectady, N. Y., assignor to the General Electric Company of that city, has been granted a patent for a terminal for electric conductors. It consists of a metal strip having holding clips formed at opposite ends, these being arranged so as to be coaxial and to engage adjacent portions of the conductor. It is stated of the device that the larger clip holds the insulated member securely and that the wire or conductor may be fastened equally as well.

Thompson Mixer.

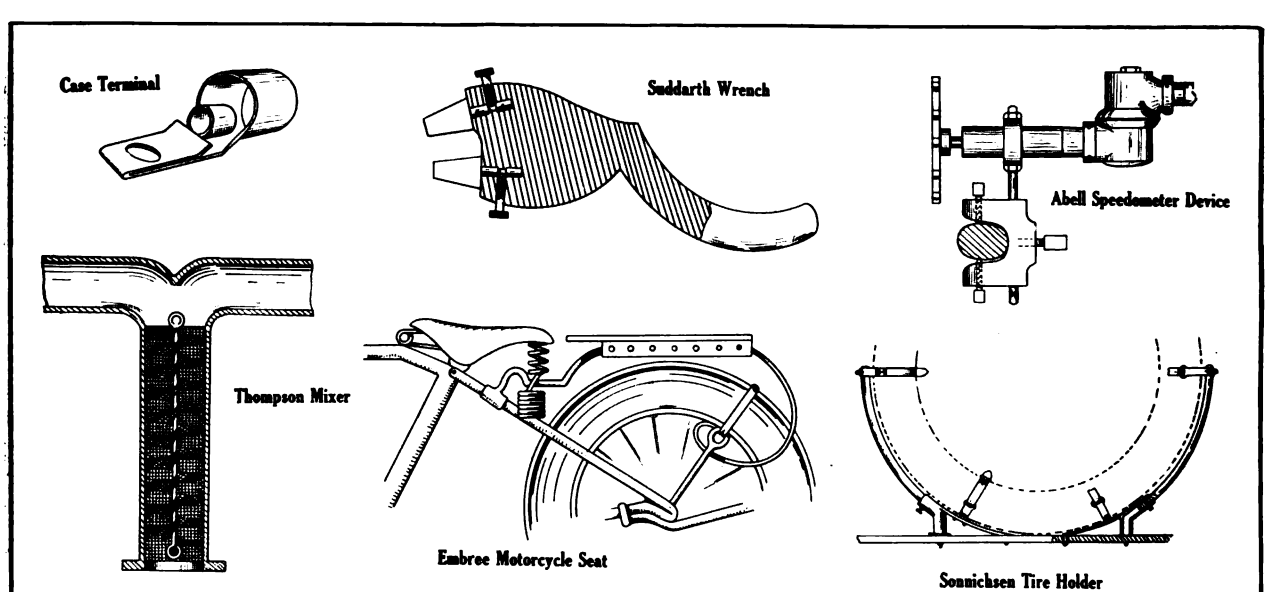
To secure the greatest efficiency from a hydrocarbon motor it is necessary that the fuel be mixed thoroughly with the atmosphere and in the proper proportions. Sometimes through faulty action of the vaporizer raw gasoline is drawn into the manifold and combustion chamber, impairing action of motor. Frederick Foster Thompson, Lawton, Okla., has been granted a patent for a mixer for gaseous fluids adapted to be inserted in the intake manifold between the carburetor and the combustion chamber. It comprises a tube or cylinder of perforated material and a rod arranged axially of the tube. This rod carries a helical wing or vane of perforated material and this is in contact with the edges of the tube. It is claimed by the inventor that the swirling motion imparted to the mixture drawn in by the suction of the piston breaks up any particles of fluid, and that carburetion is improved thereby.

Suddarth Wrench.

A wrench of which the inventor claims a quick adjustment of the jaws is the subject of a patent issued to Archibald S. Suddarth, Monterey, Va. It consists of a wrench stock having a head provided with deep cylindrical depressions. A pair of revoluble jaws having eccentrically arranged shanks and provided with annular grooves is fitted within the depression. By means of pins fitted through the head of the tool and extending into the grooves of the shank, the jaws are swivelly adjustable. The jaws are rectangular in cross section and taper longitudinally, thereby forming a plurality of nut engaging faces. In practise these jaws are rotated until the desired opening is secured.

Abell Speedometer Support.

Rollin Abell, Boston, has been granted a patent for a supporting device for speedometer driving mechanism. It comprises a split collar having lugs or ears, a threaded rod and a fork shaped block. The



Some Recent Patents Applicable to the Motor Propelled Vehicle, Including Case Terminal, Suddarth Wrench, Thompson Mixer and Embree Motorcycle Seat.

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collar is clamped over the bearing sleeve of the speedometer driving mechanism and locked securely by nuts. A vertical rod is also locked to this collar and carries a block which is moved up or down as desired in making an adjustment to mesh the driving and driven gears of the speedometer. The block is equipped with three set screws, one of which is utilized to lock the block in position and the other members the knuckle of the wheel.

Embree Motorcycle Carrier.

Many motorcyclists utilize their mounts for carrying packages and at times desire an extra seat when transporting two persons. Clarence J. Embree, Tacoma, Wash., has been granted a patent for a seat and carrier attachment which comprises a fork having its ends secured to the rear axle and having its intermediate portion spanning the rear wheel. Resilient members are incorporated each having one end secured to the fork and the other to the frame of the machine. The seat is equipped with flanges extending downward at the sides of the resilient members and means are provided for resiliently holding the seat in position to permit of slight longitudinal movement on the spring members. Set screws are utilized to fasten the seat securely.

Sonnichsen Tire Holder.

Some motorists object to attaching tire holders to the body of the machine, preferring to carry the extra casings on the running board. Andreas M. Sonnichsen, Milwaukee, Wis., assignor to the Auto Parts Manufacturing Company, has invented a tire holder of the running board type, which is so constructed that it may be adjusted to accommodate different sized shoes. It comprises a pair of independent tubular curved brackets, these being fitted with extensions for the purpose of fastening securely to the running board. Extensions are fitted into these supporting members and means are incorporated for securing the parts. The curved brackets are moved toward or away from each other to accommodate tires of different diameter and are fitted with curved members for the purpose of fastening the shoes thereto.

SPLITDORF TWO-POINT MAGNETO.

"It is an established fact, which has been proven to the satisfaction of those who have given it a fair trial, that the double distributor magneto gives increased power to the automobiles, with which it is equipped, and many of the leading manufacturers, including the makers of National and Pope-Hartford cars are adopting this type of ignition," says Charles F. Splitdorf, New York City, maker of Splitdorf ignition specialties. "While a single spark calls for an approximate advance of 30 degrees at the maximum power developed, the actual advance is reduced 15 degrees, but owing to the twin sparks obtained and firing simultaneously, the compressed charge is ignited more quickly and from both sides of the cylinder, thus burning the charge more rapidly and tending to expand it more completely. Fouling and short circuiting are thus eliminated to a greater extent, resulting in more power with a smoother running motor and car, and requiring less work to keep the motor rings and valves clean, which means longer life."

NEW CONTINENTAL MOTOR PLANT.

Work will be started at the new plant of the Continental Motor Company, maker of Continental motors for both pleasure and commercial vehicles, on Jefferson avenue in Detroit, April 15. The first order to be filled will be that of 10,000 engines for the Hudson Motor Car Company. The old factory in Muskegon, Mich., will be kept in operation for some time, however.

CALL SALES MANAGERS TOGETHER.

At the quarterly meeting of the Automobile Board of Trade in New York City, April 5, it was decided to call the sales managers of the various manufacturing companies together for a general discussion of trade conditions, similar to that held in March for the manufacturers of commercial vehicles. Reports at hand indicated that the spring selling season was very satisfactory, and that the demand for cars was at a point which was pressing the production departments of all makers. President Clifton presided and the following were in attendance:

John S. Clarke, Autocar Company; C. W. Nash, Buick Motor Company; W. C. Leland, Cadillac Motor Car Company and Cartercar Company; Charles Glover, Corbin Motor Vehicle Corporation; James C. Dryer, Jas. Cunningham, Son & Co.; George W. Bennett, Garford Company; R. D. Chapin, Hudson Motor Car Company; E. R. Hewitt, International Motor Company; G. A. Matthews, Jackson Automobile Company; A. N. Mayo, Knox Automobile Company; S. T. Davis, Jr., Locomobile Company of America; W. S. M. Mead, Lozier Motor Company; W. C. Leland, Marquette Motor Company; F. F. Matheson, Matheson Automobile Company; W. E. Metzger, Metzger Motor Car Company; W. J. Coghlan, Moon Motor Car Company; C. C. Hanch, National Motor Vehicle Company and Nordyke & Marmon Company; G. E. Daniels, Oakland Motor Car Company, W. C. Leland, Olds Motor Works; L. H. Kittredge, Peerless Motor Car Company; Charles Clifton, Pierce-Arrow Motor Car Company; George Pope and A. L. Pope, Pope Manufacturing Company; H. O. Smith, Premier Motor Manufacturing Company; W. C. Leland, Reliance Motor Truck Company and Rapid Motor Vehicle Company; R. E. Olds, Reo Motor Car Company; R. H. Salmon, Selden Motor Vehicle Company; F. B. Stearns, F. B. Stearns Company; Alfred Reeves, United States Motor Company; C. S. Henshaw, E. R. Thomas Motor Car Company; W. T. White, White Company; George W. Bennett, Willys-Overland Company; H. A. Bonnell, general manager.

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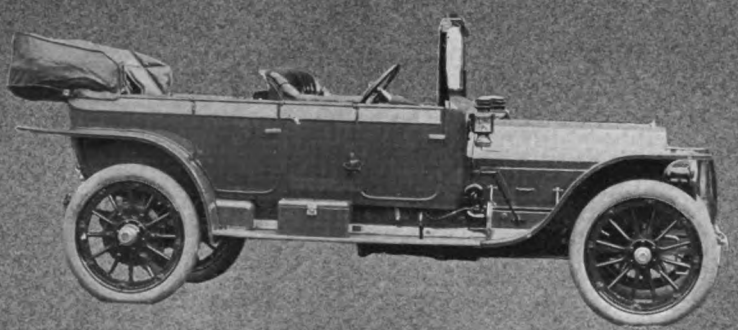
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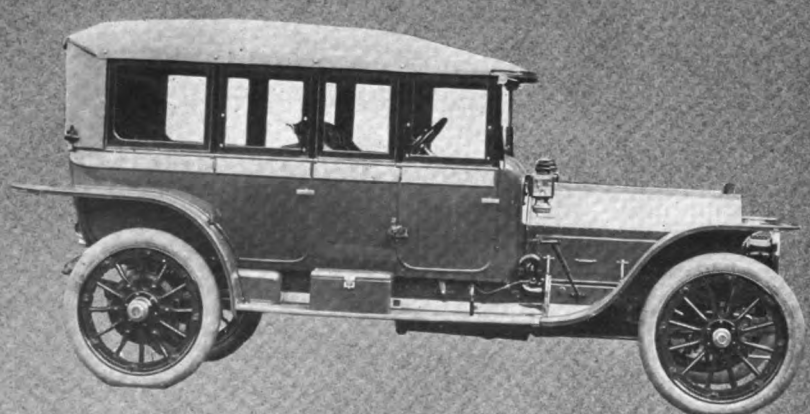
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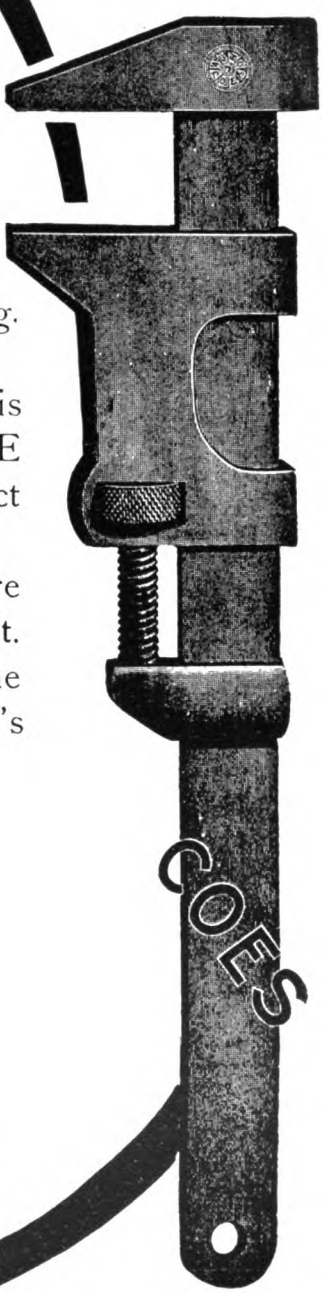
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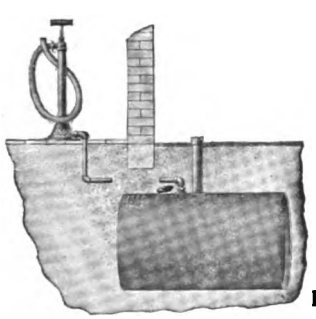
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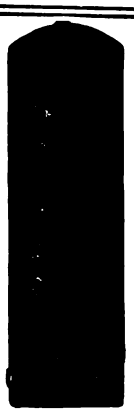
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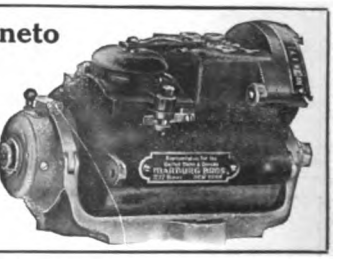
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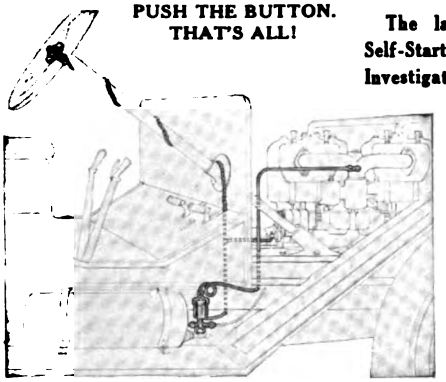
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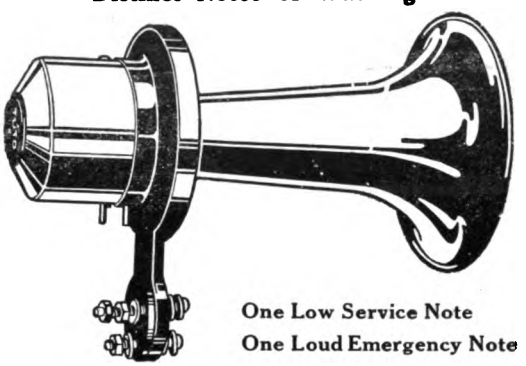
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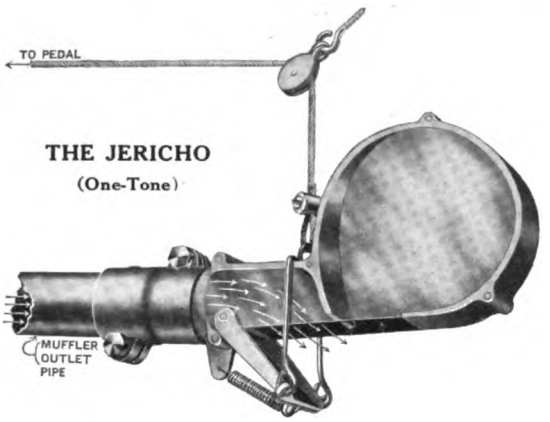
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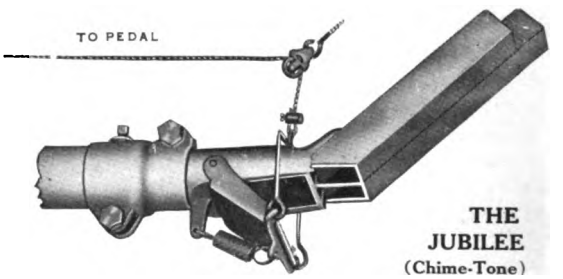
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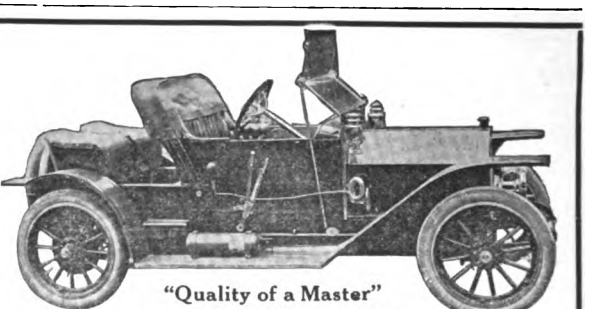
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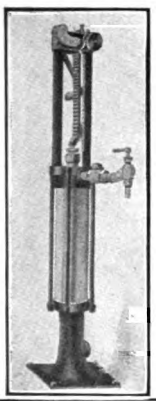
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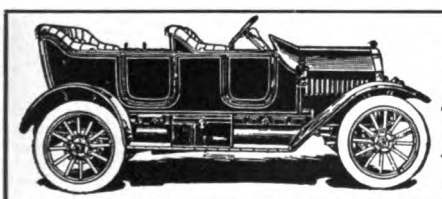
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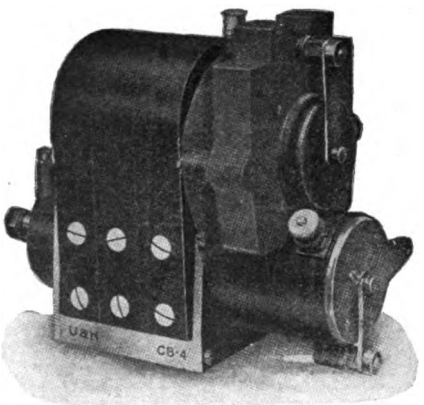
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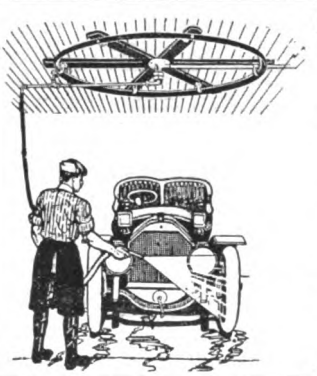
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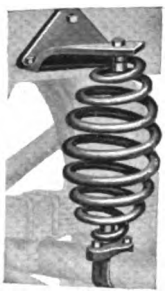
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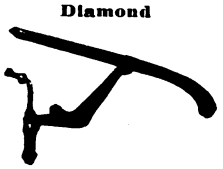


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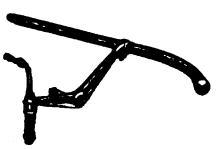
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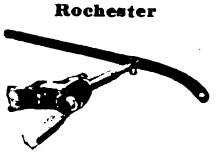


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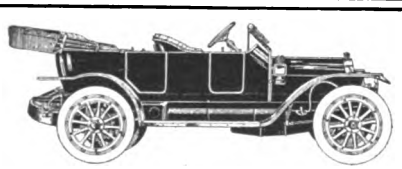


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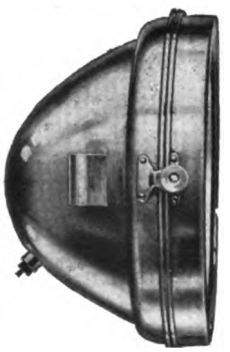
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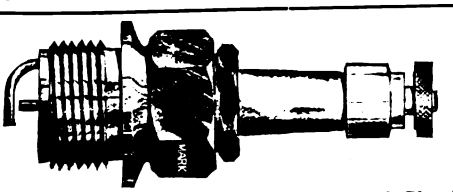
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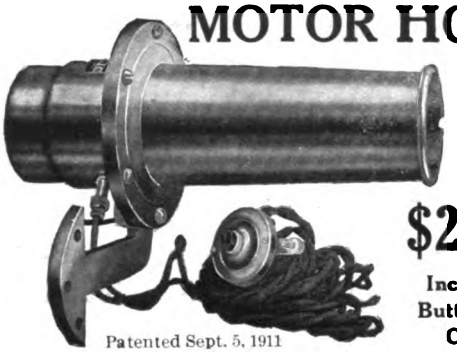
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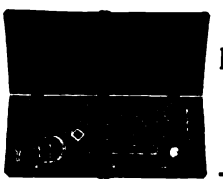
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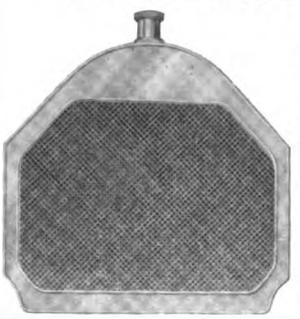
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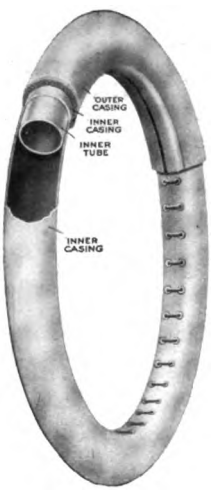
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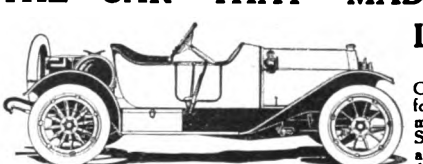
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Willard Storage Battery Co., Cleveland, O. (L B A.)

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Geissler Bros. Storage Battery Co., 514 W. 57th St., New York City.

Waite Auto Supply Co., 81 Exchange place, Providence, R. I. (Success.)

BLOWOUT PATCHES.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.

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Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

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Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Raybestos.)

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Branches: 903 Boylston St., Boston Mass.; 237 Lafayette St., New York, N. Y.

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Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Duplex.)

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Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Diamond.)

CARS—GASOLINE PLEASURE.

Abbott Motor Co., 605 Waterloo St., Detroit, Mich. (Abbott-Detroit.)

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas-Knight.)
Branch: N. E. corner Broadway and 64th St., New York City.

Berkshire Motors Co., Cambridge, Mass. (Berkshire.)

Brush Runabout Co., 3 West 61st St., New York City. (Brush runabout, Liberty-Brush.)

Buckeye Mfg. Co., Anderson, Ind. (Lambert.)

Cartercar Co., Pontiac, Mich. (Cartercar.)

Clarke-Carter Automobile Co., Jackson, Mich. (Cutting.)

Cole Motor Car Co. See Henderson Motor Sales Co.

Columbia Motor Car Co., 3 West 61st St., New York City. (Columbia.)

Dayton Motor Car Co., 3 West 61st St., New York City. (Stoddard-Dayton.)

Ford Motor Co., Detroit, Mich. (Ford.)

Haynes Automobile Co., 106 Main St., Kokomo, Ind. (Haynes.)

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Henderson Motor Sales Co., Indianapolis, Ind. (Cole.)
Eastern Distributors, Colt-Stratton Co., Broadway at 68th St., New York City.

Herreshoff Motor Co., 620 Harper Ave., Detroit, Mich. (Herreshoff.)

Hupp Motor Car Co., Detroit, Mich. (Hupmobile.)
Branches: Detroit, Buffalo, Chicago, Cleveland, Denver, Kansas City, Los Angeles, Minneapolis, Philadelphia.

Ideal Motor Car Co., Indianapolis, Ind. (Stutz.)

Imperial Automobile Co., Jackson, Mich. (Imperial.)

Inter-State Automobile Co., Dept. N, Muncie, Ind. (Inter-State.)
Branch: 153 Massachusetts Ave., Boston, Mass.

Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)

Kissel Motor Car Co., 174 Kissel Ave., Hartford, Wis. (KisselKar.)

Knox Automobile Co., Springfield, Mass. (Knox.)

K-R-I-T Motor Car Co., Detroit, Mich. (K-R-I-T.)

Lenox Motor Car Co., Inc., Boston, Mass. (Lenox.)

Marquette Co., The, Detroit, Mich. (Marquette.)
Branches: New York, Boston, Chicago.

Maxwell-Briscoe Motor Co., 3 West 61st St., New York City. (Maxwell.)

Michigan Buggy Co., 147 Lay St., Kalamazoo, Mich. (Michigan.)

National Motor Vehicle Co., 1033 22d street, Indianapolis, Ind. (National.)

Oakland Motor Car Co., 1300 Oakland Ave., Pontiac, Mich. (Oakland.)

Paige-Detroit Motor Car Co., The, Detroit, Mich. (Page-Detroit.)

Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: 660 Beacon St., Boston, Mass.,; Broadway and 57th St., New York City; Michigan Ave. and 25th St., Chicago, Ill.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

R. C. H. Corporation, 107 Lycaste St., Detroit, Mich. (R. C. H.)

Reo Motor Car Co., Lansing Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Selden Motor Vehicle Co., Rochester, N. Y. (Selden.)

Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)

Studebaker Corporation, Detroit, Mich, (E-M-F, Flanders.)

United States Motor Co., 3 West 61st St., New York City. (Brush, Maxwell, Sampson, Stoddard-Dayton, Columbia.)

Warren Motor Car Co., Detroit, Mich. (Warren-Detroit.)

White Co., The, 828 E. 79th St., Cleveland, O. (White.)
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Willys-Overland Co., Toledo, O. (Overland.)

CARS—STEAM PLEASURE.

White Co., The, 828 E 79th St., Cleveland, O. (White.)
Branches: See Cars — Gasoline Pleasure.

CARS—GASOLINE COMMERCIAL.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branch: See Cars—Gasoline Pleasure.

Available Truck Co., 2334 Hamilton Ct., Chicago, Ill. (Available.)

Bessemer Motor Truck Co., Grove City, Penn. (Bessemer.)

Brush Runabout Co., 3 West 61st St., New York City (Brush.)

Cartercar Co., Pontiac, Mich. (Cartercar.)

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches: New York, Chicago, Boston, Philadelphia, Kansas City.

Grand Rapids Motor Truck Co., Grand Rapids, Mich. (Hoosier Limited.)

Hupp Motor Car Co., Detroit, Mich. (Hupmobile.)
Branches: See Cars — Gasoline Pleasure.

Jarvis-Huntington Automobile Co., Huntington, W. Va. (Jarvis-Huntington.)

Knox Automobile Co., Springfield, Mass. (Knox.)

Mais Motor Truck Company, Indianapolis, Ind. (Mais.)

McIntyre Co., W. H., Auburn, Ind. (McIntyre.)

Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: See Cars — Gasoline Pleasure.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

Reo Motor Car Co., Lansing, Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y., (Sullivan.)

United States Motor Co., 3 West 61st St., New York City. (Sampson, Brush, Stoddard.)

Victor Motor Truck Co., 656 Main St., Buffalo, N. Y. (Victor.)

Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Couple-Gear Freight-Wheel Co., 540 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York City; 178 Devonshire St. Boston, Mass.

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches. See Cars, Gasoline Commercial.

General Vehicle Co., Long Island City, N. Y. (G. V.)

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Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branch: See Cars—Gasoline Pleasure.

Cartercar Co., Pontiac, Mich. (Cartercar.)

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CHAINS, TIRE.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

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Miller, Chas. E., 97-103 Reade St., New York City (Brampton.)

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CLOCKS FOR DASHBOARD, ETC.

Boston Clock Co., 16 State St., Boston, Mass.
Chelsea Clock Co., 16 State St., Boston, Mass.

CLUTCHES — AUTOMOBILE FRICTION.

Bretz Co., J. S., 250 W. 54th St., New York City (Hartford cone.)

CRANES.

Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee, Wis.
Prest-O-Lite Company (Prest-O-Carbon Remover.) See under Acetylene Tanks for address of main office and branches.

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

GASOLINE MIXING DEVICES.

Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

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National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Tire Pressure and Gasoline Tank Gauges.)
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Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

HORNS—BULB, ELECTRIC, EXHAUST.

Automobile Supply Mfg. Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)
Randall-Faichney Co., Boston, Mass. (Jericho, Jubilee.)

JACKS AND LIFTING DEVICES.

Canton Foundry & Machine Co., Canton, O. (Universal Combination Auto Jack and Emergency Truck.)
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Hopewell Brothers Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York City.

LAMPS—HEAD, TAIL AND SIDE.

Gray & Davis, 55 Lansdowne St., Boston, Mass.

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
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LIGHTING EQUIPMENT — ELECTRIC.

Edison Storage Battery Co., 137 Lakeside Ave., Orange, N. J.
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Branches: Detroit, Mich.; San Francisco, Cal.; 196 Pine St., Atlanta, Ga.; 114 Liberty St., New York City; Exchange Bldg., 53 State St., Boston, Mass.; 16 E. Main St., Waterbury, Conn.; 810½ Chapel St., New Haven, Conn.
Geissler Bros. Storage Battery Co., 514-520 W. 57th St., New York City.
Gray & Davis, 55 Lansdowne St., Boston, Mass.
K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O.
Sager Co., J. H., 271 South Ave., Rochester, N. Y.

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Marburg Bros., 1777 Broadway, New York City (Mea.)
Remy Electric Co., Anderson, Ind. (Remy.)
Splitdorf, C. F., Walton Ave. and 138th St., New York City.
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MEASURES, ETC.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Simplex.)

MOTORCYCLES AND MOTORCYCLE SUPPLIES.

American F. N., Co., Boston (F. N.)
Branches: 49 Union St., Providence, R. I.; 415 Trumbull St., Hartford, Conn.
Emblem Mfg. Co., Angola, N. Y. (Emblem.)
Swenson, B. A., 298 Blackstone St., Providence, R. I. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.
International Automobile Association, Sheldon M. Booth, Old South Bldg., Boston, Mass.

MOTORS AND POWER PLANTS.

Hazard Motor Mfg. Co., 122 Coates St., Rochester, N. Y. (Hazard.)
Western Motor Company, Marion, Ind. (Rutenber.)

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Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)
Eagle Oil & Supply Co., 104 Broad St., Boston (Eagleine No-Karbon.)
Fiske Bros. Refining Co., New York City (Lubroleine.)
Branch: Pittsburg, Penn.
Harris Oil Co., A. W., 326 South Water St., Providence, R. I. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.
Harris Oil Co., Muncie, Ind. (Autoil.)
Havoline Oil Co., 17 Battery Place, New York City (Havoline.)
Branches: Pacific Coast — Kohl Bldg., San Francisco, Cal.; Western—People's Gas Bldg., Chicago, Ill.; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O., Lynchburg, Va.; St. Paul, Minn.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.
Haws, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 899 Boylston St., Boston, Mass.
Keilom & Co., Chas. F., 113 Arch St. Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.
Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York Lubricating Oil Co., 116 Broad St., New York City (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleve-

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land, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle. Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.

New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York City (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York City.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston, Mass.; 605 Brown Bros. Bldg., Philadelphia, Penn.; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

Wolverine Lubricants Co., 80 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

OIL AND GREASE PUMPS, GUNS, ETC.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Randall-Faichney Co., Boston, Mass. (B-Line.)

POLISHES.

Harris Oil Co., Munice, Ind. (Metal, Wood, Leather.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

RADIATORS.

Eureka Auto Parts Mfg. Co., 3100 Olive St., St. Louis, Mo. (Eureka.)

RIMS — REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittlesey Demontachable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Webb-Veitch Co., 1777 Broadway, New York City (Invex.)

Willard Storage Battery Co., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")
Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Harris Oil Co., Muncie, Ind.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York City (Rex.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPEEDOMETERS AND RECORDING DEVICES

Casgrain Speedometer Co., 172 Columbus Ave., Boston, Mass.
Branches: 1919 Broadway, New York City; 2031 Euclid Ave., Cleveland, O.

Joner Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)

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TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St, Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1776 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims — Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17 1-2 Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

Western Automobile Supply Co., 3900 Sheridan road, Chicago, Ill. (Auto Inner Casings.)

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator.) See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

New Tyr Manufacturing Co., 771 Lexington Ave., New York City. (New Tyr.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz (Cushion.)
Branches: New York, Chicago, Detroit, Kansas City.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TRUCK BODIES.

Lynch Manufacturing Co.,. Hammond, Ind.
Branches: East Chicago, Ill.; South Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Canton Foundry & Machine Co., Canton, O. (Universal.)

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Pitless Auto Turntable Co., Kansas City, Mo.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Garage and Individual.)
Branches: In all principal cities.

WASHING DEVICES FOR GARAGES.

Perfect Mfg. Co., Albany, N. Y.

WINDSHIELDS AND WINDSHIELD CLEANERS.

Conover & Robinson, 244-252 W. 54th St., Motor Hall, New York City (Boreas.)

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.

Cutter, George A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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Young's "Self Lighter"

LIGHTS LAMPS FROM SEAT

Turn a Valve; Throw a Switch, That's All

Guaranteed to SAVE 50 PER CENT. of Your Gas Bill.

Any one can attach it in a few minutes. Simple and efficient. No complicated mechanism. Just a valve, switch and single wire. Will pay for itself in a short time in gas saved. Price complete $10.

WILLIAM H. POLLOCK,
Selling Agent, PITTSBURG, PA.
Room 604, McGeagh Building.
607 WEBSTER AVENUE



TIRE SOLDER

Guaranteed to repair cuts in shoes or punctures in tubes without heat or vulcanizing. Ask your jobber.

Set, $1.50

Chas. O. Tingley & Co.
Rahway, N. J.

THE SELDEN CAR.

Sturdy and staunch, powerful and strong,—a car ready to at all times satisfactorily perform any service you may ask of it.

A new standard of value in the automobile world. The Selden Car is sold with complete touring equipment. Five models—$2250 to $2600. Good territory still open to live agents.

SELDEN MOTOR VEHICLE CO., Rochester, N. Y.

DOVER AUTO FUNNELS

ARE THE STANDARD

56 Sizes and Styles



SEND FOR 1912 CATALOGUE

DOVER STAMPING AND MFG. CO.
CAMBRIDGE, MASS.

The Berdon Electric Lighting System

Offers complete electric lighting luxury—assured by a mechanically perfect product—and GUARANTEED FOR THE LIFE OF A CAR.

Send for the story of the most exacting trial ever given an electric lighting system—"The Acid Test."—Sent free to any address.

THE ESTERLINE CO. La Fayette, Indiana 120 Main St.

Polarine Oil and Greases

BEST FOR ALL MOTORS

STANDARD OIL COMPANY OF NEW YORK
New York City



"THE BRAKE LINING OF QUALITY."

Unequalled Efficient
Enduring Economical

Standard Woven Fabric Co.
Worcester, Mass.
Boston—903 Boylston St.
New York—237 LaFayette St.



DECARBONIZER

Chemically removes carbon from cylinders, pistons, rings and valves

INCREASES POWER 20 PER CENT.

Volatilizes carbon, in which form it passes out thru exhaust; injury to metal impossible. Agents wanted in certain localities. Sample quart can $1.50. Write today for particulars.

MILWAUKEE AUTO SPECIALTY COMPANY
128 Second St., Milwaukee, Wis.

UNITED STATES TIRES

Continental *Hartford*
G & J *Morgan & Wright*

The Strength of Four at the Price of One

Why Not Let Us Tell You?

How to reach 11,500 active purchasing heads in the Automobile Industry each month. The only guaranteed service of its kind.

We can save you from $150 to $500 a month on your mailing list and give you the benefit of the best list obtainable. ***A postal will bring full information.***

THE ACCESSORY & GARAGE JOURNAL
Times Building Pawtucket, R. I.

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"INVADER" GEAR OIL

"Puts Noisy Gears to Sleep"



INVADER GEAR OIL is a heavy, dark fluid lubricant, designed for the lubrication of sliding gear transmissions and differential gears. It can also be used for front gears where a heavy lubricant is required, if the case is is tight and separate from the crank case.

This oil possesses peculiar properties which make it invaluable as a lubricant for gears. It contains no foreign matters, such as ground cork, sawdust, etc., but is 100% oil. It is stronger and more serviceable than any other lubricant made. Being free from water and chemicals, it will not foam in the gear case when running or allow the bearings to rust when idle.

Invader Gear Oil being a fluid lubricant it is only necessary to fill the case sufficiently to allow the gears to dip. It is not necessary to pack the case full, as is customary when grease is used. It faces the gears with a coating which is practically indestructible, thereby preventing wear and reducing *noise* and friction to a minimum. A trial will convince the most skeptical that "**Invader**" Gear Oil is the only practical and economical gear lubricant.

Sold in 10 lb. square cans, lithographed; 25 and 50 lb. wooden jacketed cans, special top; barrels and half-barrels

CHAS. F. KELLOM & CO., 113 Arch Street, Philadelphia; Branch: 719 N. Broad Street

NEW ENGLAND BRANCH, 284 Columbus Ave., BOSTON, MASS.

Empire Tires

WEAR LONGEST

EMPIRE TIRE CO., Trenton, N.J.

Can You Adjust and Time a Magneto?

If not,

THE A B C OF

Magneto Ignition Systems

By VICTOR W. PAGE, M. E.

Will make principles of operation, construction, timing, adjusting, and locating trouble clear. A practical treatise for all who motor, written so that you can understand it. Over 30 illustrations and charts. Covers the subject thoroughly and concisely. Sent postpaid to any address in U. S. or Canada on receipt of 35 cents. More Useful Information Than Ever Before Published on This Subject.

AUTOMOBILE JOURNAL

Times Building, Pawtucket, R. I.

Complete Instructions for Repairing Chassis Components

All parts of the motor vehicle, exclusive of the power plant, are considered in a comprehensive manner. Details restoration of all types of clutches, transmissions, driving systems, steering gears, etc.

A B C of Motor Car Chassis Maintenance & Repair

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More practical information in this book than in others selling for many times the price. Contains over 50 illustrations and charts.

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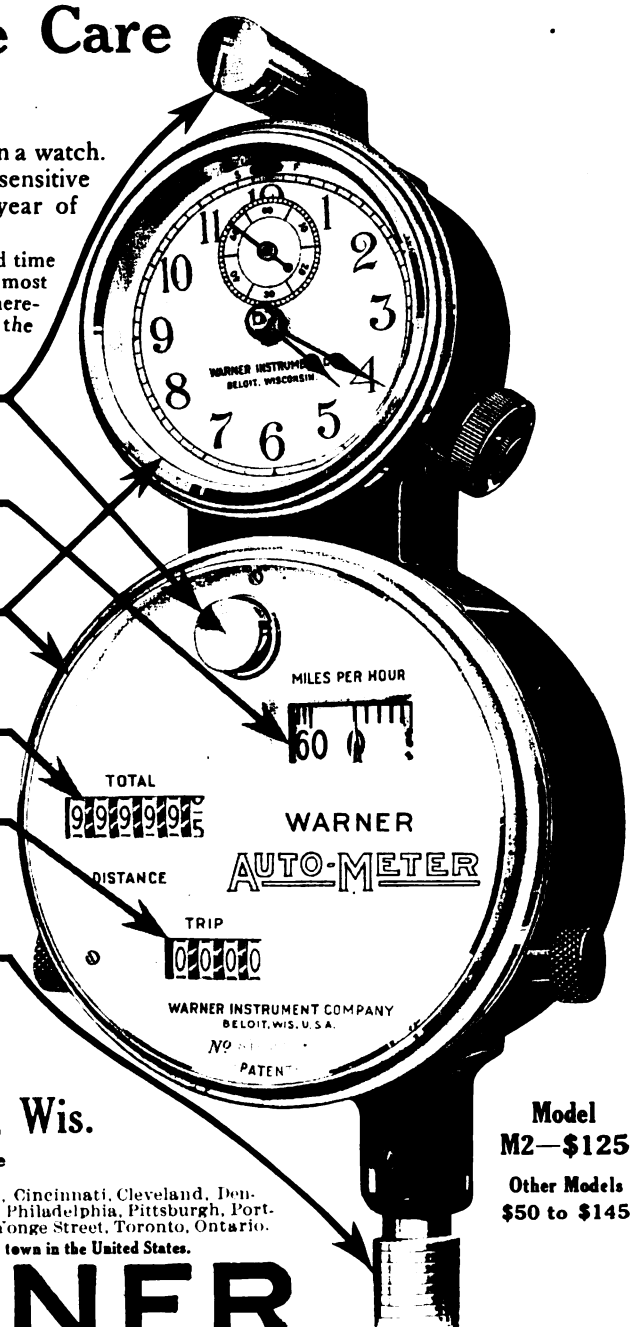
The Automobile Journal, Times Bldg., Pawtucket, R. I.

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The Jeweled Auto-Meter Built With Even More Care Than a Watch

This is necessary, as more is expected of a Warner than a watch. It must actually *do* more than a watch. It must be more sensitive and yet be able to stand hour after hour and year after year of jolting vibration.

Every Warner is a *jeweled* instrument. Each is tested time and time again before it goes to grace the dash of your car—to be the most looked-at as well as the most *responsible* part of your car. Therefore, we can make the guarantee and feel safe in making it, for the Warner is trouble-proof.



Dial Illumination

Two tiny electric lights underneath bezel, which concentrate rays on clock face and upon speed and distance figures; no light escaping to blind the eyes.

Speed Indicating Scale

Circular aluminum dial mounted on standard ship-chronometer pivot. Hairspring returns disc to zero when speed stops. Total weight 106 grains. Figures can be plainly read by the average eye 10 feet away.

Bezel

Made of heavy seamless brass tubing, accurately machined. Spun around thick French plate glass, which cannot become loose and rattling. Absolutely dust-proof, water-proof and oil-proof. These are, of course, exclusive Warner features.

Total Distance Indicator

Odometer registers to 100,000 miles before it automatically resets. The season odometer runs independently of trip odometer.

Trip Indicator

Trip odometer registers to 1,000 miles and automatically resets to zero. Another reset turns up any desired mileage on trip odometer, thus you may pick up and follow a route book, beginning at any point and have trip mileage absolutely agree with route book.

Warner Unbreakable Flexible Shaft

Driving shaft troubles and annoyances entirely wiped out by this new unbreakable casing. Made from high-carbon spring steel wire of great tensile strength. Heavy outer wire coiled over smaller inner wire into perfect oil-tight flexible casing; highest grade of vanadium steel used for inside driving chain. Heavily plated with either brass or nickel.

Warner Instrument Co., Beloit, Wis.

Main Offices and Factory: 1270 Wheeler Avenue

BRANCH HOUSES maintained at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Indianapolis, Kansas City, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore.; San Francisco, Seattle, St. Louis. **Canadian Branch,** 559 Yonge Street, Toronto, Ontario.

The Warner can be secured through reputable automobile dealers in any city or town in the United States.

Model M2—$125

Other Models $50 to $145

WARNER AUTO-METER

(180)

NOTE TO DEALERS: When suggesting a speed indicator always recommend the Quality Warner *first*. Then if you finally have to sell something inferior because of price, your customer can't blame you for his dissatisfaction—he refused the Warner against your judgment.

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Truffault-Hartford Shock Absorber Patent Again Sustained
Westen Shock Absorber Enjoined

THE United States Circuit Court of Appeals for the Third Circuit has just handed down an opinion affirming the decision of the Circuit Court for the District of New Jersey, holding that the Truffault Patent is valid and that the Westen Shock Absorber is a clear infringement thereof.

The Court of Appeals, the Court of last resort in patent cases, makes this decision **final.** The manufacture and sale of the Westen Shock Absorber is perpetually enjoined.

We have always believed that the Truffault Patent was fundamental and covered broadly all types of rotary friction Shock Absorbers. This belief has been affirmed by the highest courts and we hereby give notice that we shall protect our rights to the fullest possible extent.

WARNING

We wish to warn the trade and individual automobile owners against the use or sale of infringing Shock Absorbers, some of which are advertised as non-friction devices. Years of experience have taught us that no successful Shock Absorber can be made which is not essentially a friction device, despite the misleading statements of other manufacturers to the contrary. We are advised by our attorney that our patents are basic and complete and we intend to bring suit against all manufacturers, dealers or users who in any way encroach upon our rights.

HARTFORD SUSPENSION CO.

EDWARD V. HARTFORD, Pres. **146 Bay Street, Jersey City, N. J.**

Branches:

NEW YORK: 212-214 W. 88th St. & 1700 Broadway.
BOSTON: 325 Columbus Avenue.
PHILADELPHIA: 1437 Vine Street.
CHICAGO: 1458 Michigan Avenue.
NEWARK: 289 Halsey Street.
DETROIT: 870 Woodward Avenue.
KANSAS CITY: 1524 Grand Avenue.

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VOL. XXXIII No. 6

AUTOMOBILE JOURNAL

$1.00 the Year.
10 Cents the Copy.

PAWTUCKET, R. I.

April 25, 1912

APR 29 19

We Lubricate the World's Motors.

UNDER its Gargoyle trademark the Vacuum Oil Company supplies lubricants to—

The floating armament of the world's leading naval powers.

To leading ocean steamship companies throughout the world.

Outside of the American market, to over seventy foreign automobile manufacturers.

To practically every aeroplane in active use, both private machines and the military aeroplanes of the leading powers.

To leading manufacturing plants at home and in every quarter of the globe.

For over half a century we have made lubricants, not as by-products, nor as temporary profit makers, but as a serious business.

In power-engineering circles, our standing as the authoritative leaders in high-grade lubricants is unquestioned.

No one lubricating oil is best for all cars. That is why we analyzed all automobiles and now make five grades of Gargoyle Mobiloils to supply them.

The quality of Gargoyle Mobiloil necessitates a price that is somewhat higher than that of the usual automobile lubricating oils.

However, their use should result in an actual saving. Properly used, they will go farther than less correct oils.

Gargoyle Mobiloils are supplied to owners through garages, auto-supply-stores, and others who handle lubricants.

If the retailer who generally supplies you carries no stock at present, you should have no difficulty in securing through him the grade of Gargoyle Mobiloil you require.

They are put up in barrels, half barrels, in 5 and 1 gallon cans. All are marked with our Gargoyle trademark.

Send for our free chart which shows the correct grade of oil for every American car and most of the foreign makes.

GARGOYLE

Mobiloil

A grade for each type of motor.

If oil saves power, it follows that one oil saves more power than another.

VACUUM OIL COMPANY, Rochester, U. S. A.

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1912 Annual Catalog No. 22

Our 1912 Catalog, the Largest and Most Complete Catalog of the kind, containing 256 Pages, is Now Ready for Distribution. The Circulation is Limited to ONE HUNDRED THOUSAND Copies. It will be mailed to any one on request.

CUT PRICES

Concerns that offer Large Discounts make it their practice to INFLATE LIST PRICES and then offer Large Discounts, which are somewhat misleading. We have seen a catalog in which a certain spark plug is illustrated, "PRICE $2.50, OUR PRICE $1.00," while THE STANDARD LIST or RETAIL PRICE for the same spark plug as illustrated in Our Catalog and advertised by the manufacturer is $1.00 each. Their CUT PRICE Therefore Is Not Lower Than OUR LIST PRICE.

DON'T BE DECEIVED BY LARGE DISCOUNTS QUOTED FROM INFLATED LIST PRICES . . . .

ORDER FROM OUR NEAREST BRANCH

Boston, Mass., Branch, 202-204 Columbus Avenue
Springfield, Mass., Branch, Bridge and Dwight Streets
Hartford, Conn., Branch, 274 Trumbull Street
Albany, N. Y., Branch, 135 Central Avenue

The Largest Auto Supply House in America

CHAS. E. MILLER

Manufacturer, Jobber, Exporter and Importer

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NEW YORK CITY 97-103 Reade St.	BROOKLYN, N. Y. 1421 Bedford Ave.	BOSTON, MASS. 202-204 Columbus Ave.	DETROIT, MICH. 227-229 Jefferson Ave.	ATLANTA, GA. 66 Edgewood Ave.
NEW YORK CITY 924 Eighth Ave.	BUFFALO, N. Y. 824 Main Street	SPRINGFIELD, MASS. Bridge & Dwight Sts.	CLEVELAND, O. 1829 Euclid Ave.	NEW ORLEANS, LA. 601-603 Baronne St.
NEW YORK CITY 2782 Broadway	ALBANY, N. Y. 135 Central Ave.	HARTFORD, CONN. 274 Trumbull St.	PHILADELPHIA, PA. 318 North Broad St.	NEWARK, N. J. 274 Halsey St.

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TEXACO
MOTOR OIL



YOU, the car owner, need no longer number cylinder troubles among your motor cares.

Pitted cylinder walls and valves, weak compression, faulty ignition, can almost invariably be traced to an inferior cylinder oil.

The perfect cylinder oil contains no carbon impurities. Its lubricating qualities have not been impaired in order to eliminate carbon. It shows a zero cold test.

Texaco Motor Oil meets these requirements. The most careful working tests have shown none of the troublesome carbon deposits so common with motor oils. It h· **shoul** ·ely clean. It has sufficient body to lubricate ıders never "dry out," never become scarred ¶ Send for (ıt has a cold test of zero and thereby eliminates all of the lubrication troubles usually caused by cold weather.

These are strong statements. You may feel skeptical. The best proof of their truth is in the use of the oil itself. Try a can.

Sold in 1 and 5 gallon cans at garages and supply shops. For instructive booklet, "About Motor Lubrication," address Dept. B. 7 West Street, N. Y. City.

THE TEXAS COMPANY

HOUSTON NEW YORK

BRANCH OFFICES

Boston Philadelphia Chicago St. Louis Norfolk Atlanta New Orleans El Paso Dallas Tulsa Pueblo

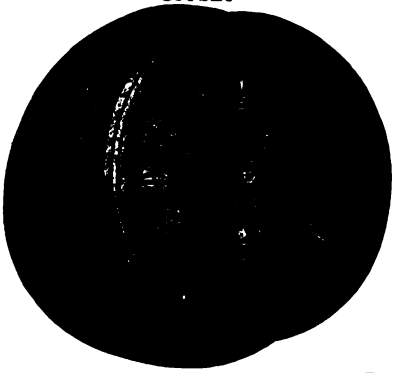
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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Auto[illegible] Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF [illegible]venue

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass ca.. the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

	"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA" 2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
3½-in. Auto Clock.....	28.00	30.00	45.00	Only made in
3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—Add $3.00 to above Price Lists. (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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Overland

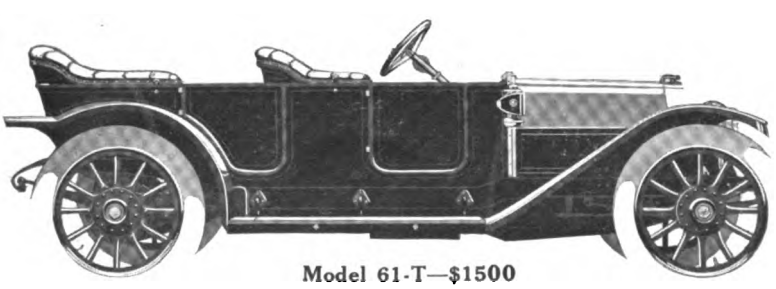
IF judged by the value received in the average forty-five horsepower five-passenger touring car our Model 61 will give you $1800 worth for $1500. It gives you everything that you get in the best of the other cars of this type and a little more than you can get in the average.

¶ Take the specifications of our Model 61---line them up against any set of $1800 specifications and you will find them practically the same. And not only are the base specifications almost identical but the appearance, comfort, finish and general construction are equal.

¶ If the $1500 Overland gets you about as much as you get in any other $1800 forty-five horsepower five-passenger touring car why should you pay the difference?

¶ Send for our interesting catalogue. Ask for book K44.

The Willys-Overland Co., Toledo, Ohio.



Model 61-T—$1500

Wheel base, 115 inches; body, 5-passenger fore-door touring; motor, 4 3-8x4 1-2; horsepower, 45; Bosch magneto; tires, 34 x 4 inch Q. D.; finish, Brewster green, ivory stripe, all bright parts nickel-plated; 3 black and nickel oil lamps; 2 black and nickel gas lamps. Price, $1500.

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COES

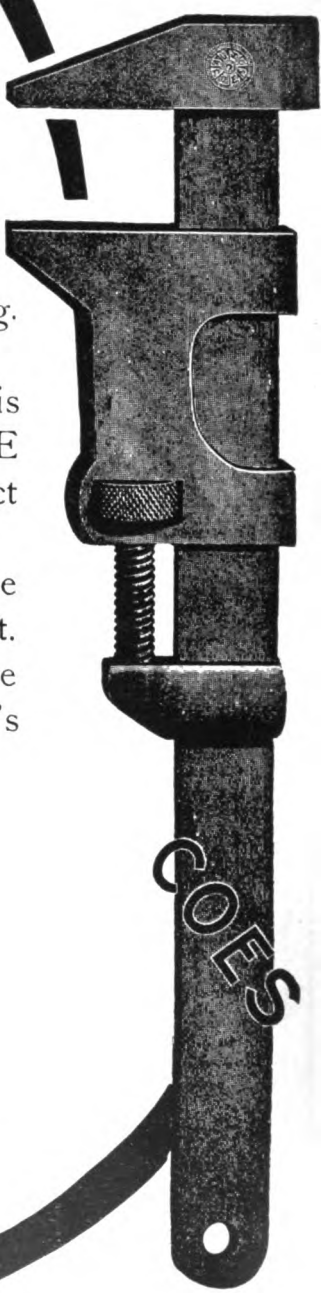
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.



Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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HARRIS

TRADE MARK—REG. U.S. PAT. OFF.

OILS

Actually Save You Money

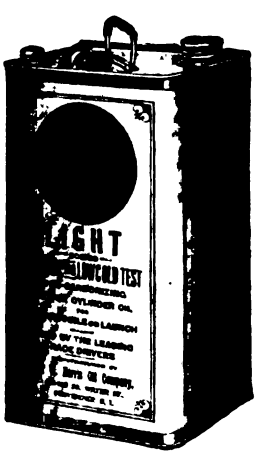
THE SAVING is in the increased mileage they give. There is more lubrication in every drop of HARRIS OILS than there is in ordinary lubricants.

THE SAVING is in the reduced cost for upkeep. Remember that the soot-deposit ingredients are eliminated to the greatest posssible extent. This naturally reduces chances of carbonization. There is less cost for repairs and overhauling.

THE SAVING is in the absence of lubricating troubles. Your engine runs smoother—no knocking or pounding, no constant grinding of valves.

It costs but little—a trifle to prove the efficiency of HARRIS OILS. One or two cans tell the story more graphically than thousands of advertisements.

If you, too, believe HARRIS OILS will save you money and give you a better motor—why not try them?



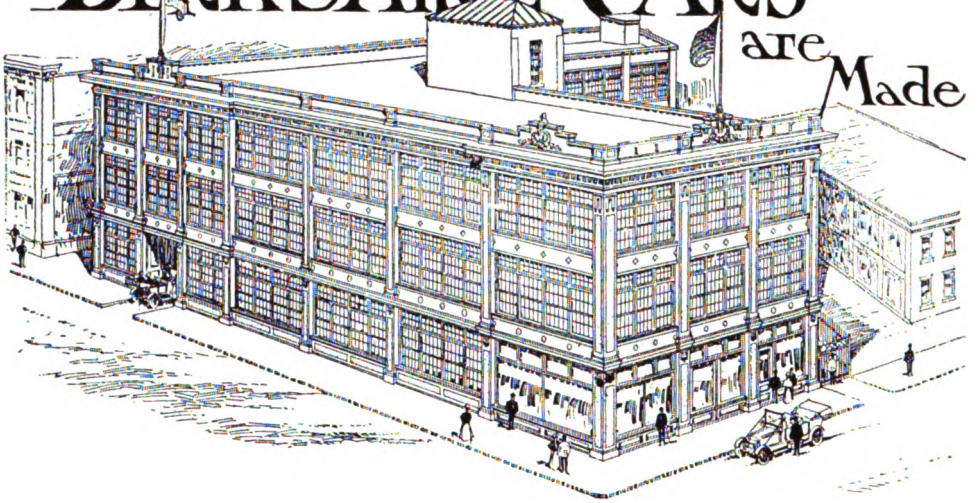
If your dealer does not sell Harris Oils, send 80 cents (for 1 gal. can) or $3.75 (for 5 gal. can) and we will ship same prepaid.

A. W. HARRIS OIL COMPANY

326 South Water Street, PROVIDENCE, R. I.
143 No. Wabash Ave., CHICAGO, ILL.

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Where BERKSHIRE CARS are Made



The New Plant of the "Berkshire," Cambridge, Mass.

Simple! Speedy!

THE BERKSHIRE

"The Made to Order Car."

4 CYLINDER CARS.

Motors—4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—119 inches.
Springs—Semi-Elliptic front, ¾ rear.
Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
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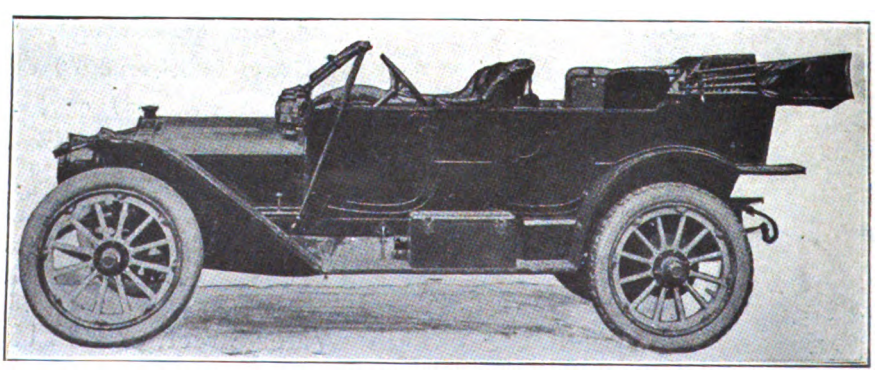
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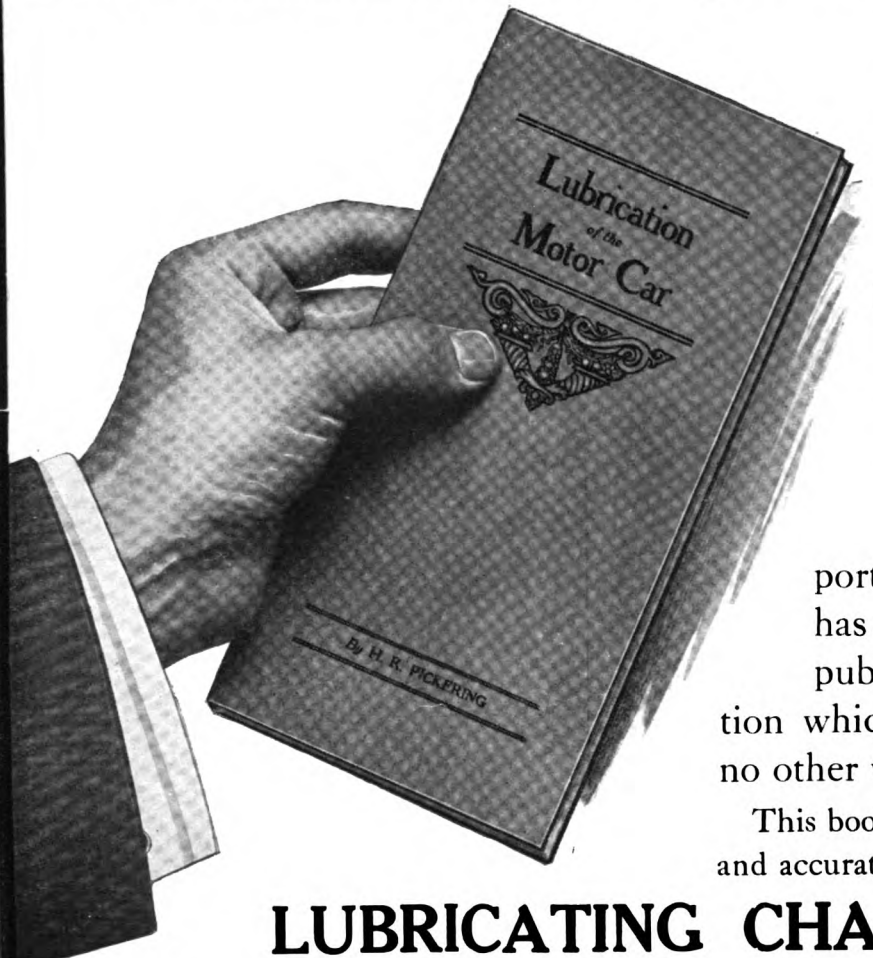
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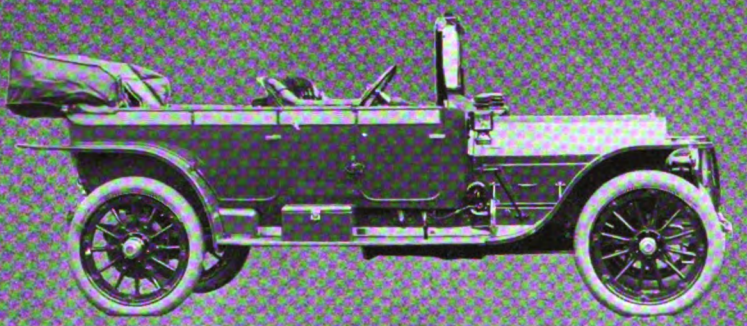
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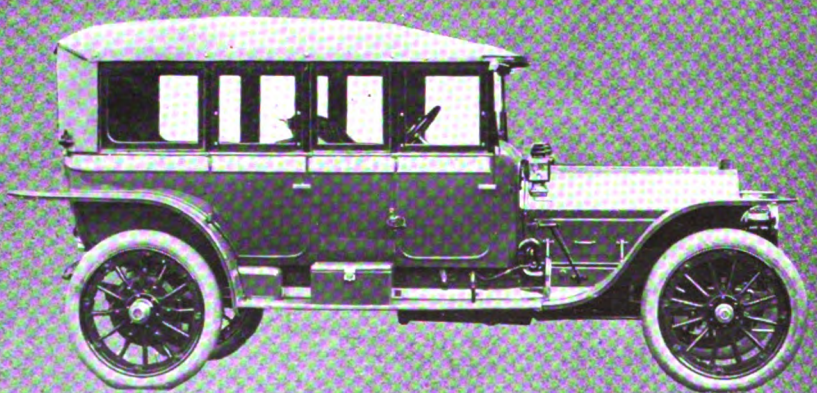
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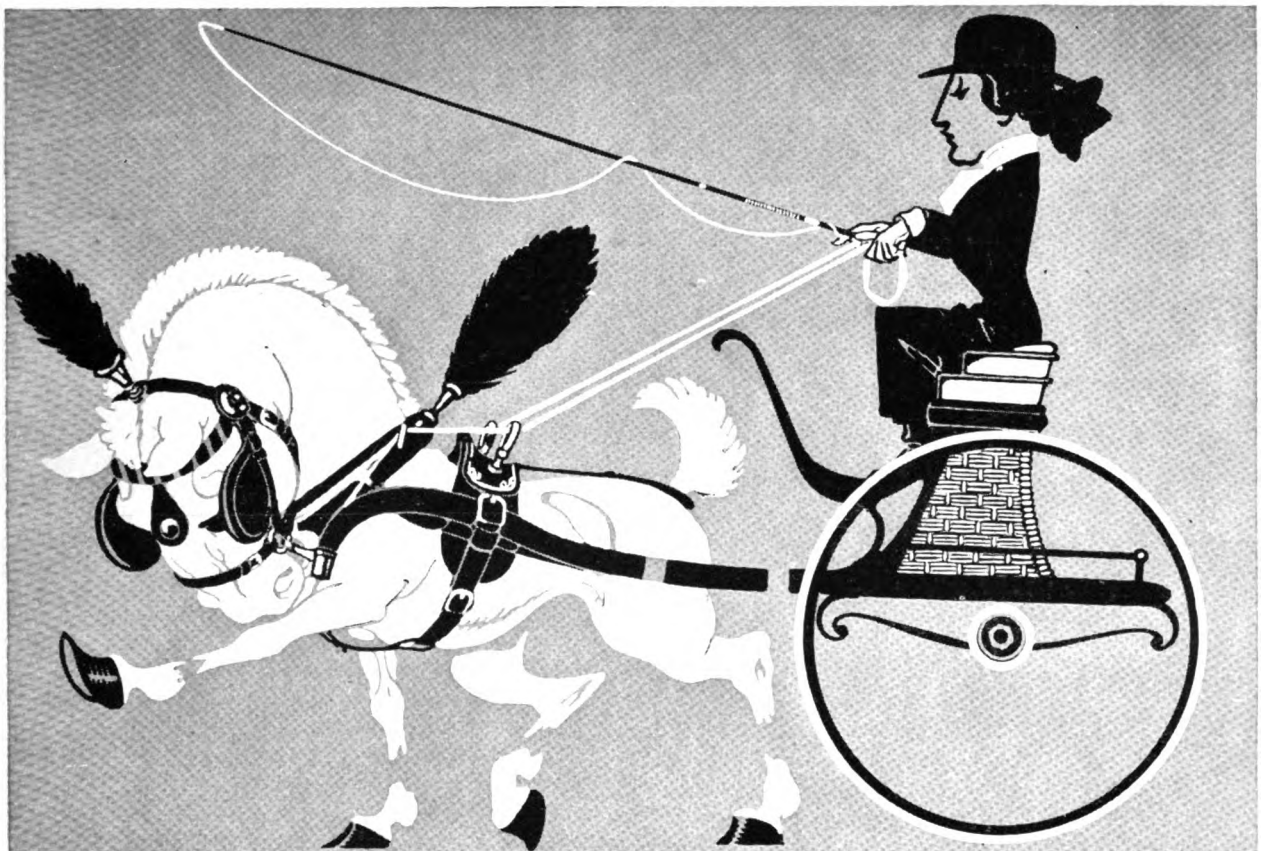
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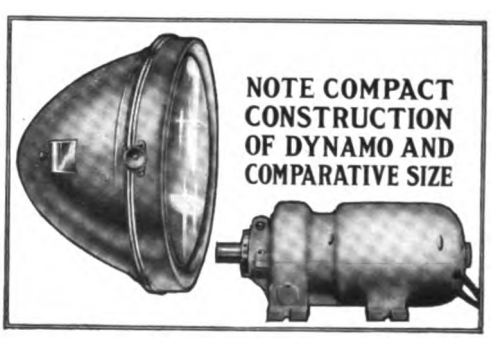
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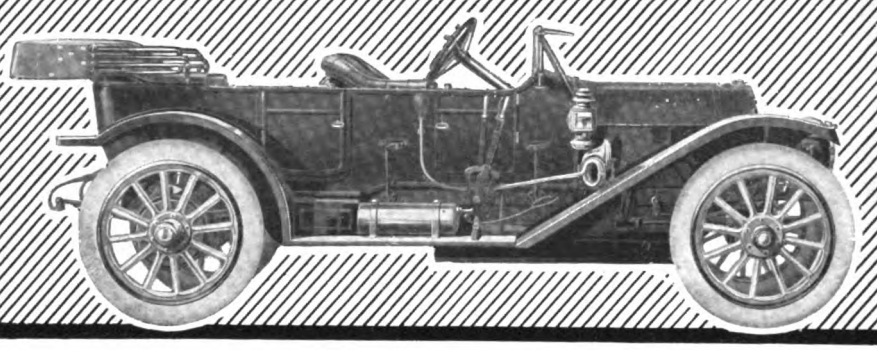
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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 6 APRIL 25, 1912 Price $1.00 the Year

TYPES OF ROTARY VALVE MOTORS.

Constructional Features of Three Designs Now Offered to American Public, Illustrating Wide Variance in Method of Attaining Similar Results.

ABOUT a year ago the Reynolds Motor Company of Detroit made its preliminary announcement of a four-cylinder, four-cycle, rotary valve motor, designed for automobiles and motor boats. Several of these engines have seen satisfactory service since that time in marine work, and it is understood that others have been given extended tests in various makes of cars and with splendid results. The latest product of the company is a six-cylinder power plant, embodying all the features of the original, but with some slight detail modifications. A description of this will prove of decided interest, in connection with the discussion of non-poppet valve motors begun in the last issue of The Automobile Journal.

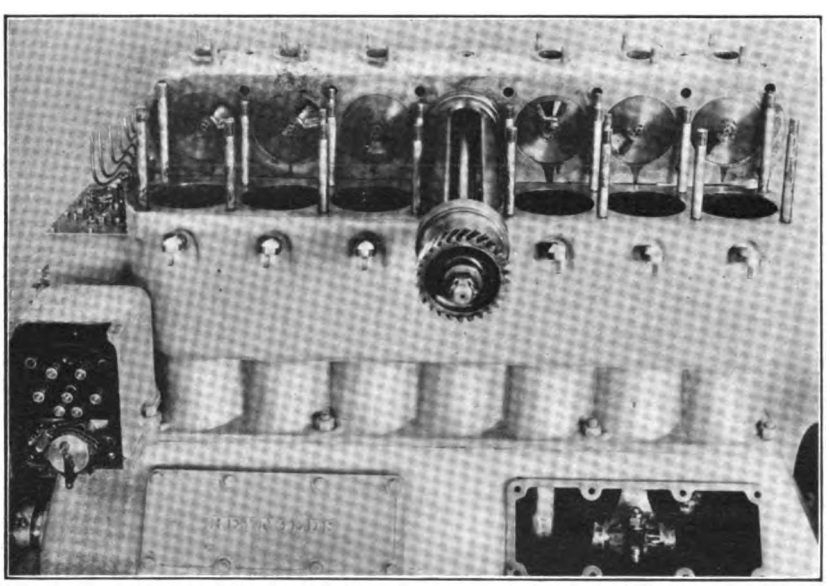


Fig. 1—Six-Cylinder Reynolds Rotary Valve Motor Partly Dismantled, Showing Valve Location and Master Gearing.

Fig. 1 presents the six-cylinder unit partially assembled, but with the cover plate and master gearing removed to illustrate the principal difference between its construction and that of the four-cylinder design, which is indicated in Fig. 3. In this latter it will be noted that the master gear is located in a separate housing at the end of the train which operates the individual valves in the respective cylinder heads. In the six, this master gear is located in a separate compartment in the centre, between each set of three cylinders. This is the principal distinction between the two models, but it will be necessary to describe the features of the Reynolds rotary valve in more detail before considering the effect of this change upon the working of the motor. The valve itself is seen in Fig. 3, between the two main views of the cylinder head assembly. The view at the right is that presented by looking into the cylinders, and in the one nearest to the master

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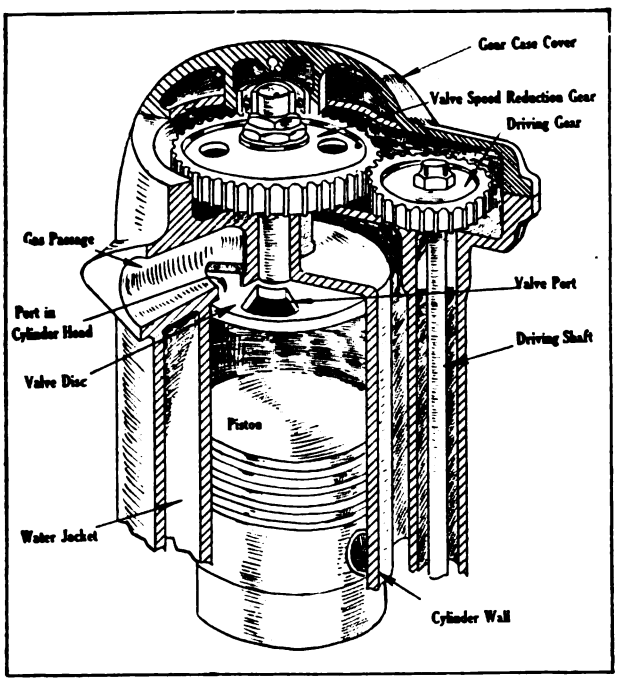


Fig. 2—Sectional View of Cylinder in Reynolds Motor, Indicating Position of Valve and Intake Port.

driving gear, the valve has been removed to show the construction of the cylinder head. It will be noted that there are two ports in the cylinder head, and only one in the valve. The exhaust is so constructed that it remains open about 14 per cent. longer than the inlet, providing for complete scavenging of the cylinder during the exhaust stroke of the piston.

Reynolds Valve Disc.

In the Reynolds motor the pistons are the only reciprocating parts. The valve discs are in effect sliding members, except that they rotate on top of the cylinder head, their ports registering with inlet and exhaust openings in these members. After careful experimentation, the maker has constructed the discs of a special bronze composition, and it is claimed that extended use has demonstrated that the amount of wear is so slight as to be possible of detection only with a micrometer.

These valves are .0625 inch less in diameter than the bore of the cylinder, so that in an engine of 3.5-inch bore, for instance, the valves are 3.4375 inches diameter, .5 inch thick and with a stem .75 inch diameter. The stems are formed integral with the discs. Operation is at one-half speed, and the timing and order of firing may be arranged to suit the various individual needs.

Broached in the bronze disc is a triangular hole or port, opening approximately one square inch. Formed in the cylinder head are two ports, also triangular in shape. The action of the valves is through a train of spiral steel gears, .875 inch face, and carried in a recess on top of the cylinders. This construction is brought out more clearly at the left of Fig. 3.

Operating Gears.

To the .75-inch stem of each of the four or six valves is keyed one of these spiral gears, so that all valve stem gears are in mesh. Primary action is from a steel spiral gear keyed to the crankshaft, this meshing with a bronze gear keyed to the hub of another steel spiral gear on the .75-inch transverse shaft. This latter steel gear meshes with a bronze spirally cut member at the base of the .75-inch vertical shaft, fitted at the bottom with a thrust bearing. This shaft is carried in an integral housing at the end of the cylinder casting in the four-cylinder models, as outlined at Fig. 3, but in a central dummy cylinder in the six, as noted in Figs. 1 and 5.

At the upper end of this vertical shaft is a spiral gear which meshes with the first of the four gears in the four-cylinder unit, imparting a continuous rotary movement to the valve discs. In the six, the top of the vertical shaft caries a helical gear, which actuates three gears each way, thus serving to rotate the six valves on their seats. This central placing of the driving gear is held to balance the drive and minimize back lash. The design has been so worked out that the Reynolds six can be delivered to run permanently in either direction as desired.

The valve stems being bronze, virtually supply their own bearing surfaces, working on the cast iron of the cylinder heads. All valve gears are secured through lock nuts, and with these in place enough space exists to support imported ball bearings on the valve stems, these recessing in the aluminum cover plate when it is bolted in position. Adjustment of

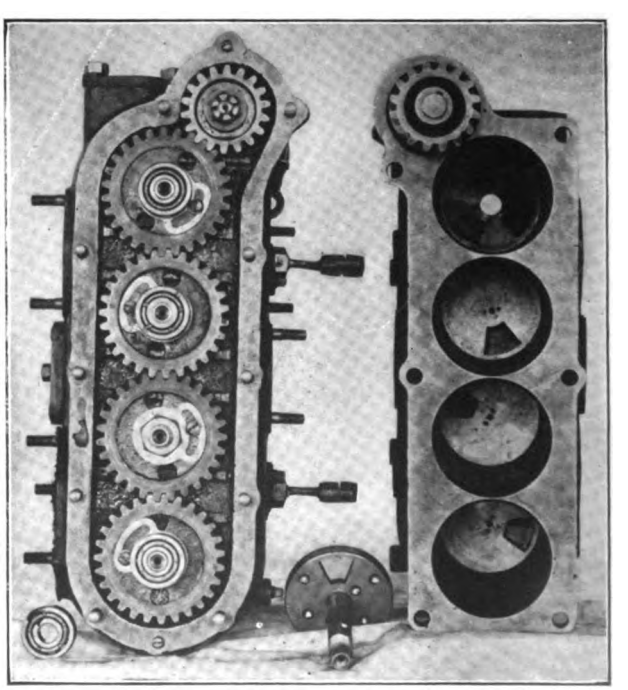


Fig. 3—Train of Gears, Valves in Place in Cylinder Heads, and Other Components in Reynolds Four-Cylinder Model.

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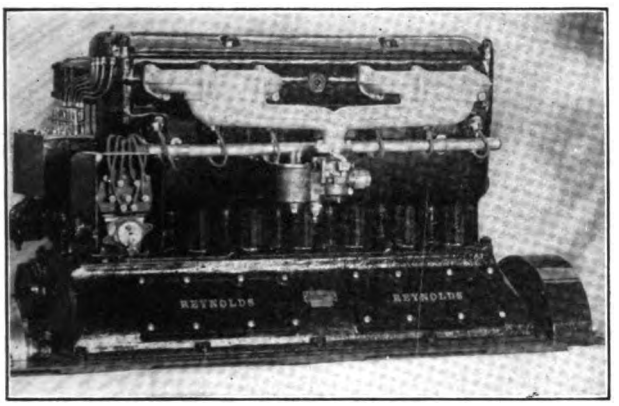


Fig. 4—Reynolds Six-Cylinder Model Completely Assembled, Presenting Neat and Compact Appearance.

the stems is such that a smooth rotation is provided without undue wear. Since the valve never leaves its seat, there is held to be slight accumulation of carbon, and this is cared for by countersunk holes in the top face of the valve, which also serve as oil receptacles. Careful study of Fig. 1 will reveal the oil leads to the various gears, from which lubricant finds its way to the valve discs.

The Four Cycles.

Fig. 2 will serve to illustrate the cycle of operation, this being a cut-out section through one of the cylinders, with the valve disc exposed. It will be seen that the triangular port in the disc is registering with the inlet port of the cylinder head, and the piston is on its way down on the suction stroke. By the time the piston has reached the bottom of its stroke a full charge of gas has been drawn into the cylinder. The opening in the disc has then passed by the inlet port in the cylinder head and there is no opening at the top of the cylinder during the compression and power strokes. When the piston reaches the bottom of its travel on this latter, the opening in the valve begins to register with the exhaust port in the cylinder head, not shown in the drawing, and scavenging commences.

The cylinders of the Reynolds motor are cast en bloc, with water jackets integral, and there is a gradual taper from the top to the base of the jackets, which adds materially to the smooth and finished appearance of the whole. With the four, the bore is 3.5 inches and the stroke 4.5. With the six, the bore is 4.5 inches and the stroke six.

Materials Employed.

Pistons, like the cylinders are cast of a very fine grade of gray iron and are carefully finished. These are fitted with four .25-inch compression rings, cast separately, turned on the outer faces, ground on the edges and untouched on the inner faces. This means that the scale on the inner faces is not removed, it being the opinion of the designers that to do so effects a loss in the natural elasticity of the rings. The bottom ring groove shoulder is beveled at 45 degrees for the purpose of scraping the oil descending the cylinder walls and forcing it through holes drilled in the piston and thence to the bottom of the crankcase.

Among the other features incorporated in the design of the six-cylinder model is the provision for accessibility. The gearcase cover is removable from the head to permit of simple adjustment of the valves. The head is removable from the cylinder casting, as shown herewith. The cylinders may be removed from the base, and the upper half of the base may be separated from the lower half, leaving the crankshaft, pistons and rods undisturbed, if desired. More than this, removable plates are provided on both sides of the crankcase, and these are of such generous size that a bearing can be replaced easily, should this become necessary, without taking down any part of the motor. It may be mentioned here, that the bearings employed are of the finest grade of bronze, with genuine babbitt

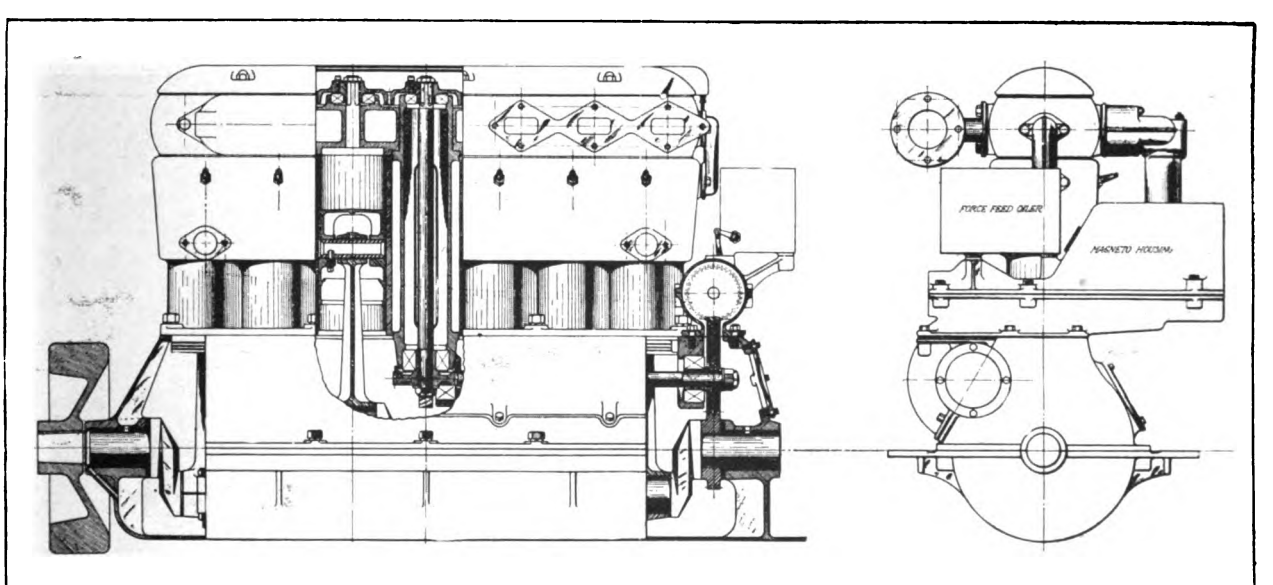


Fig. 5—Sectional View of Reynolds Six-Cylinder Engine at Left, Showing Dummy Cylinder; Front of Motor at Right.

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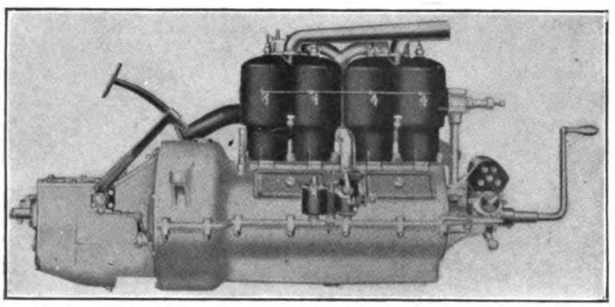


Fig. 6—Right Side of Silent Valve Four-Cylinder Engine, Completely Assembled.

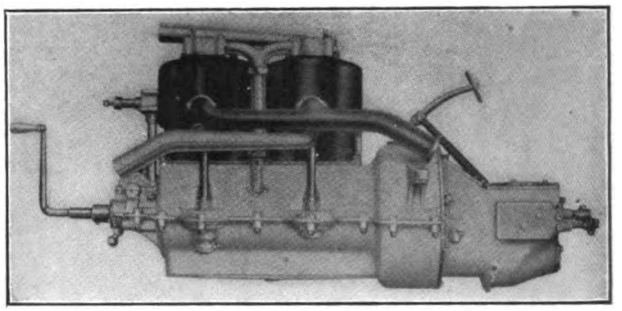


Fig. 7—Left Side of Silent Valve Motor, Showing Inlet and Exhaust Manifolds.

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Silent Valve Motor.

The Silent Valve Company of America, Connersville, Ind., has brought out the Silent Valve motor, designed by E. L. Russel, while engaged as a district manager for the Bell Telephone Company at Dallas, Tex., in 1899. He worked on the principles involved for some 10 years before he was rewarded with anything in the nature of success, but for the past two years the motor has been taking on its present form, until the company offers what it believes is a thoroughly tested automobile engine of the rotary valve type.

The motor is shown in accompanying illustrations, as offered to the public in the four-cylinder form, with bore of 4.5 inches and stroke of 5.5. Fig. 10 shows a view of the motor from the bottom, with the valve actuating gears, and it will be noted that each valve serves for a pair of cylinders. Fig. 8 presents the valve and actuating mechanism assembled and completely dismantled. The valve is geared one-quarter crankshaft speed, and its periphery is so constructed as to provide suitable inlet and exhaust ports to carry each of the cylinders through four cycles. This is accomplished once each half-revolution of the valve, as this is provided with two inlet and two exhaust ports.

It will be seen that the valve is made conical or tapered, the purpose being to provide means for adjusting it to and from the seat as may be required in order to compensate for variation in the size of the valve and seat due to heat or wear. The incoming gas enters through the valve cover to the centre, thence through the inlet port of the valve, which registers with the cylinder port. Following the compression and expansion of the charge the burnt gas finds its way out through the exhaust port or the passage which extends through the centre of the valve and which, when registering with the cylinder port, also registers with the exhaust side of the valve seat. Fig. 11 gives two sectional views of the valve itself, and still further brings out its construction.

In order to accomplish its functions automatically the valve is provided with a peculiar and special actuating means, which may be described as follows: The lower end of the valve is constructed so that in combination with a suitably arranged pin and rollers, it serves the function of a nut by means of which it is drawn down positively onto the valve seat, since the rollers are made to engage a double spiral grooved collar or yoke member, which is assembled on the upper end of the valve shaft.

This spiral grooved collar is fitted with two lugs and two pins located in their centres. These lugs are engaged by two compression springs, which also en-

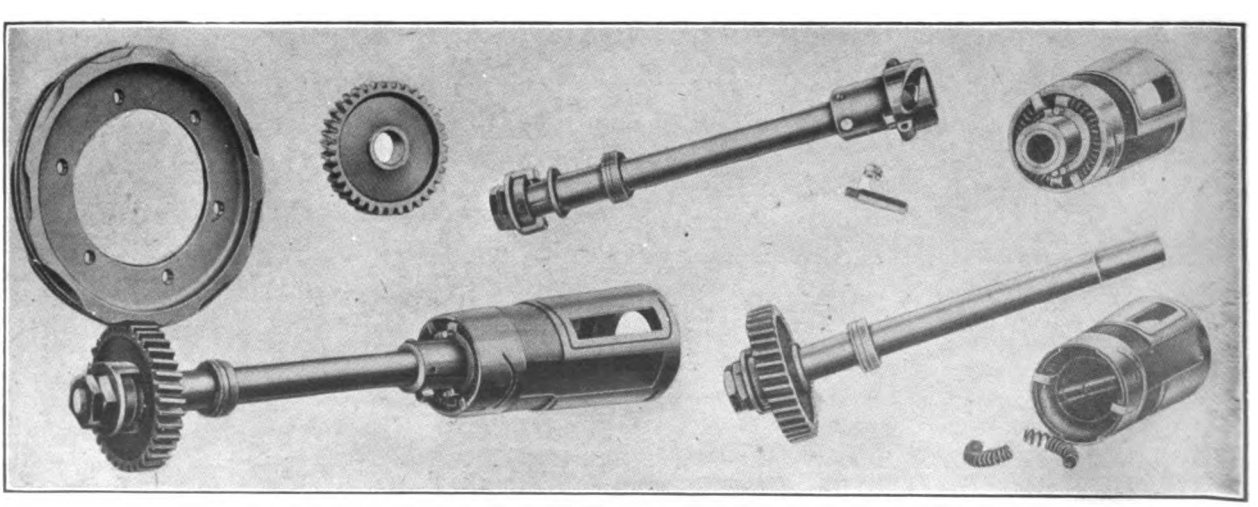


Fig. 8—Valve in Silent Valve Motor Completely Assembled with Actuating Mechanism and the Various Components Detached for Better Examination of Its Construction.

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gage two posts or bosses forming a part of the construction on the lower end of the valve. It is apparent that the valve is drawn into its seat by means of the spiral grooved collar and the torque exerted by the springs around the axis of the valve, and further that the valve cannot move axially on its seat without rotating the valve shaft, as it is literally screwed onto this shaft. Consequently it cannot be forced from the seat through pressure from the cylinder exerted over the projected area of the ports.

Operation of Mechanism.

The operation of the valve actuating mechanism in driving forward is as follows: The valve as described is too tight on the seat to allow free rotation. However, on turning the engine over, the valve shaft travels ahead of the valve a fraction of a degree, consequently the spiral grooved collar lifts the valve by means of upward thrust of the collar against the rollers. After the engine is started, the valve naturally increases in diameter from expansion due to the heat of the engine, thereby momentarily causing it to

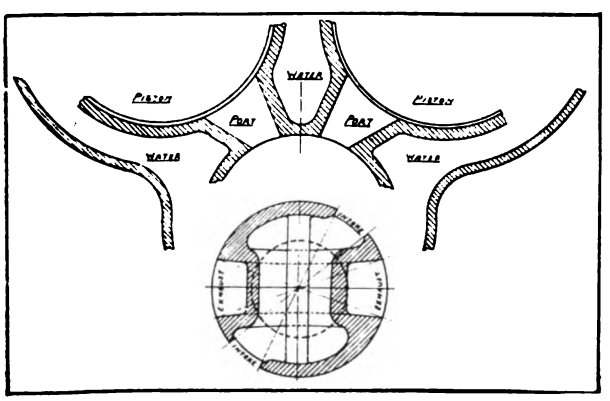


Fig. 9—Outlining Position of Valve with Reference to Pair of Cylinders in Silent Valve Motor.

run tighter on the seat. As soon, however, as the torque or turning effort of the valve increases the slightest amount, the spiral grooved collar travels in advance of the valve a fraction of a degree, thereby raising the valve to a higher running level and easing it on its seat.

When the load of the engine is reduced and the temperature of the valve becomes less intense, the latter returns to the lower running level, since it contracts and becomes smaller in diameter. The action of the valve is thus described as automatic under all conditions of temperature and it runs within a fraction of a thousandth of an inch of the seat at all times, or as close as the thickness of the lubricant will permit. The wear of the valve and the valve seat is automatically compensated for through the same means, which adjusts the valve for variation of temperature.

What is termed a reverse drive cam is assembled with the spiral grooved collar and the valve drive yoke, this serving the function of lifting the valve slightly during the backward rotation of the engine.

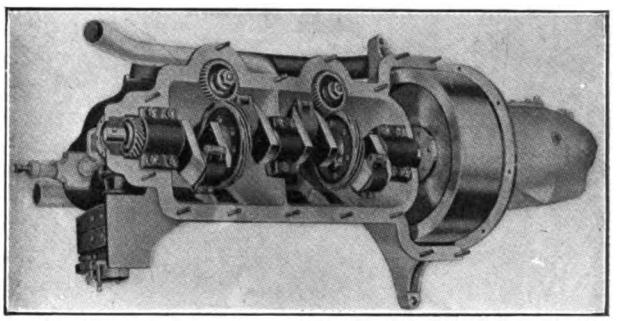


Fig. 10—Looking Up into Silent Valve Cylinders, Presenting Valve Actuating Mechanism.

Otherwise, the valve would be jammed on the seat owing to the screw action of the collar. This reverse drive cam and the valve drive yoke move positively with the valve shaft, as they are rigidly fastened to the shaft by means of a taper pin. The spiral grooved collar, however, only moves positively with the valve shaft during the forward rotation of the engine, as it is driven by means of lugs or wings on the sides of the valve driver, which engages studs or pins located in the lower side of the collar. It will thus be seen that the forward drive yoke remains inactive when the engine rocks back and that at such time the reverse drive cam becomes operative in performing the function for which it was designed.

Interior of Valve.

Having reference to Fig. 8: The driving mechanism is contained within the cylindrical base. The exhaust passage goes straight through the valve. The inlet opening is through the top, is separated from the exhaust port by suitable walls and opens into the inlet valve ports. Oil grooves are provided on the sides as indicated and these communicate with a small hole in the top, which registers with the oil supply pipe once each revolution. There is a decided suction in the inlet port which draws the oil from the upper groove and distributes it over the

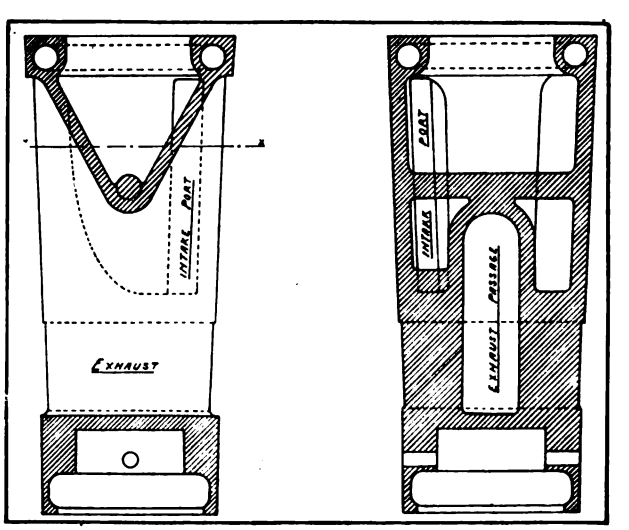


Fig. 11—Section through Silent Valve Cylinder and Valve as Seen on Intake Stroke.

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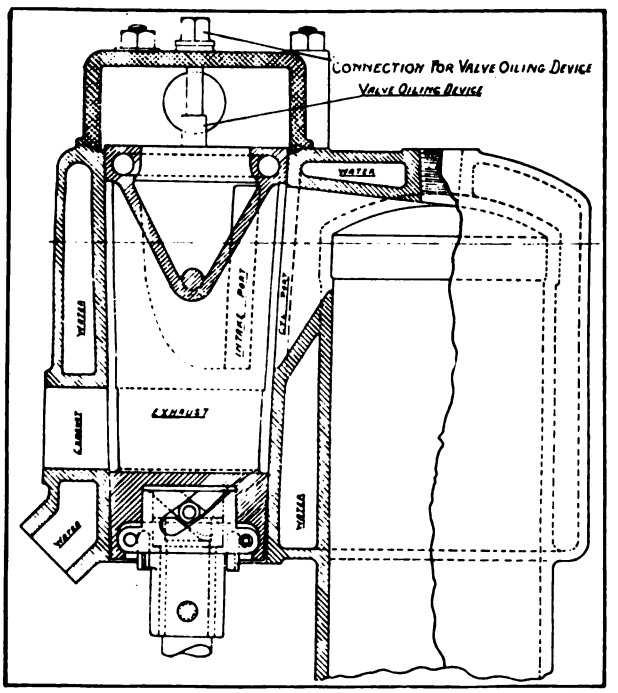


Fig. 12—Two Views of Silent Valve, Showing Construction of Inlet and Exhaust Ports.

whole length of the valve seat and its face.

Fig. 12 shows a section through the cylinder and valve, with the latter in position on the inlet stroke. The charge may now enter over the top of the valve and through the inlet port. By reference to the right of Fig. 11 it will be seen that when the valve has turned so that its exhaust port registers with the port in the cylinder, the burnt gases will pass directly through to the exhaust manifold and the open air. Fig. 9 presents the valve and its position between the two cylinders, although in this case the former has been pushed away to show the construction at this point. By careful study of this and the other drawings the whole design will be understood readily.

The Darracq-Henroid Motor.

A rotary valve motor, which had its origin in France and which made its first appearance in America during the Importers' Salon at New York in January, is the Darracq-Henroid, utilized in the 1912 Darracq cars, and represented in this country by Ducasse & Co., 735 Seventh avenue, New York City. This design employs a cylindrical sleeve, which is hollow to obtain a greater degree of lightness and rigidity, on the periphery of which are cut four notches, each serving to connect one cylinder alternately with inlet and exhaust ports. The round portion of the sleeve covers the port in the engine cylinder during the compression and expansion strokes, and as a result the sleeve itself travels at half crankshaft speed.

In order to set the valve cylinder in motion a gear wheel is located at the end. Another gear wheel is keyed on the end of the crankshaft, and the two are connected by a vertical shaft bearing a worm gear at either extremity. The relation between these gear wheels and worms is so calculated as to obtain one revolution of the sleeve for two of the crankshaft, and the correct valve timing is thus attained.

Fig. 13 herewith presents the motor assembled, and Fig. 14 the bloc casting and the cylindrical sleeve or distributor as it is termed. This distributor is located along the side and at the top of the engine cylinders, as is brought out more clearly in the sketch, Fig. 15, which shows the cycle of operations.

How It Operates.

The drawing at the right indicates the intake stroke, when the revolving distributor has reached a point where the slot registers with the port in the side of the engine cylinder. The piston has moved downward from the beginning of the stroke and will continue in this direction until it reaches the point indicated next, which depicts the beginning of the compression stroke. The third shows the position of the members at the time of firing, while the last presents that of the piston and distributor at the time of exhaust.

During the first part of the intake and until the downward movement of the piston discloses the orifice of the feeding port no gas will be admitted to the cylinder, and this will last during a period equal to about one-sixth of the total piston travel. The designer claims that with the very large section which the distributor affords to the exhaust gases, the cylinder is emptied with such unusual abruptness that nearly the whole of the residue gases, as the consequence of the laws of expansion of gas, is exhausted and the moment the inlet begins the top of the cylinders would contain a burnt gas at a very weak pressure inferior to that of the atmosphere, and this would cause the feeding to take place much more quickly and thoroughly as soon as the feeding orifice is disclosed. This brings up a question upon which there is a decided difference of opinion among engineers, and involves the problem of the exact volume

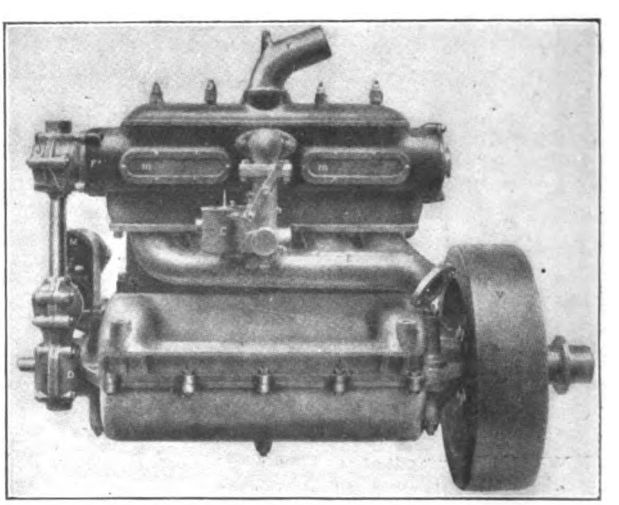


Fig. 13—Darracq-Henroid Four-Cylinder Rotary Valve Motor, Completely Assembled.

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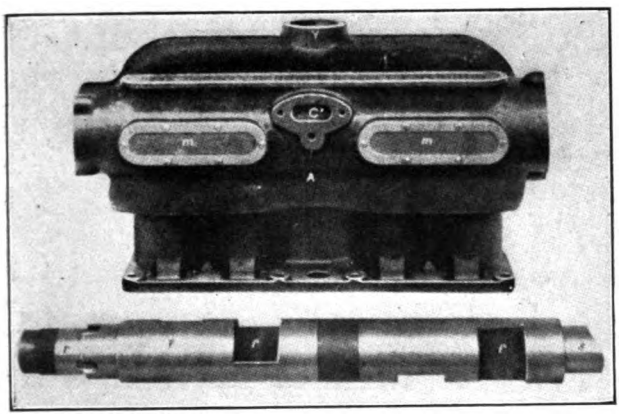


Fig. 14—Darracq Cylinder and Distributor Casting, and Rotary Valve Sleeve Below.

of burnt gases which must be retained in order to improve the suction stroke subsequent to the explosion.

Matter of Lubrication.

At no point along its periphery does the distributing sleeve come in contact with the surface of the casing in which it revolves. The designer claims that as it is carried at either end on large ball bearings it will defy wear forever. But if there were no means of filling this intervening space the engine could not become gas tight.

The space between the sleeve and the casing is only about a twentieth part of a millimeter, the exact measurement having been determined by a series of experiments covering many months. It is claimed that were it any larger, the oil coating, with which this space is sealed, would be swept away. As the matter now stands this sleeve is completely covered with a thin coating of lubricant, which forms an oil joint exactly sufficient to support the necessary pressures. The distributor is placed in such position that at the moment the compression reaches its maximum point, the top of the piston has covered the orifice of the port leading to this oil coating, and the latter has no more part to play during that portion of the cycle.

(To Be Continued.)

CONNECTICUT CAR FIRST IN JERSEY.

A Connecticut car, bearing the registration number 3444, was the first machine to take advantage of the new reciprocity provision of the New Jersey automobile law. April 2, the owner of this car was standing in front of the state house in Trenton, when Governor Wilson signed the so-called Stickel bill, which went into effect immediately. He at once took off his special New Jersey license plate and proceeded down the street, being stopped at nearly every corner to explain to the policeman on the beat that New Jersey had officially decided to be neighborly once more.

NEW SIX-CYLINDER CAR.

W. H. Cameron, formerly designer and engineer for the Overland Motor Car Company of Toledo, now the Willys-Overland Company, is said to have interested W. E. Flanders of Detroit in the production of a new six-cylinder car, which it is understood will be placed in the market in the near future from the plant of the Universal Motor Truck Company of Detroit.

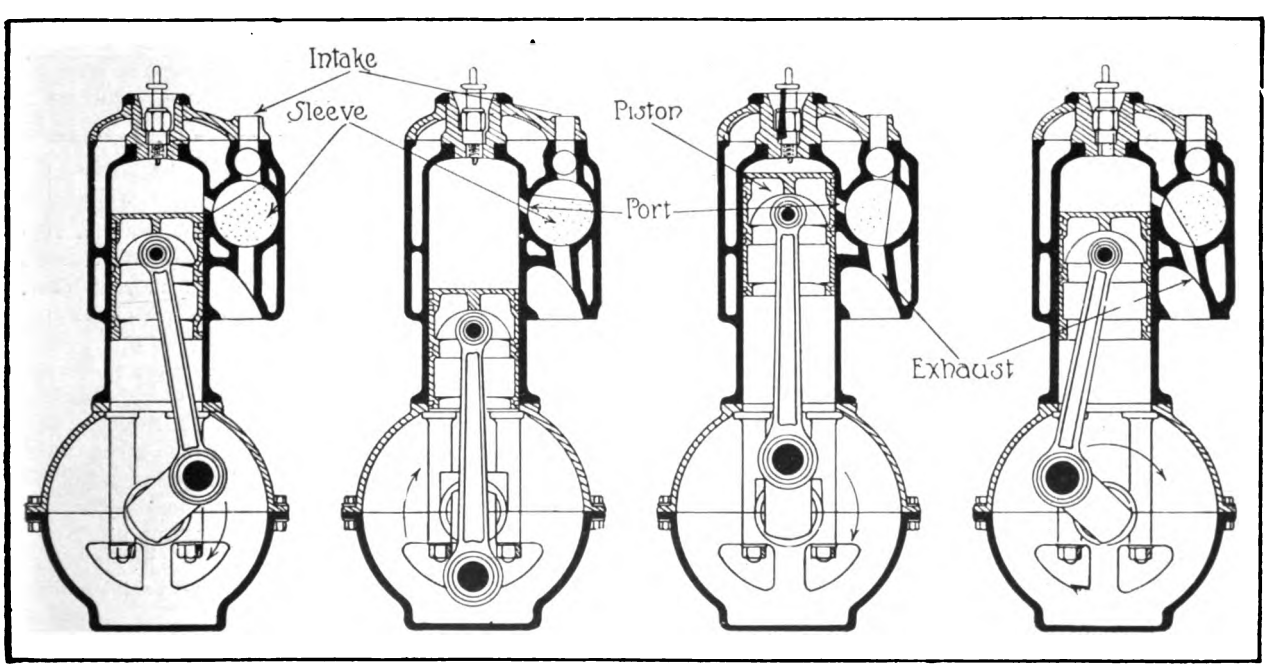


Fig. 15—Sketch Presenting Working Details of Darracq Motor, During the Progress of Its Four Cycles.

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SECOND ANNUAL MOTOR TRUCK PARADE.

Result of Remarkable Demonstration Indicates That Business Concerns in New York City Are Using 100 Per Cent. More Commercial Vehicles Than Last Year.

WHAT is considered by those familiar with the rapid development of the mechanical transport to be the largest and most impressive demonstration of the practicability of power wagons, took place in New York, Saturday, April 13, when something over 400 machines participated in the second annual parade held under the auspices of the Motor Truck Club of that city. It is interesting to note that the majority of entrants were owners, representing leading business concerns, converts to the more progressive type of transportation, many of whom took part because of their own enthusiasm. The display also served to impress those not familiar with the modern vehicle that the day of experimentation is past and that the motor car, whether propelled by gasoline or electricity is rapidly replacing the horse drawn equipment.



Formation of New York's Second Annual Parade of Commercial Vehicles at Battery Park Ready for the Start.

Although the weather was more propitious than last year when the machines were operated in a rain storm, the overcast sky with occasional light showers had its effect upon the crowds, but not upon the entrants. By actual count at the reviewing point on Broadway and 100th street there were something like 420 cars, and it is probable that there were nearer 500, as many joined which were not entered, these falling into line from time to time. Some idea of the extent of the parade may be obtained from the fact that cars were 50 minutes passing a certain point. That there is a decided increase in the use of motor trucks was shown by comparison with the first demonstration in which about 200 machines took part a year ago.

The formation was at Battery park from which point the route led to Bowling Green and thence to 125th street, a distance of approximately eight miles, which was covered in 2:30:00. The parade wound its way through the financial and business sections, including those districts where it would attract the attention of business men who would be most likely to become interested in the purchase of motor trucks. This was in decided contrast to the event of last year when the cars made a circuit of the upper section of the city. The one-way route also had its special features as many owners took advantage of this to load their machines with different kinds of merchandise, which was delivered uptown or at places in vicinity of the finish.

In spite of the difficult task of forming the three divisions the start was but 30 minutes late and this was due largely to the confusion of distributing banners and flags, although traffic obstructions played their part. As a rule, there was little decoration save the club flags and uniform signs attached to the cars for easy identification. Many of the salesrooms of "Automobile Row" were decorated with flags and emblems of the Motor Truck Club, and as the vehicles filed past they were given a hearty reception. Perfect order was maintained at the start, and the machines formed a continuous procession in three divisions,

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but because of the heavy traffic the parade was much scattered when the financial district was reached, gaps showing in the formation.

All types of mechanical transports were in line, these ranging from the light delivery car to the 10-ton truck. Every entrant was permitted to load his machine with whatsoever he willed, and the majority took advantage of the privilege. As a result, the different industries were represented, these ranging from the florist to the transportation of coal. The wide variety in body design was also demonstrated, including special dumpers, furniture vans, brewery trucks, etc.

The first division, which was under the supervision of Grand Marshal E. W. Curtis, Jr., was composed of 124 trucks of 17 different makes, these being ar-

OFFICIAL ENTRY LIST FOR NEW YORK'S ANNUAL TRUCK PARADE.

FIRST DIVISION.

E. W. Curtis, Jr., Grand Marshal, 124 Trucks of 17 Makes.

Owner and Maker	Trucks
Fleishmann Vienna Bakery, Alco.	1
Joseph Stern & Son, Alco	3
Nathan Schweitzer, Alco	1
Fred. Ewert, Alco	1
Heineman Bros., Alco	1
Reisenweber, Alco	1
John W. Butler, Alco	2
Hutweller & Briggs, Alco	1
Acton Van & Storage Co., Alco	1
Long Island Express, Alco	1
J. S. Kinstler, Alco	1
Anderson Electric Co., Detroit	1
Atterbury Commercial Truck Co., Atterbury	1
Autocar Sales Co., Autocar	25
Seeman Bros., Autocar	2
Autocar Sales Co., Autocar	15
N. Y. Edison Co., Baker	2
Bronx Electric Truck Co., Bronx	1
Curtis-Blaisdell Co., Couple-Gear	5
Leonard Bros., Couple-Gear	2
John Wegmann, Buick	1
Consolidated Gas Co., Cadillac	1
Woodburn Langmuir, Champion	1
Chase Motor Truck Co., Chase	6
James T. Smith, Dayton	1
E. W. McClove & Son, Dayton	1
Federal Truck Co., Federal	1
Abenroth & Root, Frontenac	1
Loewers Brewery, Gaggenau	1
Standard Oil Co., Gaggenau	1
Jacob Ruppert, Gaggenau	1
Weingarten Bros., Gaggenau	1
Est. Ed. A. Ladew, Gaggenau	1
United Cigar Stores, Gaggenau	1
Monroe-Eckstein Brewing Co., Gaggenau	1
James Butler, G. M. C.	5
Waite's Storage Warehouse, G.M.C.	1
Jacob Ruppert, G. M. C.	1
Powell's, G. M. C.	1
General Motors Co., G. M. C.	20
General Motors Co., G. M. C.	3

SECOND DIVISION.

T. A. Aspel, Marshal, 116 Trucks of 13 Makes.

General Vehicle Co., G. V.	2
Sprague Electric Co., G. V.	1
Jacob Ruppert, G. V.	4
Jacob Ruppert, G. V.	2
Jacob Ruppert, G. V.	1
N. Y. & Queens Electric Light & Power Co., G. V.	1
N. Y. & Queens Electric Light & Power Co., G. V.	2
N. Y. Edison Co., G. V.	5
N. Y. Edison Co., G. V.	1
Jules Weber, G. V.	1
M. Groh's Sons, G. V.	2
M. Groh's Sons, G. V.	1
Lincoln Safe Deposit Co., G. V.	2
Lincoln Safe Deposit Co., G. V.	1
Curtis-Blaisdell Coal Co., G. V.	1
John Meyer, G. V.	2
W. B. A. Jurgens, G. V.	1
Tiffany Studios, G. V.	1
Repetti, G. V.	1
General Electric Co., G. V.	1
Peter Doelger, G. V.	2
United Electric Co., G. V.	3
Sam S. Glauber, G. V.	1
E. Greenberger & Co., Grabowsky	1
Simpson Crawford Co., Grabowsky	1
G. & A. Carburetor Co., Gramm	1
Coal Boulet Co., Hewitt	3
Emerson Drug Co., Hewitt	1
R-C-H Corporation, Hupp-Yeats.	1
W. L. Byrnes, Knickerbocker	1
A. F. W. Bursch, Knickerbocker	1
Columbia Theatrical Trans. Co., Knickerbocker	1
Ebling Brewing Co., Knickerb'ker	2
Wm. Farrell & Son, Knickerb'ker	1
Philip Kenze, Knickerbocker	1
McKinley Storage Co., Knickerb'r	1
Streat Coal Co., Knickerbocker	1
Wm. Kroepke, Knickerbocker	1
Armstrong Express Co., Knox	1
Colwell Lead Co., Knox	1
Hencken & Willenbrock, Knox	1
Ostermoor & Co., Knox	1
Phoenix Cheese Co., Knox	1
M. J. Wolfe, Knox	1
Richard Webber, Knox	1
John A. Schwarz, Knox	1
Brainard Bros, Knox	1
Hy. & S. G. Lindeman, Knox	1
Borno Hat Co., Knox	1
Felgenspan Brewing Co., Knox	1
E. W. McClove & Son, Martin tractor	1
Knox Auto Co., Martin tractor	1
Hydraulic Truck Sales Co., La France	1
Phineas Jones & Co., Lauth-Juergens	1
Columbia Storage Warehouse, Lansden	1
Chicago Pneu. Tool Co., Little Giant	3
Locomobile Co., Locomobile	2
Swinehart Tire Co., Mack	1
M. Zimmerman Co., Mack	1
S. Karpen & Bro., Mack	1
A. D. Matthews & Sons, Mack	1
G. Robinson & Son, Mack	1
International Motor Co., Mack	10
Morgan Bros., Mack	1
Harlem & Fulton Market, Mack	3
Sol Cirker, Mack	1
Goodyear Tire Co., Mack	1
Eberling Brewing Co., Mack	1
Jos. Dixon Crucible Co., Mack	1

THIRD DIVISION.

C. W. Fletcher, Marshal, 104 Trucks of 23 Makes.

Stewart Automobile Co., Mais	8
Daimler Import Co., Mercedes (fire engine)	1
Liberman Dairy Co., Mercedes	1
Daimler Import Co., Mercedes	4
B. F. Goodrich Co., Packard	4
Francis H. Leggett, Packard	1
Adams Express Co., Packard	1
John J. Timmons, Packard	1
Francis H. Leggett, Garford	1
John J. Timmons, Walter	3
Seeman Bros., Packard	2
T. G. Patterson, Packard	1
E. Pritchard, Packard	1
Packers' Motor Truck Co., Packers	1
Runkel Bros., Packers	2
B. T. Babbitt Co., Peerless	4
Peerless Motor Car Co., Peerless	1
Leonard & Mitchell Bros., Peerless	1
N. Y. Bottling Co., Peerless	1
Jos. Dixon Crucible Co., Pierce	1
Recht & Rosenbaum, Pierce-Arrow	1
Muntha & Schmohl, Pierce-Arrow	1
Mergenthaler Linotype Co., Pierce-Arrow	1
Chemung Spring Water Co., Pierce-Arrow	1
Jones Bros., Pierce-Arrow	2
C. H. Evans & Sons, Pierce-Arrow	1
Ames Transfer Co., Pierce-Arrow.	1
Akron Rub. Tire Co., Plymouth	1
Pope-Hartford Auto Co., Pope-Hartford	1
W. J. & S. H. Davenport, Pope-Hartford	1
Long Island Cons. Car Co., Poss	1
Remington Standard Motor Co., Remington	1
Renault Freres Selling Branch, Renault	1
James T. Smith, Reo	3
Geo. I. Pound, Rowe	1
Reilly Electrotype Co., Sampson	1
Politzner Bros., Sampson	1
Jacob Ruppert, Sampson	1
Rohe & Son, Sampson	1
U. S. Motor Co., Sampson	3
Pure Oil Co., Sampson	1
United Motor N. Y. Co., Sampson.	23
Hecker-Jones-Jewell, Sampson	5
Advance Motor Express, Saurer	1
Austen & Bergdoll, Saurer	1
International Motor Co., Saurer	6
S. E. Reynolds, Sampson	1
S. J. Kornblum, Sampson	1
Seeman Bros., Saurer	2
Wm. P. McDonald Construction Co., Saurer	1
Speedwell Motor Truck, Speedwell	2
Berkshire Spring Co., Universal	1
E. Greenberger & Co., Victor	1
Columbia Storage Warehouse, Walter	2
James A. McClurg, Walter	1
Hess Bros., Walter	1
Simon Strauss, Walter	1
Am'n Pastry & Mfg. Co., Walter.	1
Louis Rapette, Walter	1
A. M. Powell, Walter	1
Walter Motor Truck Co., Walter	2
Geo. B. Cohens Son, White	1
May Manton Pattern Co., White	1
White Star Motor & Engine Co., White Star	3

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ranged in alphabetical order. T. A. Aspel was marshal of the second division, in which there were 116 machines, representing 13 different manufacturers, while C. W. Fletcher was in charge of the third section, in which there were 104 cars of 23 different makes.

Two manufacturers vied with each other in the matter of number of vehicles in line, these being the General Vehicle Company, Long Island City, N. Y., with G. V. electrics, and the Autocar Company, Ardmore, Penn., with Autocar gasoline cars, each being represented by over 40. The International Motor Company, New York City, was second with 25 Macks, 13 Saurers and nine Hewitts. These figures are taken from the list of entrants, and undoubtedly would need revision if an exact count of all the cars in line were available.

Other concerns which were favored by large representation were: The General Motors Truck Company, Detroit, Mich., G. M. C.; United States Motor Company, New York City, Sampson; Peerless Motor Car Company, Cleveland, O., Peerless; Couple-Gear Freight-Wheel Company, Grand Rapids, Mich., Couple-Gear electrics; Mais Motor Truck Company, Indianapolis, Ind., Mais; White Company, Cleveland, O., White; W. H. McIntyre Company, Auburn, Ind., McIntyre; Reo Motor Car Company, Lansing, Mich., Reo; Speedwell Motor Car Company, Dayton, O., Speedwell; Pierce-Arrow Motor Car Company, Buffalo, N. Y., Pierce-Arrow, and Victor Motor Truck Company, Buffalo, N. Y., Victor.

Special mention should be accorded to the two Martin tractors, made by the Knox Automobile Company, Springfield, Mass., which attracted considerable attention because of their peculiar appearance. Three G. V. electric crane trucks, of which the cranes were the most conspicuous feature, also were the subject of much favorable comment through the entire journey.

Besides the chiefs of divisions, Grand Marshal Curtis was assisted by the following aides: G. M. Curran, International Motor Company; D. D. Robinson, Baker electrics; R. R. Clayton, Studebaker Corporation; H. C. Brown, Sampson; F. B. Kutz, Pierce-Arrow; E. A. Bedell, B. F. Goodrich Company; N. Mallouf, Peerless; P. J. Dougherty, Detroit electric; F. W. Dix, Pope-Hartford; C. W. Wurster, Commer; E. O. Hoopgartner, Swinehart Tire & Rubber Company; J. M. Young, Chase; Melvin J. Adams, Alco; J. L. Breese, Jr., Commer; G. E. Anderson, Goodrich tires; A. L. Baringer, Sampson; G. L. Moore, Swinehart tires, and William H. Langford, Remington.

The accompanying table presents the list of official entries, although many other machines were included in the parade, as previously mentioned.

TESTING MARMON CARS.

While a Marmon car won the 500-mile internation sweepstakes race on the Indianapolis motor speedway, Memorial Day, 1911, the maker, the Nordyke & Marmon Company of Indianapolis, will have no entry in this year's event. However, stock 32 horsepower Marmons are now indulging in frequent brushes with the special racing cars in training for that contest. Of course the testers have orders from the factory not to compete with these machines, but the temptation is too strong, in most cases, and it is understood that in several instances the stock cars have been able to hold their own with credit.

Inasmuch as these cars are in no sense specially built speed creations, but regular stock models on their first complete running tests, the drivers feel particularly elated when they are able to pass the racers on the brick track. The Nordyke & Marmon Company has found that the two or three-day periods on the speedway track are of better service in giving a stringent test to the chassis, than twice that time spent in road work.

BIG MILEAGE WITH ALCO.

An interesting statement as to the mileage obtained from a touring car is noted in a recent letter to the American Locomotive Company, New York City, maker of Alco cars. The owner is Henry Vissering, president of a large railway supplies and equipment company in Chicago. He purchased his 40 horsepower car in 1907, and states that he has driven it 135,000 miles since that time.

During 1908, he drove this machine more than 10,000 miles in Europe, crossing the Alps and visiting various points of interest. He says that he has made it a practise to give it a thorough overhaul once a year and in that way keep it up to its maximum efficiency. In the matter of tires, he adds that two of the rear shoes each gave him nearly 10,000 miles of service.

JOINS EVERITT FORCES.

Announcement is made by the Metzger Motor Car Company, Detroit, maker of the Everitt line, that T. A. Peck has been appointed as manager of its technical department. Mr. Peck has been connected with the automobile industry practically since its inception, having left the machine shops of the Brown & Sharpe Manufacturing Company, Providence, R. I., many years ago. In addition to being an all around mechanic he is an expert gear cutter and is recognized as an authority on all technical matters, having contributed generally to the motoring magazines.

Bridgeport Club Elects Officers—The following officers have been elected for the ensuing year by the Automobile Club of Bridgeport, Conn.: President, Frank T. Staples; vice president, Ralph M. Sperry; secretary, Herbert M. Lyon; treasurer, L. B. Powe; board of governors, George F. Bushnell, G. S. Hadley, John E. Boyle, F. A. Strong, F. D. Baker and A. K. L. Watson.

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LINSCOTT GOT HIS REOS.

Probably one of the most ingenious schemes ever carried through for securing the use of railroad freight cars, during a shortage recently, was put into execution by J. M. Linscott of the Linscott Motor Company, Boston, agent for Reo cars in that city and vicinity. During the Boston show, and for several days thereafter, Mr. Linscott was busy signing up orders for Reos, made by the Reo Motor Car Company, Lansing, Mich. The difficulty came in securing freight cars in which to ship the machines from the factory.

After spending a small fortune in telephone and telegraph charges, he located 25 40-foot box cars, only to learn that these would not be shipped to Lansing unless they were loaded. "Oh, that is easy," replied Mr. Linscott. "You get the box cars ready and I'll see to loading them."

Shortly, the 25 cars were lined up in the Boston freight yards, and almost immediately thereafter they were loaded with empty barrels purchased by the Linscott Motor Company. These were sent to R. M. Owen & Co., general distributor, at Lansing, charges prepaid, with positive instructions that when the barrels were unloaded the cars were to be filled promptly with Reo the Fifths and shipped back to Boston. It may be added that the scheme worked out exactly as planned.

SPLITDORF SERVICE STATIONS.

The manufacturers of automobile equipment and accessories are following the example of the car makers in establishing service stations throughout the country, where users of their product may receive the assistance of skilled workmen in obtaining new installations, repairs or replacements, and where a large stock of goods and spare parts is maintained. Charles F. Splitdorf, New York City, maker of Splitdorf magnetos and other ignition equipment, has adopted this method and such service stations have been located in New York, Chicago, San Francisco, Detroit, Boston, Los Angeles and Kansas City. It is announced that others will follow, among them being those located in connection with the foreign branches in London, Paris, Turin, Brussels and Johannesburg.

MOTOR MAGAZINE OF CANADA.

One of the most interesting motoring publications in Canada is the Motoring Magazine of Toronto. A recent change in management is noted with the April issue, in that it is to be published in the future by H. Gagnier, Ltd., whose many publications are of that standard of excellence which guarantees that this journal is setting out on a new career of broader scope and usefulness than it has enjoyed hitherto. The April number appears in new dress and the contents are such as to indicate that the new management is to present features of even more timely interest than has been true in the past.

LYNN DEALERS ACTIVE.

The members of the Lynn Automobile Dealers' Association, Lynn, Mass., have decided that in the future they will not accept second hand cars as part payment on new machines. Cut price rates on automobile sundries are also looked upon as a special weakness in the local field, and while no definite action has been taken, this matter is under advisement.

WITH PAIGE-DETROIT CARS.

The many friends of O. R. Hardwell, both in and out of the industry, will be glad to learn of his appointment as advertising and publicity manager for the Paige-Detroit Motor Car Company, Detroit. He assumed his new duties April 1, and under his direction the exploitation of Paige-Detroit cars will be pressed with increased vigor throughout the coming season.

Mr. Hardwell was born in Toronto, Can., and was for five years a newspaper reporter in Montreal and Canada before taking up advertising work. He spent one year as advertising manager of the Canada Cycle & Motor Company under the direction of E. R. Thomas, and another year in Detroit as publicity writer. From Detroit he went to Chicago, where he spent three years with two of the largest national advertisers in the country. About 18 months ago he joined the force of the Charles H. Fuller agency in Chicago, and six months later returned to Detroit to take charge of several automobile accounts with this agency in that city.



O. R. Hardwell, Advertising Manager Paige-Detroit Car Co.

In selecting Mr. Hardwell, Henry Krohn, sales manager of the Paige-Detroit company, had in mind his thorough knowledge of the advertising media of the country, as well as his ability to prepare successful advertising copy. It will be seen that his experience has been wide and his understanding of the needs of the industry is such as to place him in the front rank. There is little doubt that under his management the combined department will be one of the most efficient in the country.

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NATIONAL CONTEST AND RACING NEWS.

Entries for Santa Monica Races---Reorganization of the Contest Board---Memorial Day Events at Salem, N. H.---Indianapolis 500-Mile Race---Other Notes.

The importance of the road races at Santa Monica, Cal., May 4, is better understood when it is remembered that at both of the previous meets held over this course, new records have been made. Because of this fact, it is generally conceded that the Santa Monica course is the fastest in America, if not in the world. However, the contests have been held in the fall, heretofore, and it remains to be seen what effect it will have upon the speed of the contending cars by changing the date to one of late spring or early summer. Of course, climatic conditions are by no means the same in southern California as in other sections of the country, and the motoring world expects that the event of May 4, will reveal even greater speed than has been seen anywhere heretofore.



One of the Stutz Cars, a California Favorite in the Santa Monica Road Races of May 4.

Teddy Tetzlaff in a Lozier created a new American road record in the fall of 1910, covering the distance at a speed of 73.22 miles an hour. At that time Felice Nazzaro held the world's record at 74.3, having driven a Fiat car over the Targa Florio course in Italy in 1908. This mark was exceeded twice in the Santa Monica races of Oct. 14, 1911. Charles Merz drove a National car at the rate of 74.42 and Harvey Herrick now holds the world's record with another National at 74.62. This is the mark which the winner of next week's race is expected to exceed.

Several well known drivers are looked upon as probable entries for the event. The list closes at midnight, April 25, and there may be some changes from that which was announced a few days ago by Manager A. M. Young of Los Angeles. This includes the following: David L. Bruce-Brown, Fiat; Ralph De Palma, Mercer; Bert Dingley, Simplex; Teddy Tetzlaff, Fiat; Caleb Bragg, Fiat, Erwin Bergdoll, Mercer; Barney Oldfield, Fiat; Charles Merz, National; Louis Disbrow, Case; Joseph Nikrent, Case; David Lewis, Stutz; Earl Cooper, Stutz; Earl Devore, Buick, Frank Siefert, Midland—besides, two E-M-F's, two Fords, two Cinos, a Maxwell, K-R-I-T, Regal, Reo, Pathfinder and Flanders for which no drivers have been named as yet.

There will be three races, all run at the same time, the major event being the free-for-all for 202 miles, the award in which is the Ferris cup. The event for cars of 301-450 cubic inches piston displacement will be for 151.5 miles, the prize being the Shettler cup. The Chanslor & Lyon trophy will go to the winner in the 101-mile contest for cars of 161-230 cubic inches. There also will be cash awards.

It appears that the recent commutation of Barney Oldfield's disqualification to expire April 30, was made by the contest board of the American Automobile Association upon the earnest solicitation of Manager Young. It had been supposed that his suspension was lifted in order that he might take part in the 500-mile race at the Indianapolis speedway May 30. Manager Young brought the matter to the attention of E. G. Kuster, the southern California representative on the contest board, who wired the headquarters in New York while the board was in session, and the favorable action was taken immediately. His suspension would have expired by limitation July 1.

SECOND ANNUAL FOUR-STATES TOUR.

The Indiana Automobile Manufacturers' Association has completed arrangements for its second annual Four-States tour, which will cover 1264 miles and last 15 days. Following the plan inaugurated last year abundant opportunity will be had to make this event an advertising campaign. The tour is limited to cars produced in the State of Indiana, and the tentative itinerary follows:

July 9, Indianapolis, Noblesville, Kokomo, Wabash, Huntington and Fort Wayne, Ind.; 10, Van Wert and Lima, O.; 11, Fostoria, Fremont and Tiffin, O.; 12, Bucyrus, Mansfield and Wooster, O.; 13, Massillon and Akron, O.; 14, Sunday in Akron; 15, Canton, O., and Wheeling, W. Va.; 16, Cambridge, W. Va.; and Zanesville, O.; 17, Newark and Columbus, O.; 18, Lancaster, Circleville and Chillicothe, O.; 19, Portsmouth and Ironton, O.; Catlettsburg, Ky., and Huntington, W.

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Va.; 20, Kenova, W. Va.; Catlettsburg, Ky.; Ironton and Portsmouth, O.; 21, Peebles, O., and Maysville, Ky.; 22, Paris, Winchester and Lexington, Ky.; 23, Frankfort, Shelbyville and Louisville, Ky.; 24, Jeffersonville, Seymour, Columbus and Indianapolis, Ind.

SCHIMPF REMAINS AS CHAIRMAN.

William Schimpf, formerly president of the Long Island Automobile Club, Brooklyn, N. Y., who took the office of chairman of the contest board of the American Automobile Association upon the death of Samuel M. Butler, has acceded to the request of President R. P. Hooper and officials of the Manufacturers' Contest Association and will remain at the head of that committee during the 1912 season. He is an amateur and having served on the board for the past year is thoroughly conversant with his duties.

Recent conferences between American Automobile Association and Manufacturers' Contest Association officials have resulted in a renewal of the contest relations of these two organizations, with some slight but essential changes in the agreement. The contest board is composed of 12 members and is supplemented by an advisory committee and representatives from each state as follows:

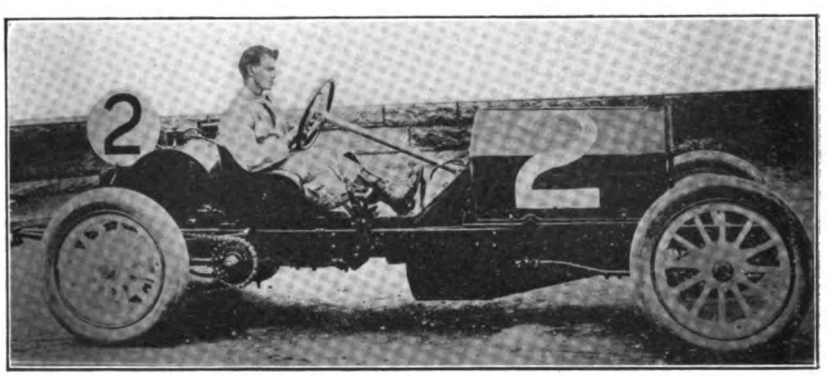
Contest board—William Schimpf, chairman; H. W. Knights, Boston; Frank G. Webb, New York City; P. D. Folwell, Philadelphia; Joseph H. Wood, Newark, N. J.; Charles I. Ryan, Atlanta, Ga.; David Beecroft, Chicago; Frank M. Joyce, Minneapolis, Minn.; R. W. Carr, San Antonio, Tex.; Ralph W. Smith, Denver, Col.; P. J. Walker, San Francisco.

Advisory committee—S. A. Miles, National Association of Automobile Manufacturers; Jesse Froehlich, importers; H. A. Bonnell, Automobile Board of Trade.

State representatives—Alabama, A. M. Kennedy, Montgomery; Arizona, G. P. Bullard, Phoenix; northern California, P. J. Walker, San Francisco; southern California, Edward G. Kuster, Los Angeles; Colorado, Ralph W. Smith, Denver; Connecticut, C. H. Gillette, Hartford; Delaware, Henry M. Taylor, Wilmington; Florida, H. B. Race, Jacksonville; Georgia, C. I. Ryan, Atlanta; Idaho, R. W. Spangler, Twin Falls; Illinois, D. Beecroft, Chicago; Indiana, C. W. Sedwick, Indianapolis; Iowa, C. A. Kneedler, Sioux City; Louisiana, P. M. Milner and T. C. Campbell, New Orleans; Maine, D. W. Hoegg, Jr., Portland; Maryland, Dr. H. M. Rowe, Baltimore; Massachusetts, H. W. Knights, Boston; Minnesota, Dr. C. E. Britton, Minneapolis; Mississippi, Robert B. Bridge, Natchez; Missouri, W. P. M. Stevens, Kansas City; Nebraska, W. D. Hosford, Omaha; New Hampshire, C. M. Floyd, Manchester; New Jersey, Joseph H. Wood, Newark; New York, Frank G. Webb, Brooklyn; North Carolina, James R. Gray, Jr., Winston-Salem; North Dakota, W. J. Price, Fargo; Ohio, Nelson B. Ruggles, Columbus; Oregon, H. L. Keats, Portland; Pennsylvania, P. D. Folwell, Philadelphia; Rhode Island, Charles E. Doe, Providence; South Carolina, A. McP. Hamby, Columbia; South Dakota, H. C. MacCoshen, Watertown; Texas, R. W. Carr, San Antonio; Vermont, W. W. Brown, Springfield; Virginia, Dr. H. W. Bassett, Richmond; Washington, F. M. Fretwell, Seattle; West Virginia, T. A. Westmyer, Wheeling; Wisconsin, George A. West, Milwaukee.

BOSCH MAGNETO PRIZES.

In addition to the prizes awarded by the management of the road race at Santa Monica, Cal., May 4, and the 500-mile race on the Indianapolis speedway, May 30, the Bosch Magneto Company, New York City, maker of Bosch magnetos and spark plugs, has followed its usual custom in announcing special rewards for the drivers of cars fitted with its ignition devices. In the California event these prizes are to be divided as follows: Free-for-all, $200 to winner of first place, $100 for second and $50 for third; 301-450 cubic inches, $100 for first, $75 for second and $50 for third; 161-230 inches, $100 for first, $75 for second and $50 for third. In the 500-mile race the winner will receive $500; the holder of second place $300, and the third place man $200.



Bert Dingley in S implex with Which He Will Appear in Santa Monica Road Races Next Month.

QUAKER CITY ROADABILITY RUN.

The annual roadability run of the Quaker City Motor Club, Philadelphia, Penn., will be held April 27, the destination being Atlantic City, N. J. This will not only mark the official opening of the Philadelphia motoring season, but it also will prove the first club run held in the Mosquito state since the lifting of the ban against non-resident motorists. There will be a change in the features which have marked previous events of this character, in that a fuel economy test will be inaugurated. The main contest will consist of an effort to arrive in Atlantic City the nearest

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to a secret time schedule agreed upon by the committee. The fuel economy feature will be based upon the consumption of a standard gasoline, furnished by the committee, the consumption in ounces to be divided by the gross weight of the car.

ROCKINGHAM PARK RACES.

There will be 10 events on the card at the Memorial Day race meet at Rockingham Park, Salem, N. H., three of these being reserved for amateurs. Entry blanks are now in the hands of Harry H. Knepper, 47 Massachusetts avenue, and James F. Kerr, 67 Milk street, Boston. The list of events and prizes follows:

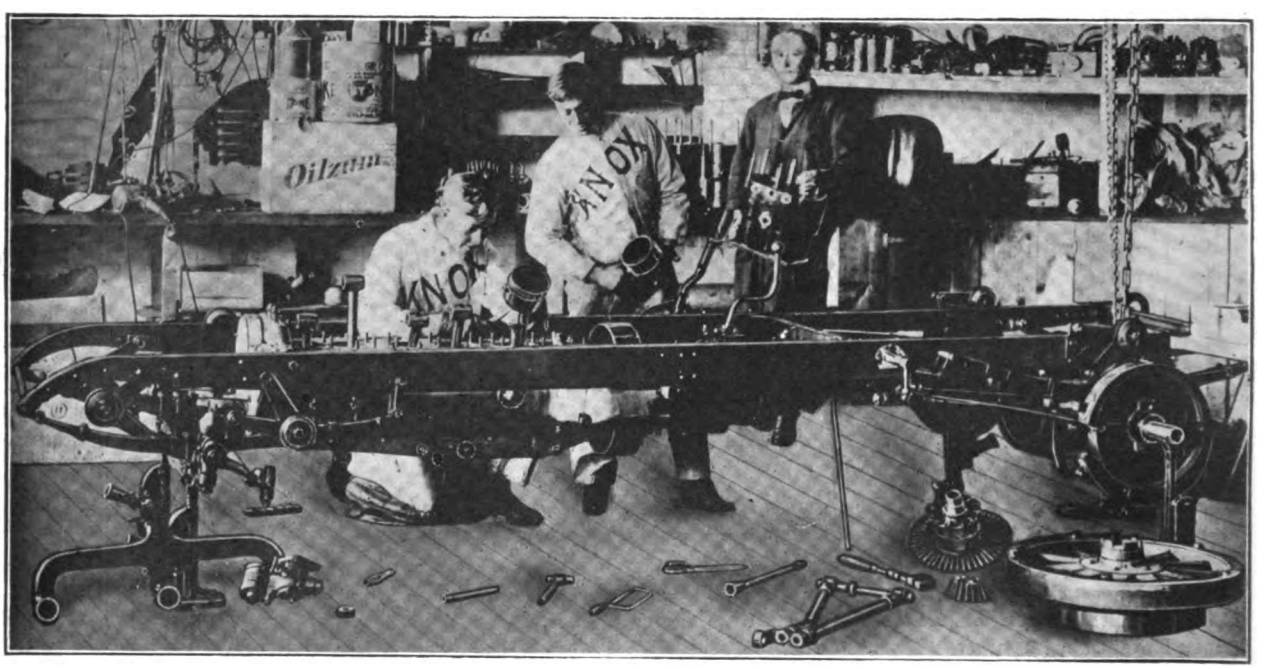
Five miles, class C, 161-230 inches, non-stock, $75, $20, $15; five miles, class C, 231-300 inches, non-stock, $75, $35, $15; five miles, class C, 301-450 inches, non-stock, $75, $35, $15; five miles, class C, 451-600 inches, non-stock, $75, $35, $15; 10 miles, free-for-all handicap, amateurs, non-stock, $75, $35, $15; 50 miles, two races at the same time, class E, 161-300, 301-600 inches, non-stock, $75, $35, $15, and $125, $50, $25; 10 miles, free-for-all handicap, class D, non-stock, $75, $35, $15; mile time trials, $50, $25, $15; five miles, class C, 161-300 inches, amateurs, non-stock, $50, $20, $10; five miles, class C, 301-600 inches, amateurs, non-stock, $75, $35, $15.

ALL IOWA ENDURANCE TRIALS.

A tentative route for the all Iowa endurance run of the Iowa State Automobile Association, which will be held some time in June, has been decided upon, and plans are under way for the selection of a path-finding car. The route will start from Des Moines, following the river-to-river road to Council Bluffs, thence across the river to Omaha, where the tourists will be entertained by members of the Omaha Automobile Club. Upon returning to the Iowa side, the tour will proceed to Sioux City, from which city the northern cross-state road will be followed to Dubuque and Keokuk, thence back to Des Moines over the old Waubonsie trail.

INDIANAPOLIS' 500-MILE RACE.

All rumors concerning the possibility of calling off the second 500-mile race on the Indianapolis motor speedway, scheduled for May 30, are set at rest by the following announcement from C. E. Shuart, representing the speedway management: "We beg to call your attention to the fact that our entries for the next 500-mile race close at midnight, May 1, and positively no entries will be received after that time." The race will take place as scheduled, unless the weather forbids, in which event it will be held Saturday, June 1, as stated in the entry blanks issued by the management.



Ralph Mulford Busily Engaged in Preparing His Privately Owned Knox Car for the 500-Mile Indianapolis Speedway Race of Memorial Day.

It is stated that the management has the promise of at least 25 cars, and it is expected that this list will be swelled to 30 before the closing date. The following are already entered:

Stutz, Gilbert Anderson; Stutz, Leonard Zengle; National, Donald Herr; National, Howard Wilcox or Charles Merz; Mercedes, Spencer Wishart; Mercedes, Ralph De Palma; Case, Harvey Herrick; Case, Louis

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Disbrow; Fiat, Teddy Tetzlaff; Lexington, Harry Knight; Cutting, Robert Burman; Simplex, Bert Dingley; Knox, Ralph Mulford; White, W. Barndollar; Firestone-Columbus, Lee Frayer; Continental, John Jenkins; Buick, William Liesaw.

WOLVERINE CLUB REMY GUEST.

More than 150 tourists, members of the Wolverine Automobile Club of Detroit, will be the guests of the Remy Electric Company, Anderson, Ind., maker of Remy ignition and lighting equipment, during the tour of that organization to witness the 500-mile race at Indianapolis, May 30. The club will leave Detroit at 8 in the morning of May 28, and the first day's run will take the contestants to Fort Wayne, Ind., where they will be the guests that night of S. F. Bowser & Co., maker of Bowser gasoline storage systems and tanks.

They will be met in Fort Wayne by F. E. Moskovics, sales manager of the Remy company, who will pilot them to Anderson, the noon control, May 29. After a stop of two hours, during which they will inspect the Remy plant, and be served with a lunch under a mammoth tent, they will leave for Indianapolis where they will be the guests of the Hoosier Motor Club.

OLD ORCHARD BEACH MEET.

The Old Orchard Automobile Association, which was organized last fall to promote this year's beach races at Old Orchard, Me., has elected Frank Mowry chairman of its contest board. He is at work upon the entry blanks and expects to have them ready for mailing within a few days. The event will take place July 4-6, and already more than 25 cars have been promised.

BOSCH IN TOUR DE FRANCE.

Of the 40 cars finishing with a perfect score in the automobile tour de France, under the auspices of L'Auto of Paris last month, 33 were equipped with Bosch magnetos, made by the Bosch Magneto Company, the American offices of which are located in New York City. This is a percentage of 82.5, which is all the more interesting when it is known that of the 62 cars which started, only 66.1 per cent. were Bosch equipped.

NEW ORGANIZATION IN MAINE.

Following a banquet in the interest of good roads at Rockland, Me., early in the month, the Knox County Automobile & Good Roads Association was organized and will be affiliated with the Maine State Automobile Association. The following officers have been elected: President, A. S. Littlefield; vice president, L. M. Littlehale; secretary and treasurer, H. N. McDougall.



COMING EVENTS.

April.

April 27—Speedway meet, Los Angeles, Cal.
April 27—Roadability run, Philadelphia, Penn.
April 29-May 4—Show, Burlington, Vt.

May.

May 4—Hill climb, Atlanta, Ga.
May 4—Road race, Santa Monica, Cal.
May 12—Track events, Salt Lake City, Utah.
May 14-17—Commercial vehicle test, Chicago, Ill.
May 17-18—Track events, Denver, Col.
May 25—Road race, Barcelona, Spain.
May 30—500-mile race, Indianapolis, Ind.
May 30—Track events, Salem, N. H.

June.

June 6—Reliability run, Washington, D. C.
June 8—Track events, Narberth, Penn.
June 20—Algonquin hill climb, Chicago, Ill.
June 20-22—Reliability run, Portland, Me.
June 25-26—Grand Prix, Dieppe, France.

July.

July 3-5—Track events, Belle Fourche, S. D.
July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach events, Old Orchard, Me.
July 5-6—Road race, Tacoma, Wash.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Stock car races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.
Sept. 9—International aviation race, Chicago, Ill.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.
Oct. 12—Track events, Salem, N. H.

November.

Nov. 6—Track meet, Shreveport, La.

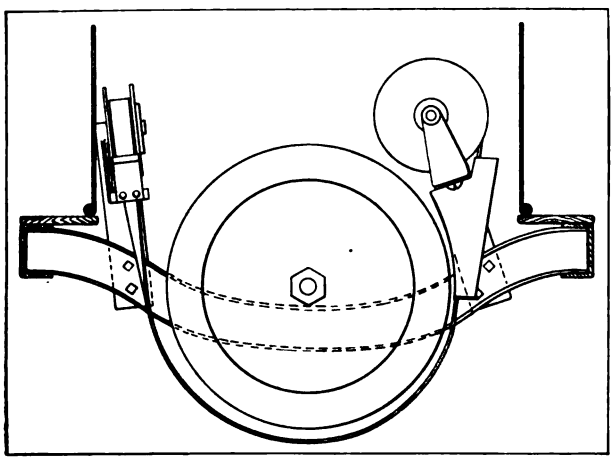
AUTOMOBILES IN PUBLIC SCHOOLS.

If the present plans of Mayor Fitzgerald of Boston materialize, the high school pupils in that city will have opportunity to study the construction and operation of automobiles. The school committee has informed him it will be glad to hear from him further regarding the suggestion, and it is understood that the board is now considering the advisability of arranging for classes in South Boston, Roxbury and in one of the schools in the city proper.

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RECENT DEVELOPMENTS IN SELF-STARTERS.

OF THE making of self-starters, like the making of books, there appears to be no end. Since this series of articles was begun in the issue of The Automobile Journal for Dec. 25 something over 40 differ-



Sectional Drawing to Illustrate Construction of Panwood, Jr.

ent devices have been described and illustrated. A careful perusal of the Patent Office Gazette will reveal the fact that new inventions of this character are appearing on an average of at least six or eight a month. In view of these facts, it is not at all surprising that motorists are becoming decidedly interested in the subject of self-starters.

It will be remembered that included in the list of devices described heretofore was a Panwood acetylene starter, produced by the Panwood Manufacturing Company, Grand Rapids, Mich. Announcement is now made of the Panwood, Jr., illustrated herewith, which is being marketed by this concern for use on the Hupmobile, Paige-Detroit, K-R-I-T, and several makes of two-cylinder cars, it being designed as a simple and efficient device to start motors which are equipped with magnetos only.

The Panwood, Jr., consists of two distinct parts, the pull or engine rotator and the primer. By this it will be seen that the device is to be placed in the so-called mechanical class, although it goes a step further than most of these. It is understood that the company has been experimenting with the principles involved for the past two years.

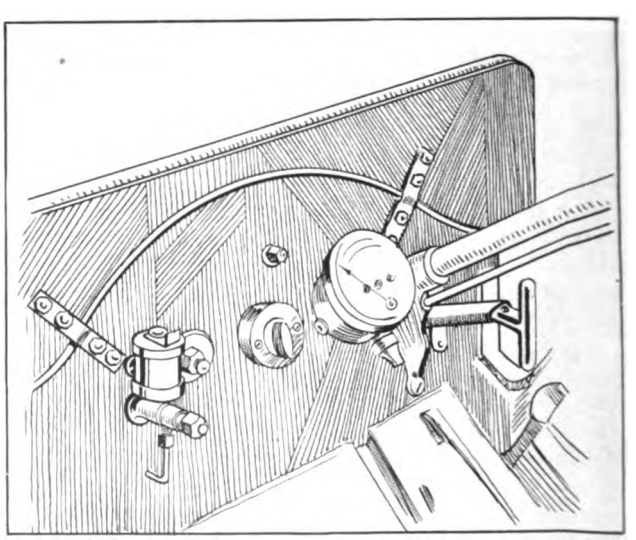
The starter proper is operated on the principle of giving the engine a complete half-turn, and it is expected that this will be sufficient to provide a start every time. However, as the leather strap which imparts the turning movement to the motor is returned automatically to its original position, as many trials may be made as desired. The primer is an auxiliary for use in case it is deemed necessary to supply the motor with a slightly richer mixture.

The pull device consists of a leather strap about 1.25 inches wide, which is held by a coil spring as shown in the sectional drawing, at the left hand side of the flywheel. The strap is passed under the flywheel and thence to the dash over a second pulley on the opposite side, which also contains a spring designed to assist in returning to its original position. Nothing shows on the dash but a small brass handle usually located under the steering column.

This statement has reference simply to the starter proper. Of course, the priming member, which is a small glass receptacle, also is located on the dash. From this a pipe leads to the engine manifold. The primer is operated by a valve which is opened by the pressure of the foot, and provision is made for the removal of this push button so that the device cannot be tampered with when the machine is left unattended.

Another new acetylene starter is the Meteor, made by the Meteor Auto Tank Company, 1666 Broadway, New York City, and designed for use in connection with the well known Meteor gas tank, although its use is not restricted to tanks of that make. It combines some of the features seen in other productions, in that it delivers the acetylene mixture to a specially designed priming cup in each cylinder and the intake manifold as well. However, unlike some of the devices which deliver the mixture to the intake manifold, the Meteor is designed to charge the cylinders only when the start is to be made, and not on the dying revolutions of the motor.

The construction is set forth in an accompanying drawing, which shows the various parts and their rela-



Dash Fitted with Panwood, Jr., Indicating Starting Handle and Priming Device.

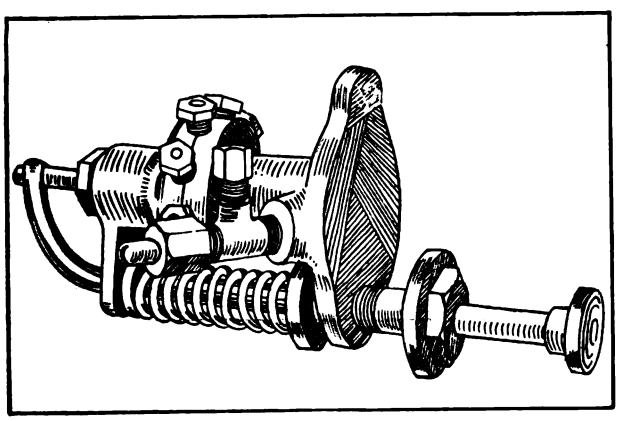
tion to each other. It will be noted that a two-way valve is attached to the gas tank, one of the leads controlling the supply of gas to the lights and the other going directly to the distributing valve located

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on the dash. This distributor is shown in front, side and rear views at the top of the drawing, pipes leading from this to the individual priming cups, one of which is shown detached, and to the inlet manifold. It may be stated that the original priming cup on the engine is replaced by a simple check valve in which the starter priming cup is inserted. Suitable means are provided, as may be seen from the regulating valve in the centre of the rear view of the distributor, for increasing or diminishing the quantity of acetylene supplied in the mixture.

When ready to start, the handle on the distributor, which is the only exposed portion of the device, the remainder of the distributor being located on the dash under the hood, is turned according to directions, and the required amount of gas is automatically injected into the cylinder or cylinders about to fire. At the same time, a suitable mixture is fed to the inlet manifold. A spark is then created in the usual manner and the engine is started.

The Auto Starter Company of Milwaukee, Wis.,

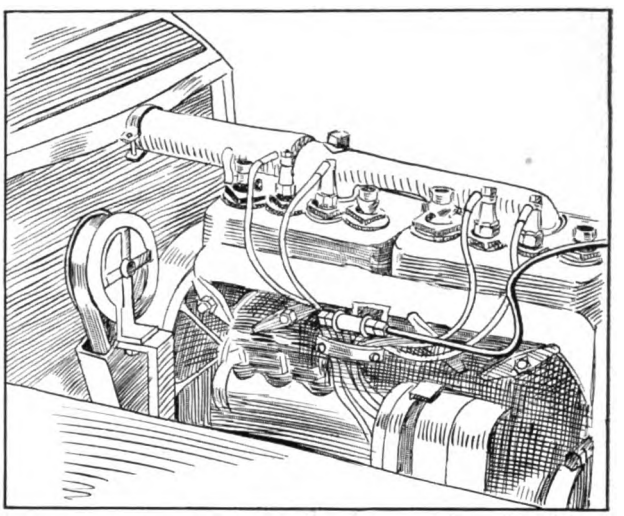


Plunger and Distributor on E. Z. Aceteylene Self-Starter.

has introduced the E. Z. acetylene device, the plunger and distributor of which is shown herewith. This does not differ materially from others which have been described, except in the formation of the distributor. A special two-way valve is attached to the regulation gas tank, one lead of which controls the flow to the lights and the other to the distributor located on the dash.

This latter consists of a spring seated valve operated by a foot button plunger. The various outlets for the leads to the several cylinders of the motor are to be noted in the drawing, the lead from the gas tank being at the extreme end of the line of openings. Just above the spring will be seen the air inlet, by means of which the proper proportioning of air and acetylene is performed in the distributor, before the charge is injected into the cylinders through a special priming cup and valve, replacing the regular priming device on these members.

When it is desired to start the motor, the plunger is pushed in to the limit of its throw, and immediately allowed to come back to its original position,



Location of Panwood, Jr., Primary Pulley with Leather Strap Running under Flywheel, and Priming Connection with Intake Manifold.

through the action of the spring. This allows a measured amount of acetylene and gas to flow into each cylinder. Starting is then accomplished by throwing the switch to the battery position and causing a spark to be shot across the gap of the spark plug in the cylinder about to fire.

RECORD MARCH PRODUCTION.

According to the Studebaker Corporation, there were manufactured in its E-M-F factories at Detroit during March an almost equal number of E-M-F and Flanders machines to a total valuation of $4,276,000, which is claimed to set a new record in automobile production. Across the Detroit river, at Walkerville, Ont., the Canadian branch increased this figure by an output valued at $325,000, making a grand total of $4,601,000 for the month.

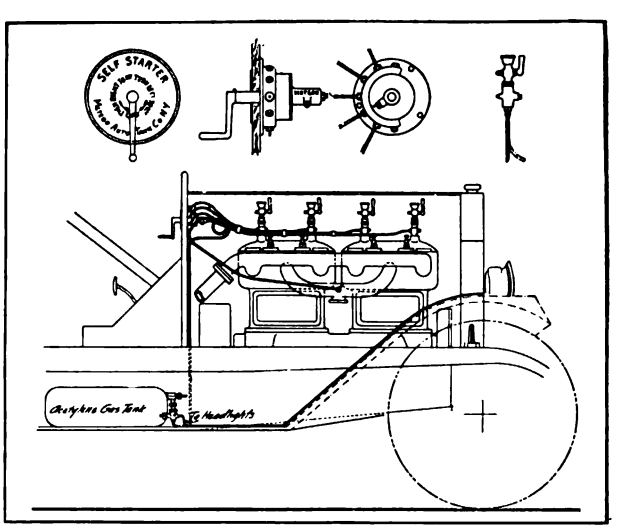
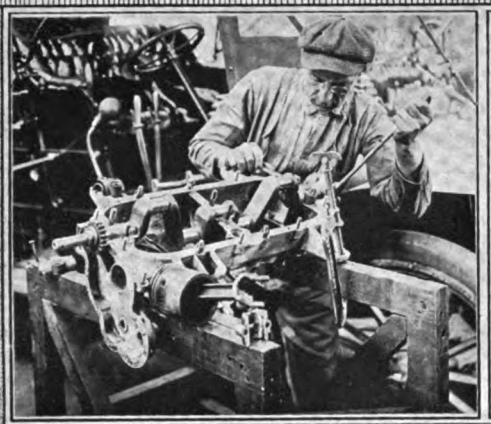


Diagram Setting Forth Construction and Operating Means of Meteor Acetylene Starting Device.

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

ADJUSTING VIBRATING COILS.

The motorist who thoroughly understands the vibrating spark coil is the exception rather than the rule. Many are able to adjust these members to obtain the desired results but few are capable of removing the exposed components such as the bridge, vibrator spring, etc., and reassembling the parts correctly. The general use of magnetos has led the present day automobilist to consider the coil incorporated in the system as an auxiliary member, and as a result it does not receive the attention it requires.

With low-tension magnetos the current is built

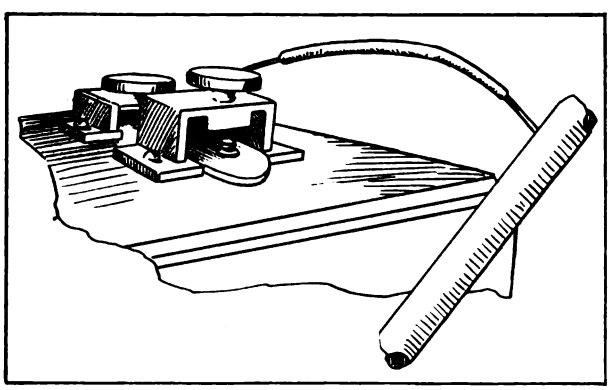


Fig. 1—Simple and Efficient Method of Adjusting Units of Spark Coils.

up or strengthened by the coil and when the latter is of the vibrating type and employed for starting the motor with current furnished by a storage battery or dry cells, it is essential that the platinum points be clean and adjusted properly. Many instances of hard starting are due to these conditions although a weak battery should be considered. Experienced motorists who operated cars before the magneto became generally used, became quite proficient in the care of vibrating coils and secured the maximum efficiency from these members, and effected a decided saving of current.

At Fig. 1 is outlined a conventional unit of a vibrating coil and it will be noted that the components consist of two bridge like members each carrying a knurled screw. Both are secured to the coil plate by small screws permitting removal for inspection and cleaning. The smaller bridge holds the vibrator spring which is fitted with a platinum point and the latter is in contact with a similar piece of metal integral with the adjusting screw in the larger bridge. Directly under the vibrator is the iron core which attracts and releases when current is passing through the coil.

It is obvious that if the vibrator is some distance from the core more current will be required to attract it, also if the contacting platinum points be pitted or burned the resistance in the circuit is increased greatly. If the contact screw be moved down to produce the necessary spark at the gaps of the spark plugs, additional current will be required.

These components should be examined, cleaned and adjusted from time to time and this work is performed easily. The larger bridge member may be displaced by taking out the screws holding it to the base which will disclose the core. If the cover does not fit accurately, or in such manner as not to exclude dampness, it will usually be found rusty. It should be cleaned and covered with a little grease, taking care not to use too much of the lubricant.

If the vibrator spring has lost its elasticity, a new one may be fitted and adjusted according to the type of coil; that is, the space between it and the core regulated as by the instruction book of the maker. The platinum points if worn to the edge of the other metal may be renewed by some jeweller dealing in platinum, or new screws may be purchased. A file is a poor tool for removing pits as too much of the metal is apt to be wasted. By utilizing a piece of fine emery paper as outlined recently in The Automobile Journal the contacts may be smoothed up without disassembling the parts.

In adjusting the coil it is not necessary to turn the motor over until the vibrator buzzes. The tuning up may be accomplished easily as shown in the sketch by attaching one end of a piece of wire to the steer-

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ing column and placing the other on the adjusting screw. Each unit may be treated in a similar manner. This kink will be found handy when testing out spark plugs in connection with a four-cylinder spark coil or those of dual units.

HANDY WRENCH KINK.

In attempting to remove a nut or bolt which has been set up snugly and which will not yield to treatment with an ordinary monkey wrench, the inexperienced workman is apt to employ a cold chisel or a large Stillson wrench. This results in damage to the part and is poor practise. At Fig. 2 A is presented a method which has been tried with success by the writer who has started nuts which refused to budge with ordinary tools.

The small monkey wrench is set up snugly upon the part, and gripped by a Stillson as shown in the drawing. It is obvious that the Stillson should be considerably larger in order to obtain the desired leverage. If the tool be of medium size and has an all metal handle, a piece of gas piping may be slipped over the handle. When pressure is applied the leverage exerted is immense and the most obstinate nut will yield to the treatment.

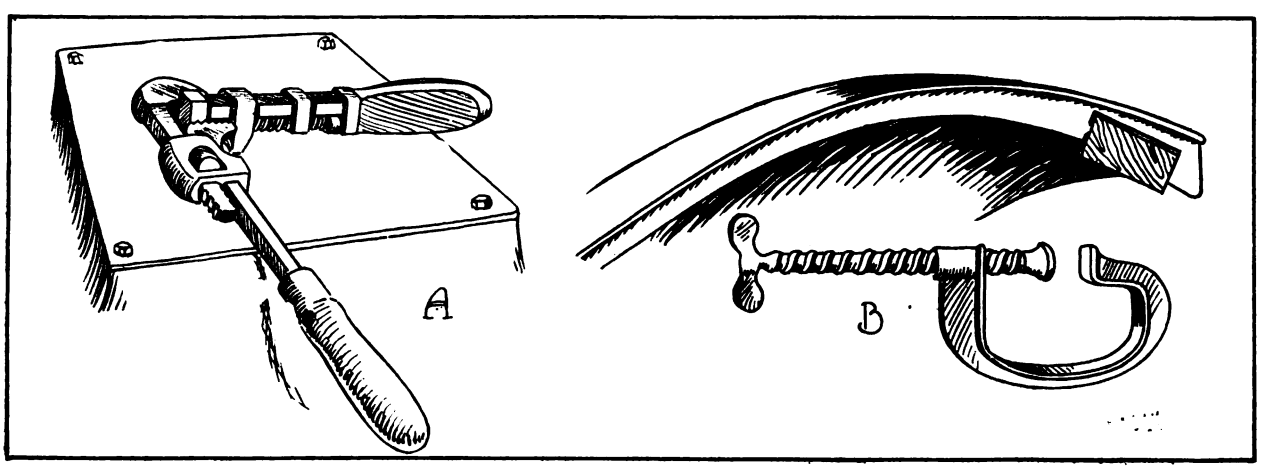


Fig. 2—Suggestions to the Owner to Facilitate Repairs: A, Depicting Combination of Stillson and Ordinary Wrench to Start Stubborn Nut; B, Outlining a Simple Method of Removing Indention in Fender.

STRAIGHTENING OUT BENT FENDERS.

When fenders become bent the usual practise is to remove them and take them to a tinsmith for repairs. This involves considerable trouble and delay. The average fender may be straightened out by taking a block of wood or a strip of metal and placing it on the damaged part as outlined at Fig. 2 B. A clamp is then attached and when screwed up the kink in the metal will be eliminated. While some of the paint will crack, the fender will present a much better appearance than if it were straightened by hammering.

HOW TO SELECT FILES.

The proper use of a file would appear simple but the early efforts of the novice prove otherwise. In his first attempts he is apt to use the first file that comes to hand, sawing backward and forward with equally heavy pressure, but he will soon discover that a tool cuts on the forward stroke only, and that if he relieves the pressure on the return movement he will husband his strength, and the teeth of the file also. In time he will buy 12-inch files and be particular as to the use to which they are put. It is poor practise to employ a new file for work on solder. These members when new and fine should be reserved for brass and similar metals. To file well is quite an accomplishment, as the novice will probably note after surveying his attempts to obtain a smooth and even surface.

In purchasing a file it should be balanced on one finger midway of its length, and struck lightly with some hard body. If the tool be a good one it will ring almost like a tuning fork. The file should next be held nearly level with the eye, the light falling obliquely up its teeth, which should present a perfectly regular and even appearance viewed from either end. The color should be a dull, silvery gray, free from spots or mottling, except at the end or tang, where it is tempered. Files should be kept in a rack by themselves, and should not be thrown in a drawer among other tools, and if a file or two be carried on the car, they should be wrapped separately in paper or cloth to prevent injury to their teeth.

INSTALLING DRY CELLS.

It is a common occurrence for motorists to find fault with dry cells when experiencing ignition troubles, especially in starting. The difficulty is due usually to careless installation of the batteries and this will apply equally well to the storage type. The prevalent use of metal battery containers, and especially where

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these are not lined, will breed trouble for the operator if he tumbles the cells in and does not take precautions to prevent their jumbling about. If the cover of the box is not fitted with wood the cells should be packed in tightly with newspapers or waste and covered with this or other non-conducting material.

Dry cells should not be placed in a box in which a storage battery has been used previously until the interior has been scrubbed thoroughly to remove all traces of acid, otherwise the zinc of the cells will be attacked and destroyed quickly. Instances are known where a number of dry cells have been destroyed within a few days by the acid left in the battery box in which a storage battery was used formerly.

When individual dry cells are employed care should be exercised in washing the car, so that the batteries

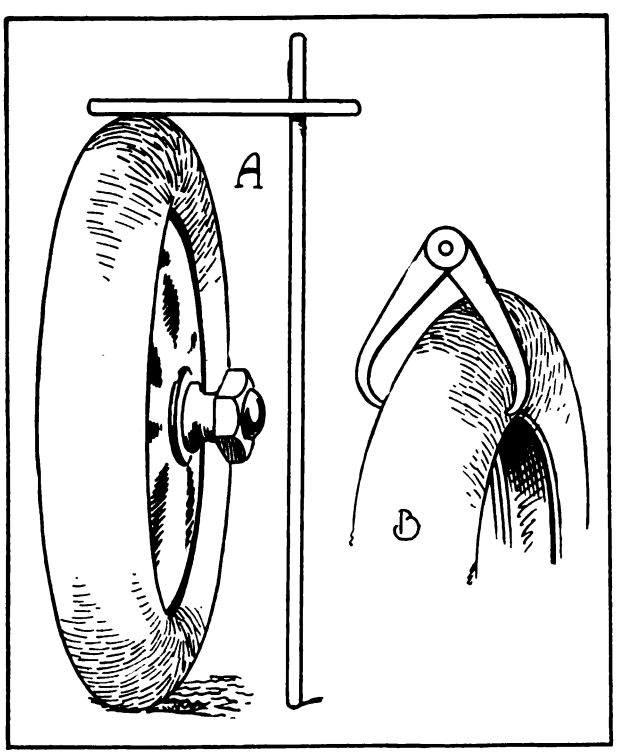


Fig. 3—Indicating How Tires May Be Measured: A, Determining Circumference; B, Utilizing Calipers to Secure Diameter.

and the interior of the box are not wet. This is apt to cause a leakage of the current, which will soon render them useless. The same will apply to containers which do not exclude the rain.

HOW TO MEASURE TIRES.

It is surprising to note the number of operators who purchase second hand tires to tide them over the latter part of the riding season and some make it a practise to take advantage of bargain sales. As the name of maker and sometimes the size is buffed off or removed, the purchaser has no accurate means of knowing whether he is obtaining full measure for his money. A simple method of measuring tires is outlined at Fig. 3. The circumference of the shoe may be ascertained readily by using two strips of wood, as shown in the drawing. The diameter is obtained by employing a pair of calipers, and the method of securing the measurement and proper location of the instrument are also depicted.

ATTACHING LICENSE PLATES.

In these days when the police are enforcing the automobile laws, especially those relating to the license tags, it is an excellent idea for the novice to give some thought and attention as to how to affix the plates. The use of straps and wires is not recommended as the material will chafe and the numbers become lost, which may mean a visit to the police court where explanations are not heeded.

Some make it a practise to fasten the tags to the front of the radiator by means of wires passed through this member. This is a poor plan, for should the wire or rods become loose, the vibration will cause them to chafe a hole in the fins of the cooler and a leaky member is the result.

There are several devices upon the market for carrying the license plates, one being so constructed that it is affixed to the radiator filler tube and when two numbers are required the other appliance is made to fit over the tail light bracket.

The front number may be secured to the axle by making two clamp like strips of metal and fitting these with threaded bolts and nuts. The fasteners should be made smaller so that in drawing the plate against the axle the former will be held securely and will not vibrate. Another method is to bolt the plate to the strip of metal extending below the radiator which covers up the lower part of the crankcase.

Many owners object to placing the rear number upon the body as it necessitates drilling holes. The sign may be located on the fender by means of angle irons or the rear cross frame drilled to take similar holders. If the tags are suspended by straps or wires from the tierod they should be so secured that the plate will not slide as it might become jammed against the starting handle and prevent proper operation of the steering mechanism.

NEW CARTERCAR CATALOGUE.

The publication of automobile catalogues from year to year is becoming an art in itself. The latest issue, presenting the merits of 1912 Cartercars, made by the Cartercar Company, Pontiac, Mich., is particularly interesting because it sets forth in a thoroughly effective manner the wonderful progress that has been made in the product of that concern since the first Cartercar left the factory in 1901. The illustrations are quite in keeping with the machines themselves and the text matter sets forth the advantages of these cars in an able manner. A copy will be mailed upon request made to the company.

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MERCER LIGHT CARS, TYPE 35.

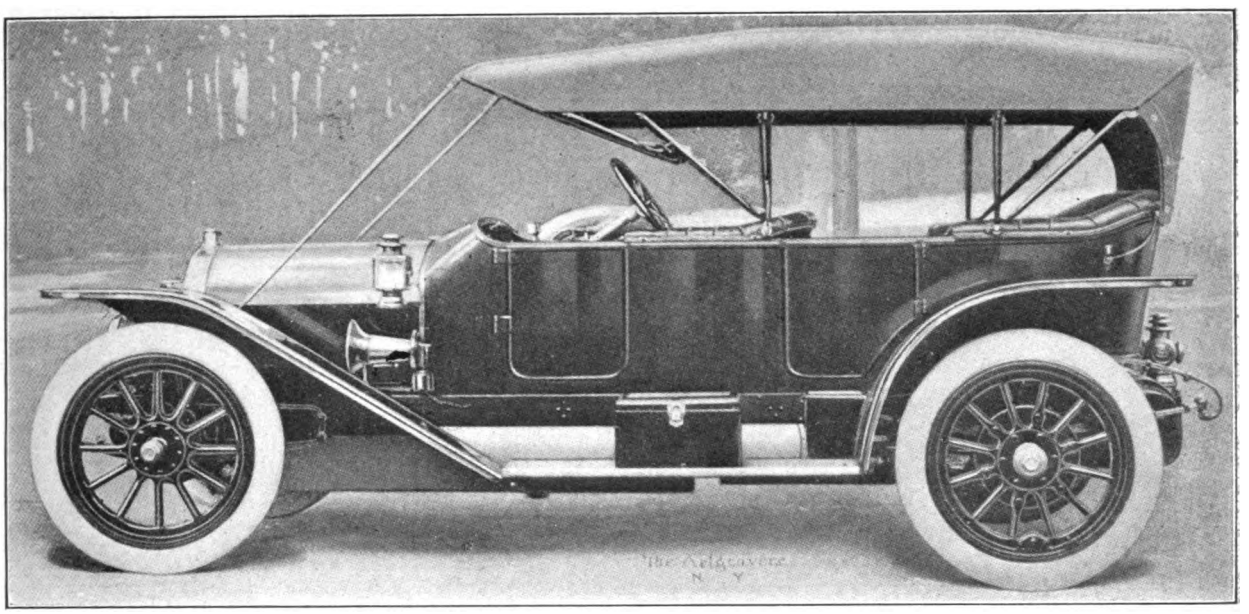
MERCER pleasure automobiles, built by the Mercer Automobile Company, Trenton, N. J., are classed by the maker as light cars, this applying both to weight and passenger capacity. The claim is made for these machines that as they have been developed from the experience of successful racing, and from sound and advanced engineering, they are not only thoroughly mechanical, but are constructed of material that will endure under all conditions of service. The design has been simplified and each part has been created with careful regard to its service, so that each chassis is a construction that justifies the claim for quality and power.

The Mercer cars are built in the shops of the company and no parts are made by others. Every work is carried on under a system of inspection that insures the maintenance of the qualities of components and the standard of workmanship. The designs are standardized and each part is interchangeable. The machines have been tested under the continued excess service of racing and the success achieved has been conclusive demonstration that the constructions have endurance and power far greater than would be required in normal use.

The largest capacity of the cars is five passengers. The weight being relatively light the proportion of useful power applied to propulsion is correspondingly large, insuring high speed and minimizing tire wear. The elimination of complications and the extreme accessibility make for ease and certainty of maintenance and care.

All Mercer cars produced are rated as Type 35, and of these those known as series A and B are the heavier chassis equipped with either four or five-passenger touring bodies. Series C and D are the lighter chassis equipped with either raceabout or runabout bodies. In the chassis there are no material differences other than that the wheelbase of series A and B is 118 inches, and that of series C and D 108 inches, while the cylinder bore of the motors is 4.375 and 4.5 inches, respectively, and the transmission has four forward speeds and reverse for series A and B, and three forward speeds and reverse for series C and D. There is, of course, variance in the length of the chassis frame members.

Relative to the production of the cars it may be stated that the Mercer shops are equipped with all machine tools and facilities for exceedingly careful and accurate work, and every process for producing has been adopted after experiment and trial has conclusively demonstrated its value.



Mercer Four or Five-Passenger Touring Car, Type 35, Series A and B, Known as the Newport Model.

For the purpose of description the A and B chassis will be a sufficient subject, it being the larger. The Mercer motor is remarkably efficient. It is a T head type, four-cycle, four-cylinder engine, with bore of 4.5 inches and stroke of five inches. The rating is 32.4 horsepower by the S. A. E. formula, but before an engine is permitted to leave the testing department it must develop 58 horsepower by actual dynamometer pull at 1700 revolutions a minute, which means practically 80 per cent. in excess of the accepted standard. The smaller engine is rated at 30.6 horsepower by the same formula.

The cylinders are cast in pairs with the water jackets integral. The castings are designed to have a large opening in the outer water jacket wall above

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the combustion chamber. The core work is unusually even and this insures large water chambers and uniformity of metal, with equalization of radiation and certainty of cooling. The openings in the cylinder units permit a thorough cleaning of the chambers and the circulation of the water is positive. After casting the units are carefuly annealed and after boring and reaming they are ground to a thousandth of an inch. That there may be no possibility of distortion through the heat generated while grinding the temperature is reduced by a circulation of water through the cylinders during the period the work is progressing. The intention is to produce castings that will, when finished, have equalized expansion and contraction.

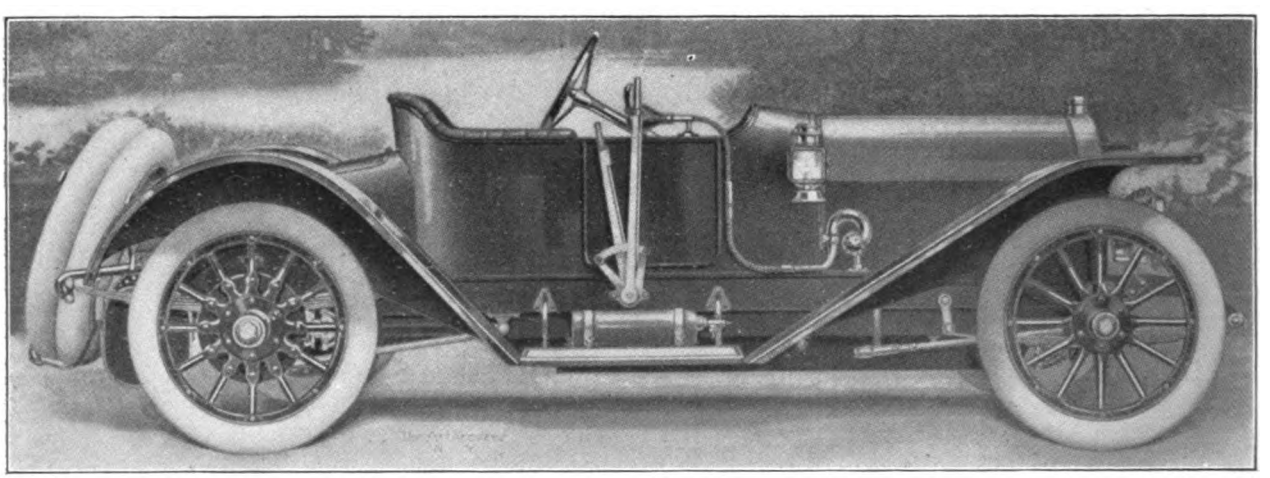
The pistons are cast of the same material as the cylinders, a high grade of gray iron, having unusual length and being extremely light. These are designed with very large bosses to carry the wristpins. The pistons are turned and ground to a limit gauge and are then channeled for four rings, all carried above the wristpins. There is a liberal area between the upper and lower bearing surfaces of the pistons for the retention of lubricant and there is an oil groove below the wristpins to fully distribute the oil. Instead of the rings being turned eccentric to insure an even bearing on the walls of the cylinders they are made with uniform thickness and are peined on a special machine which insures an even strength and elasticity and equalized bearing. By this construction a lighter piston is produced, as the rings take up all the space in the pistons usually allowed for the eccentric rings.

The crankcase is a barrel type in two sections, cast of aluminum alloy, the upper part carrying the main and camshaft bearings, and the lower constituting the oil reservoir. The case is divided transversely with a central web that supports the centre main and camshaft bearings. The design is such that the camshafts may be removed from the forward end of the case, the bearings being in the forward end web, and the timing gears housed by a removable aluminum cover. The cylinder units are firmly bolted to the solid top of the crankcase. At the front and rear of the case are heavy arms on which the motor is supported in the sub-frame.

The crankshaft is a heat treated nickel steel drop forging that is accurately ground to size, being two inches in diameter at the bearings. The bearings are 2.875 inches forward, 3.0625 at the centre and four inches at the rear, a total length of 9.9375 inches. The bearings are a special type and the journals of cast bronze bearing metal are lined with Parsons' white brass, the brass being knurled into the seats, this causing a high degree of endurance under crushing stresses which might destroy the ordinary die cast bearing. These bearings are used throughout the motor and have been found to eliminate the ordinary influences for deterioration and make for long endurance.

The connecting rods are drop forged steel I sections 12.5 inches between centres, and these are fitted to the crankshaft with heavy bushings, which are retained by four bolts and are fitted with shims for adjustment. The small ends of the rods are split and are clamped to the wristpins by large bolts. The wristpins are hollow, of hardened alloy steel ground to size, and these oscillate in the piston bosses. The length of the connecting rod is such that there is a minimum side thrust upon the cylinder walls and with the long piston there is practically elimination of vibration. The large bushings and wristpins, with complete lubrication, preclude adjustments even after thousands of miles of driving. It is stated by the maker with a pardonable pride that a connecting rod of a Mercer engine has never been broken, which is pointed to as an indication of excellence of design and quality of material and workmanship. It also is stated that a Mercer motor will not knock under a heavy load.

The camshafts are of low carbon steel, 1.25 inches diameter, with the cams integral, carefully heat treat-



Mercer Runabout, Type 35, Series D, with High Sides and Deep Upholstery.

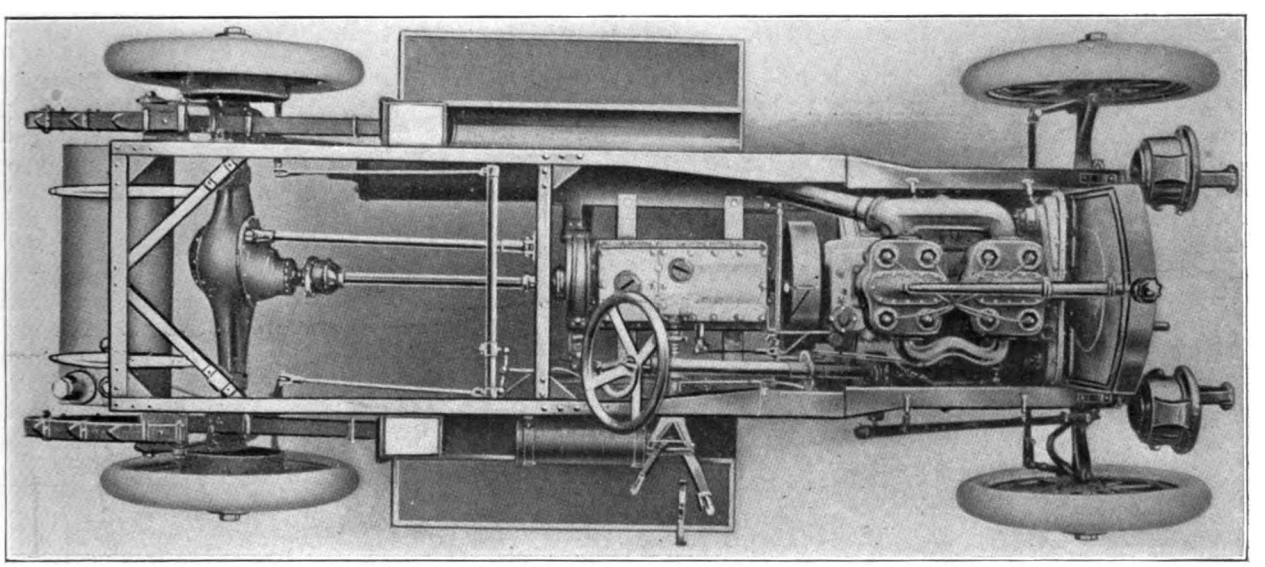
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ed, with the cam faces oil tempered and ground to size. These shafts are mounted at opposite sides of the motor and are housed by the engine case. Each shaft is carried on three main bearings of the same composite type used throughout the motor and designed for great endurance. Each camshaft is driven by a manganese bronze spur with face width of 1.25 inches meshing with the gear on the crankshaft.

The valve action of the motor is not conventional in that endeavor is made to minimize all wear of the pushrods and to secure exceedingly fine adjustment of the valves for clearance. In the engine base, directly below the line of pushrod movement, are circular openings that are closed by plates. These plates carry short sleeves or bushings that are slotted vertically, the sides of the sleeves being drilled for a short shaft on which is mounted an arm. At the end the arm widens on the under side so that a flange is formed and above this the end is tapered with a circular flat face the same diameter as the pushrod. The arm is carried in the sleeve on heavy bushings. It is free to move in a vertical plane, the weight always causing it to drop to the lowest point. The plate and the arm are bolted into the case with the end of the arm resting upon the cam. As the shaft revolves the arm always contacts with the cam, this eliminating all side thrust upon the pushrods and materially reducing the noise of operation. The pushrods are operated in sleeves bolted to the engine case and the rods are fitted with case hardened adjusting nuts and screws to secure precise relations. The valves are 2.25 inches diameter with a lift of .4375 inch, and are of composite construction, with a nickel steel and low carbon steel stem welded and riveted together in a die. This insures against breakage that might result with other construction. The valve ports are large and thorough exhaustion of the burned gas and the aspiration of a complete charge of fuel is insured. The valve stems are operated in a bushing inserted into the cylinder. With this form of construction it is possible to make adjustment or replacement of every wearing part and to maintain the efficiency of the motor at all times.

The system for lubricating the motor has been tested under the excessive requirements of racing and it has been demonstrated to be in every way satisfactory and efficient. It is a combination of force feed and splash, has the merit of extreme simplicity and certainty of operation. In the base of the engine case is a reservoir into which the oil flows. In this reservoir at the right side of the motor is the gear driven rotary pump in which there is but one moving part. This pump draws filtered oil from the reservoir and forces it through a system of tubes to a sight glass on the dash and thence to three main bearings of the engine, flooding them. The overflow of oil is carried on to the crank throws of engine shaft by centrifugal force and then is gathered by small aluminum collectors and directed through the channels of the hollow crankpins to the connecting rod bearings. Beneath each crank throw is an oil pit formed by a cross web in each half of the crankcase and the oil from each drains to the level of a drain hole and flows eventually into the reservoir. The splash from these oil pits affords lubrication to the camshafts and bearings, the cams, valve lifts, pushrods and guides, the timing gears, the cylinders, pistons and wristpin bearings. The quantity of oil in the reservoir is indicated by a tube gauge carried on a cork float, a scale showing the available lubricant at a glance.

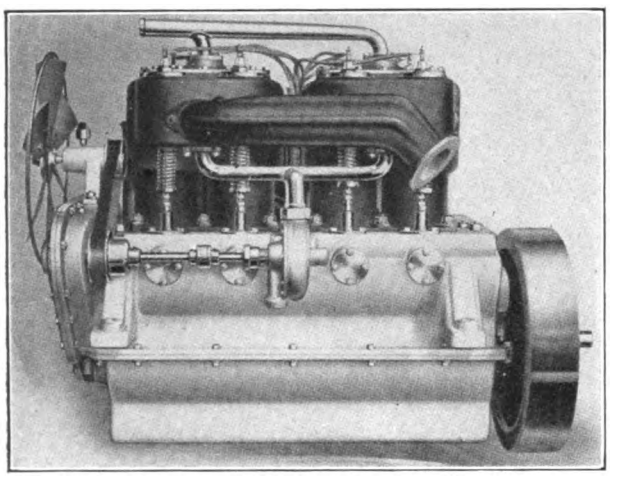
The motor is cooled by the circulation of water through the motor and a cellular radiator supported on the main frame by two ball and socket joints at the rear of the front axle. The openings at the head of the cylinder units are closed by large plates fastened by studs, these plates carrying the water out-



Chassis of the Mercer Type 35, Series A and B Touring Cars, Newport Models.

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let manifolds. The outlets are large and there is no obstruction to the circulation. The water is drawn from the base of the radiator and is forced



Exhaust Side of Mercer Motor.

into the cylinder units at the base of the jackets, passing around the exhaust valves and thoroughly cooling them. The pump is driven by an outside shaft by the left or exhaust camshaft gear, and this same shaft carries a pulley from which a flat belt drives the large six-bladed fan, which is mounted on a bracket ahead of the forward cylinder unit. The fan shaft is carried on annular ball bearings and the belt is adjustable to insure correct tension.

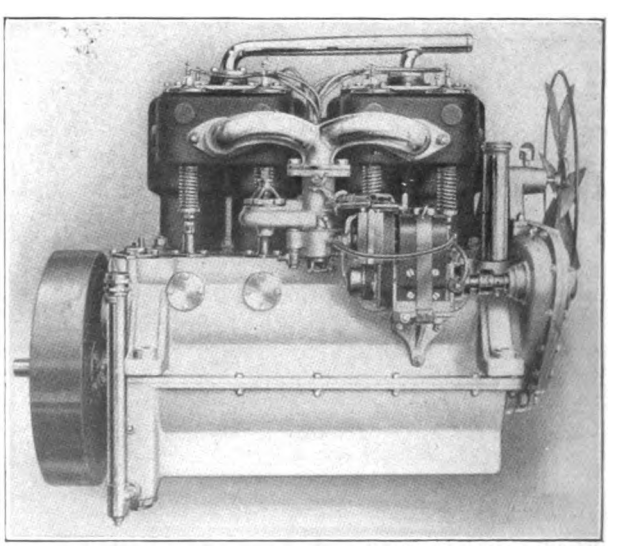
The ignition is extremely efficient, it being the Bosch synchronized two point system there being two sparks made simultaneously in each cylinder on two plugs located over the inlet and exhaust valves. The energy is generated in a high-tension magneto and it is distributed by a double distributor. It is claimed for this system that it increases the engine efficiency from 10 to 25 per cent., according to the motor speed, that it lowers fuel consumption, minimizes fouling of spark plugs, and insures continuity of engine service. In addition to this system batteries are used for starting with the touring chassis.

The fuel is vaporized by a carburetor of the float feed automatic type with auxiliary air intake. The fuel is carried from the carburetor by a large manifold with direct and unobstructed inlets. The efficiency of the device used has been effectively proven in all classes of competition.

The clutch and the transmission are incorporated in a single case that is divided by a heavy cross web. The clutch shaft is mounted in heavy annular ball bearings and the clutch is an assembly of 44 steel discs that are operated in oil and engage without harshness. A stuffing box prevents the leakage of lubricant from the clutch compartment into the transmission.

The gearset of the touring car chassis is a selective type of sliding gears with four forward speeds and reverse, the third, or direct drive, having a ratio of 3.5 to one. The fourth is higher and has a ratio of 2.70 to one and should never be used until the car has attained a speed of 35 miles an hour or more. At all speeds the gears are very quiet, and on direct drive are practically noiseless. The gear shift quadrant is a straight slot in which the lever is pivoted, instead of the conventional H slot. The gears and shafts are cut from heat treated nickel steel and are practically unbreakable. The main shaft is 1.5 inches diameter and instead of being squared it is cut with four integral splines that fit with four keyways cut in the sliding gears. This construction greatly facilitates gear shifting as there is no possibility of the gears jamming on the shaft and the large diameter of the shaft is insurance against its springing. The gears, to be positively quiet, are chucked on their pitch lines and ground out internally. The shafts are mounted in annular ball bearings. The clutch lever is mounted with two annular ball bearings and may be operated without noise. With the smaller chassis the gearset has three forward speeds and a reverse with a ratio of 2.5 to one direct driven.

The drive is by shaft with two universal joints to a full floating rear axle. The axle housing is of pressed steel and welded longitudinally to have great strength. In this the differential gears are mounted in annular ball bearings. The axle shafts are of alloy steel with four splines cut integral at each end, differing from the squared end in customary practise. They are heat treated to insure greater strength. The pinion shaft and the pinion are forged integral from alloy steel, and are carefully heat treated. The pinion shaft is mounted on two annular ball bearings. The axle relation is preserved by two radius rods and the torsion stresses are taken up by a triangular torsion bar mounted between heavy helical springs ex-



Inlet Side of Mercer Motor.

tending from a chassis cross member to the rear axle housing. Chassis frame is of pressed steel channel section, cambered forward to afford a shorter turning

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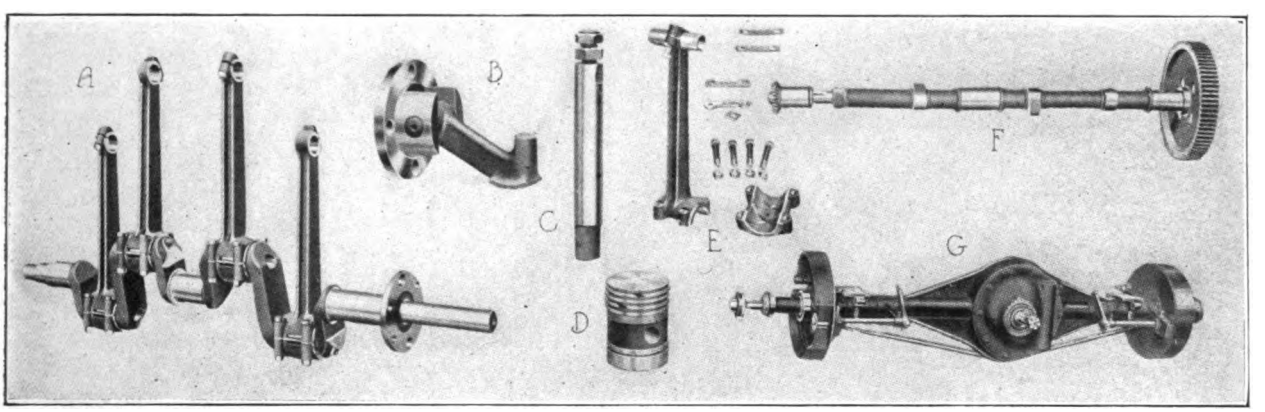
radius and raised 3.5 inches at the rear to permit the low body suspension. All rivet holes are drilled to obtain the greatest strength.

The frame is suspended on three-quarters elliptic vanadium alloy springs at the rear, these being shackled at both ends. With the larger chassis the rear springs are 49 inches length and 2.25 inches width, and the forward springs are 39 inches length and 2.25 width. In the smaller chassis the springs are semi-elliptic throughout and are three inches shorter. All springs are fitted with bronze eye bushings and grease cups for lubrication. The forward axle is an I section nickel steel forging. The wheels are wood, artillery type, 34 inches diameter on the large chassis and 32 inches diameter on the smaller. The wheels are mounted on ball bearings throughout and forward steering spindles similarly fitted. The steering gear is of the semi-irreversible worm and sector type, the worm and sector being of high grade steel, carefully hardened and adjustable for wear. The worm is supported between two adjustable ball thrust bearings and the sector shafts are mounted in two hardened and ground eccentric bushings which will permit the sector to be meshed deep should it wear. All wearing parts are provided with means of lubrication.

The control is by a clutch pedal at the left and the service brake pedal at the right, with ignition and throttle levers mounted on the steering wheel, and by a gear shifting and an emergency brake hand lever at the right side of the car. The steering wheel is a one-piece aluminum casting with a hard rubber rim. The service brake is on the driving shaft directly back of the transmission case, it being of the contracting type with the cast iron shoes lined with asbestos fabric. It is operated by a right and left worm, easily adjustable for wear. The emergency brake operates with expanding shoes within drums on the hubs of the rear wheels. These shoes are faced with asbestos fabric. All chassis are fitted with foot accelerators.

The gasoline tanks are 18 gallons capacity and are of sheet metal, double riveted, with splash plates and large filling cap. They are carried at the extreme rear and are easily accessible. The fuel is forced to the carburetor by pressure from the exhaust, automatically maintained. A magnetic gauge indicates the quantity of fuel in the tank and an indicating gauge on the dash shows at all times the pressure in the tank. All the gasoline and air line piping is annealed copper tube and every joint is carefully sweated with silver solder to insure strength. All the fittings throughout are of heat treated drop forged steel and the bolts and nuts used are manufactured in the factory. With the raceabout the gasoline capacity is 25 gallons and there is a tank that will hold five gallons of extra lubricant. The tire equipment is 34 by four and 32 by four-inch tires with demountable rims. The larger chassis are guaranteed to make 65 miles an hour and the raceabout is guaranteed to make a mile in 51 seconds.

In the touring cars the bodies are noticeable for the construction of the seats which are 22 inches in width and the seat platforms are but an inch above the floor, the cushions being nine inches depth and affording a luxury in riding that is not often experienced. The backs of the seats are made with the lower sections of heavy coiled springs. The upholstery is of fine hand-buffed leather and a high grade of curled hair. There is an abundance of leg room in all models.



Components of the Mercer Chassis: A, Crankshaft and Connecting Rods; B, Lifting Arm in Valve Mechanism; C, Adjustable Valve Pushrod; D, Piston Fitted with Four Rings; E, Connecting Rod and Wristpin, with Cap, Bearing, Shims and Bolts; F, Camshaft and Timing Gear; G, Full Floating Rear Axle Assembly.

The touring bodies are exactly the same save that one is wider at the rear seat to accommodate a fifth passenger. They are fitted with fore doors and the bodies have deep cowls that well shield the occupants. The runabout is an enclosed vestibule type with deep seat and high sides. The touring models are referred to as Newports and are finished in four different colors for the four-passenger cars and two colors with the five-passenger machines, while the runabouts are each finished with three colors. This gives an unusually large range of choice for the purchaser. The equipment for the cars is unusually complete and is high class throughout.

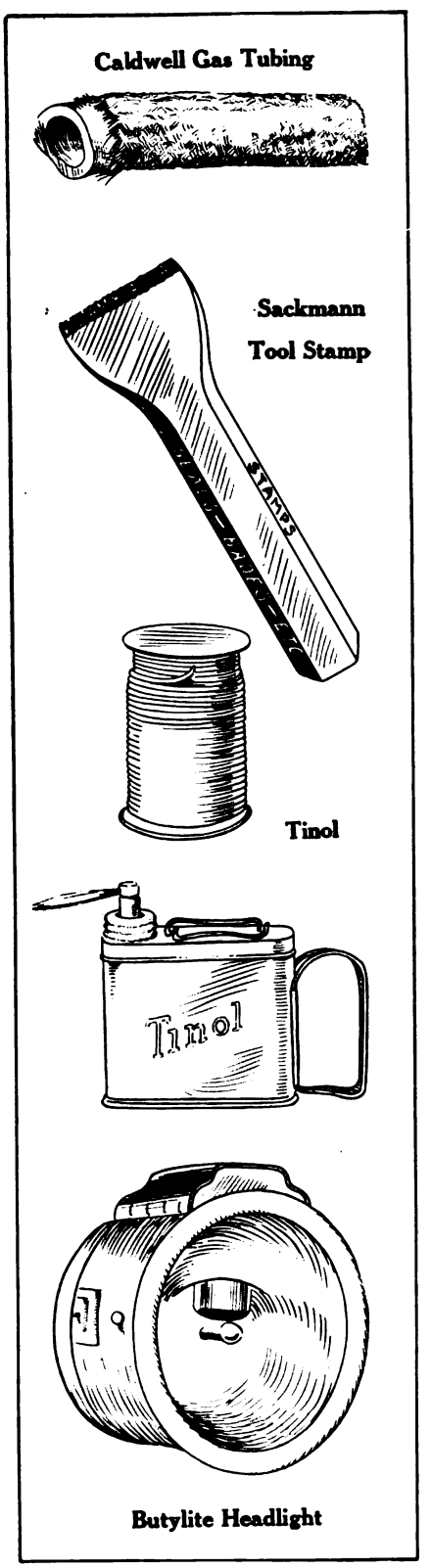
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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Caldwell's Gas Tubing will appeal to motorists who have experienced trouble with acetylene lamps due to leaky piping. The ordinary rubber tubing is short lived as the weather affects the material and it becomes hard and cracks easily, thus causing a loss of gas. Sometimes the apertures are minute and the escape of acetylene is not noticeable. This loss is augmented when the burners are clogged as the pressure is increased at the tank to obtain the desired flame. While water does not affect rubber, the oxygen in the air in time hardens the compound which loses its life or elasticity. The Caldwell tubing consists of a heavy and high grade material, which is covered with braid by a special process, this being closely woven yet not diminishing the flexible qualities of the piping. This covering protects the rubber from the air, thereby keeping it soft and considerably lengthening its life. It is pointed out by the maker that the material will endure as long as the braid is intact and that the latter is very durable. Being sturdily constructed it is not affected by the vibration of the automobile and the dark colors of the braiding harmonize with that of the machine and add to its appearance. The tubing is produced by the Caldwell Manufacturing Company, 1756 Cranston street, Providence, R. I., and is inexpensive.

★

The Sackmann Tool Stamp is the product of the Sackmann Manufacturing Company, Akron, O., and is designed to mark tools with initials or letters, thus preventing mistakes as to ownership. Standard tools, like wrenches, pliers, etc., are hard to identify and are often borrowed and others returned by mistake. Numeral stamps are handy for marking the components when overhauling the power plant, thus facilitating the reassembly of the parts. The device is inexpensive and is made to order, although certain stock stamps are carried.



★

Tinol is a new soldering outfit produced by Hess & Son, Philadelphia, and consists of an alcohol torch, soldering copper, can of paste and a spool of solder wire. The latter is tubular and filled with a special Tinol flux and the entire outfit comes in a neat leather case. It is very compact and with it repairs may be made upon the road as it is claimed by the maker that no careful cleaning of the part is necessary, owing to the special flux employed. It is stated that electrical joints may be soldered by wrapping the part with a piece of waste wet with gasoline and burning off the fluid, after the damaged place has been coated with Tinol paste. The latter is also employed for mending piping leaks, and it is held that an amateur may repair leaky radiators successfully. The outfit is not expensive and should prove a valuable acquisition to the tool kit of the motor car as well as the private garage.

★

The Butylight headlights are self-contained; that is, they burn denatured alcohol under pressure and it is stated that a very high degree of brilliancy is obtained. This is brought about by the use of a mantle which is said to be impervious to vibration or road shocks. The fuel is utilized in a somewhat similar manner to the gasoline in a torch and the flame may be regulated as desired. It is pointed out by the maker that owing to the pressure in the container the last drop of alcohol will be converted into a useful product. The lamp is equipped with a pressure gauge and a valve, and it is claimed that it will operate efficiently at five pounds. Pressure is brought about by the use of an ordinary tire pump. The lamp is similar in appearance to acetylene members and fitted with a reflector which is cleaned easily. It is stated that a pair of lamps

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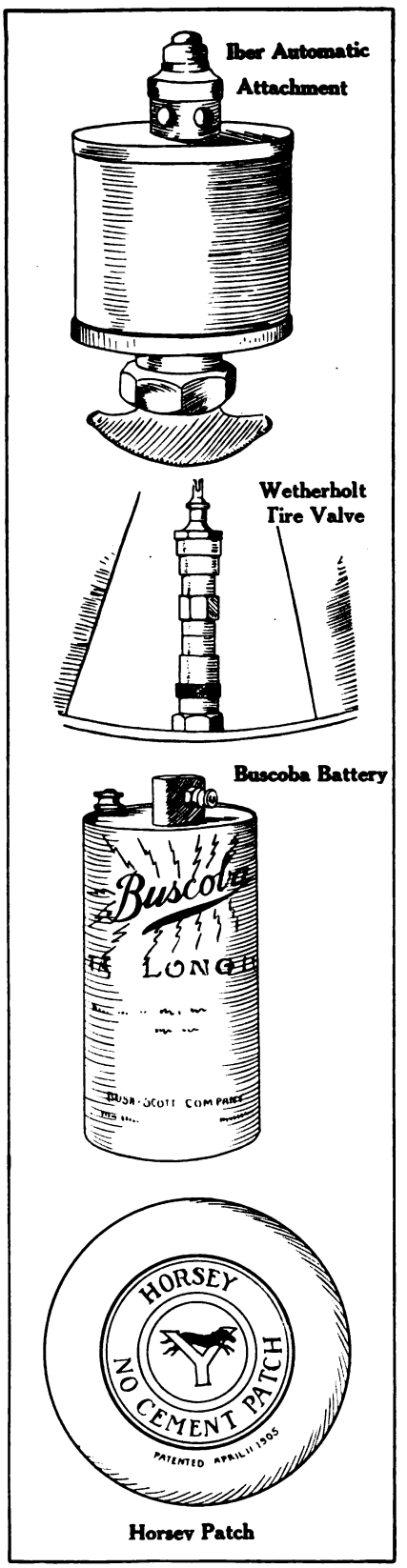
may be operated at a cost of one cent an hour. Benjamin N. Levy and William T. Fox, 32 Union square, East, New York City, are agents.

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The Iber Automatic Attachment, made by the Motor Attachment Company, Poughkeepsie, N. Y., is a device which operates in conjunction with the carburetor and it is stated by the maker that it will regulate or balance the suction of the pistons when these draw different amounts of mixture from the vaporizer. It is also claimed that a perfect vaporization is brought about, that the intake manifold is always filled with the proper mixture, and that the device automatically operates quickly at low speeds and slowly at high, thereby equalizing the suction on the carburetor. The instrument requires no adjusting whatsoever and may be fitted to any type of standard carburetor. It is held that it will save 25 per cent. of the fuel, increase power and make starting easy. It is applicable to any type of internal combustion engine.

★

The Wetherholt Tire Valve, produced by W. C. Wetherholt, Columbus, O., is designed to control automatically the pressure of tires and to prevent over inflation. The importance of proper inflation is well known and is usually determined by the use of a separate pressure gauge, the operation involving the testing of the tire after it is pumped. The Wetherholt device is so constructed that in case the tire has been pumped up over the required pressure, or expansion has taken place through friction, the valve will open and release the excess air, preventing the bursting of the shoe. Each valve is set according to the proper pressure of the size of shoe with which it is employed, and tested accurately before leaving the factory. The maker points out that it is a well known fact that in hot weather the pressure increases with friction and that air in a shoe inflated when cool will expand in service. All parts of the Wetherholt valve are interchangeable.



Horsey Patch

★

The Buscoba Dry Cell is marketed by the Bush-Scott Company, Detroit, and is made to meet the demands of those desiring a high grade special dry battery, applicable for internal combustion engines and all electrical purposes. It is of the usual form, being round, and is equipped with screw terminals. The maker claims extra long life and recuperative powers. The cell is covered with a yellow wrapper to distinguish it from other makes.

★

The Horsey No-Cement Patch, as the name implies, does not require the use of cements or acids in its application, the process involving but the usual cleaning of the tube, moistening the patch with gasoline and then affixing. The patch is manufactured of an elastic, open steam cured, red rubber and is made thick in the centre and tapering to its edges. To the cured part a layer of uncured material is permanently attached by a special process. It is claimed by the maker that a permanent repair may be effected because of its non-blooming qualities. It is produced by the Horsey Manufacturing Company, Cleveland, O.

★

The Ferguson Gas Burner attachment, manufactured by J. Ferguson, 9 West 63rd street, New York City, is a device for converting oil lamps so that acetylene may be utilized. It consists of a burner carrying member, integral with which is a spring like clip and a metal tube. The first named is slipped over the oil burner and does not interfere with its operation. The device is fitted by drilling a .25-inch hole in the side of the lamp and passing the pipe through the opening, allowing about one inch to project on the outside for the purpose of attaching the lead from the gas tank or generator. It is claimed by the maker that the burner consumes but .125 cubic foot of gas an hour

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and that an ordinary tank will supply three burners for 300 hours. The attachment is fitted easily and is not expensive.

★

A Self-Spreading Cotter Pin has been brought out by Barthel, Daly & Miller, New York City, and a feature of the device is that ends open automatically, and may be driven into the bolt, nut or other place as one would a nail. This saves time, inasmuch as the ends of the pin do not have to be opened as is the case with the usual members.

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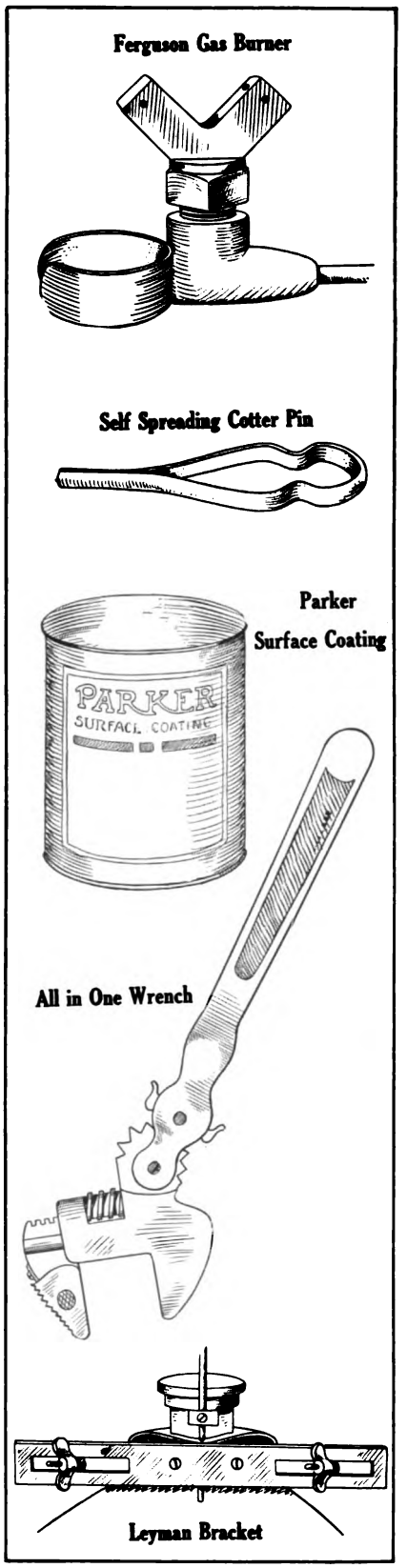
Parker's Surface Coating is a paint held to be acid and alkali proof, being produced in several colors which the maker, the Parker Refining Company, Cleveland, O., states will not fade. The cement coating is made especially for brick, stone or concrete buildings and it is pointed out that these materials are porous and absorb and hold considerable dampness. It fills and seals these pores, keeping the cement or concrete dry, clean and sanitary. It is especially adapted for garage floors and when applied produces an elastic, tough surface, making for easy cleaning and eliminating dampness.

★

The All-in-One Wrench, marketed by the Universal Wrench Company, Indianapolis, Ind., is a combination tool about nine inches long, constructed of high grade steel and nicely finished. It is fitted with an adjustable jaw which may be employed for removing nuts, etc., and this may be reversed when the service of a pipe wrench is desired. The jaws may be adjusted to eight different angles by means of a ratchet device, which also permits the use of the tool in places inaccessible with ordinary wrenches. It is claimed by the maker that it is sturdily constructed and will withstand all ordinary stresses.

★

The Leyman Bracket, produced by the Leyman Company, Cincinnati, O., is a combination license plate and pennant holder. It is designed to fit over the radiator and is secured by a binding screw which allows of adjustment to any height. The license tag is held securely and away from the radiator, and it is claimed that the plate will not rattle or vibrate. Provision is made for the attachment of pennants, the staff being held by a set screw. The bracket is made of solid brass, highly finished; is fastened by means of wing nuts, and will fit any radiator having a filler member.



★

The Globe Auto Lock will appeal to motorists, inasmuch as use or theft of the automobile is prevented. It is a simple, compact attachment in the form of a valve and provision is made for inserting in the fuel line. It may be fitted to the outside of the car body, under the front seat or any other convenient place, and when the lever is moved it shuts off the supply of fuel positively and locks the device. The loss of gasoline by flooding or leaking of the carburetor is avoided and in the event of the vaporizer catching fire the main supply is quickly shut off. When the valve is locked, the machine can only be operated for a very short distance, this depending upon the amount of fuel in the carburetor. The device is manufactured by the Globe Auto Lock Company, Canisteo, N. Y.

★

The Cataract Washer, manufactured by the Cataract Auto-Vehicle Washer Company, Topeka, Kan., is designed for washing vehicles, and it is claimed by the maker that it will outlast five sponges. It consists of a metal handle for attaching to the water line and the other end of the tool is threaded to take the washing member. The latter is of best quality mop yarn and is wound about the corrugated brass head, being held securely. The water flows through the handle and finds its way through the perforations and then through the yarn.

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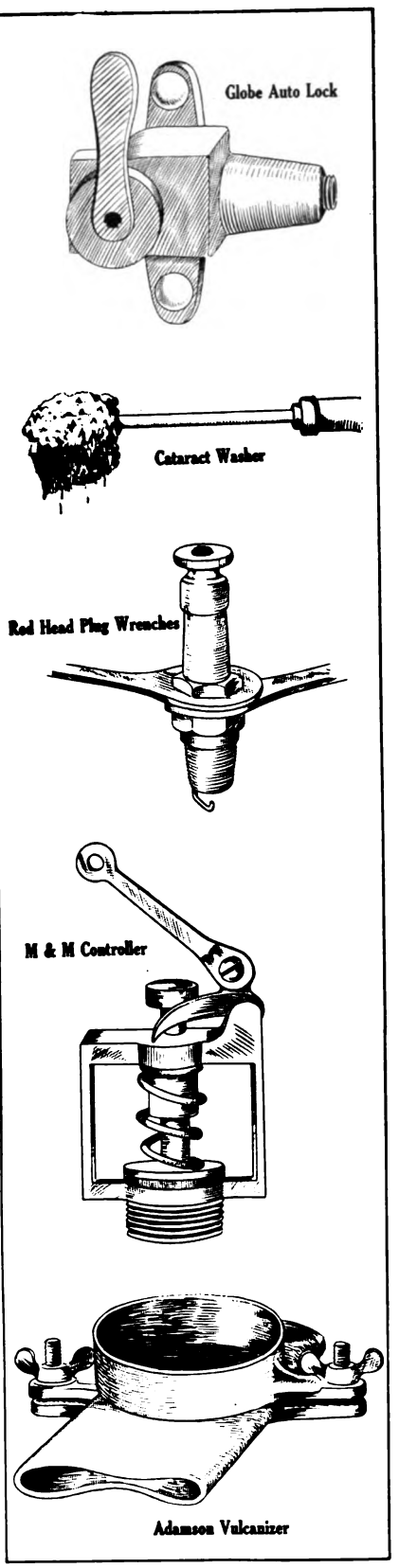
The washer is made in two styles, one having a long handle which keeps the hands out of the water and is designed for winter use. The other form permits the hand to grasp the mop for operation as with a sponge. It is stated by the maker that as the water is flowing during the washing all dirt and grit are removed easily without injuring the finish of the car. The Hagstrom Bros. Manufacturing Company, Lindsborg, Kan., is exclusive selling agent.

★

Red Head Spark Plug Wrenches are produced by the Emil Grossman Company, New York City, maker of the Red Head plugs. The wrenches come in sets of two and by their use danger of breaking the porcelain is avoided. In disassembling a plug with an ordinary wrench the insulating member is easily cracked, especially when removing or tightening the bushing. With the Red Head wrenches, one is utilized to hold the shell and another fits the bushing. These devices are furnished with a set of four plugs or may be secured for a small sum and are adaptable to standard types of spark plugs.

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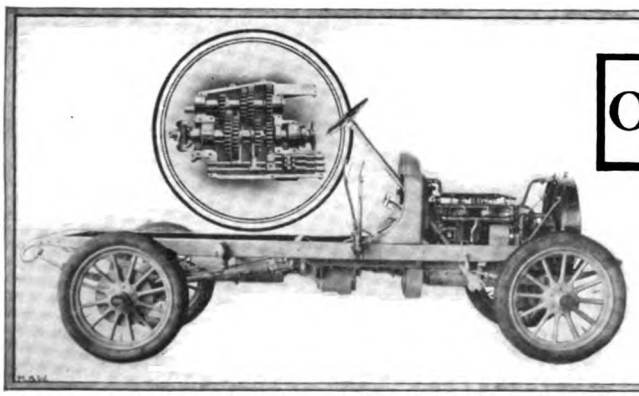
The M & M Controller and Economizer is manufactured by the Moller Bros. Controller & Economizer Company, Betz building, Philadelphia. It is designed to be inserted in the intake manifold of an internal combustion engine, the operation involving the drilling and tapping of a hole. It comprises a frame carrying a valve member which is held securely on its seat by a spring. The valve stem is fitted with a head which is in contact with a cam member pivotally mounted on the lifting lever which is actuated by a pedal convenient to the operator. When the valve is lifted the suction created by the piston of the engine draws in fresh air instead of mixture, and it is claimed by the maker that no gasoline whatsoever is drawn from the carburetor. One of the features emphasized in the device is that it may be utilized to retard the progress of the car by utilizing the compression stroke of the motor, and that as the ignition is cut off the cylinders draw in fresh charges of atmosphere thereby cooling the engine, as well as eliminating any possibility of back firing in the vaporizer. The M & M controller is equipped with a switch like device which automatically interrupts the primary circuit when the lever is lifted and by this arrangement it is claimed that rough roads may be traversed more easily, and that fuel may be saved as well. The device is compact, being about two by 3.5 inches, is inexpensive and is installed easily.



★

The Adamson Auto-Vulcanizer, made by the Adamson Manufacturing Company, East Palestine, O., is a portable repair kit weighing about three pounds with which it is claimed that a patch may be vulcanized perfectly in 15 minutes on the road or in the garage. The device is operated easily, the work consisting of clamping the tube with its repair gum in the holder and filling the latter with one ounce of gasoline. When the fuel is ignited the instrument automatically completes its work. The principle employed is that the temperature is governed automatically in relation to that of the gasoline during combustion. When the temperature of the fuel attains a certain degree, the volume of gas given off by it forces the zone of combustion above the heat conducting members. This allows the vulcanizer to cool slightly when the flame again lowers, and becomes effective. When the gasoline is first ignited the temperature of the device rises gradually to a certain vaporizing point of the fluid and remains constant. No cement or acid is utilized in the process. The kit comes complete and comprises the vulcanizer, gum, scissors, etc., is very compact and will appeal to motorists who undertake their own repairs as well as those who do considerable touring.

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Overhauling the Chassis and Preparing the Car for the Road

C. P. Shattuck

HAVING completed the overhaul of the power plant, it should be left upon the motor stand if the components of the chassis are to be disassembled as in this work it is desirable to dispense with as much weight as possible. If the machine has been in service but a short time it may not require any attention other than cleaning out the old lubricant in the transmission, rear system and grease cups and replacing with new, although a general inspection of the working parts of the chassis is recommended. Any necessary adjustments should be made, and nuts and bolts that may be loose should be tightened. In the examination the steering gear and its connections with the road wheels should not be overlooked as it is important that these members be secure and free from undue play.

If the car is several years' old or has seen considerable hard service, it is advisable to dismantle the chassis and inspect carefully all of its components, as well as to note if the frame and cross members be intact, particularly if the vehicle has been in a slight accident, such as skidding against a curb, etc. While the task may appear to involve considerable labor, the owner will be amply repaid for his trouble by having the automobile in first class condition for subsequent use, when otherwise much time might be lost in making repairs during the riding season.

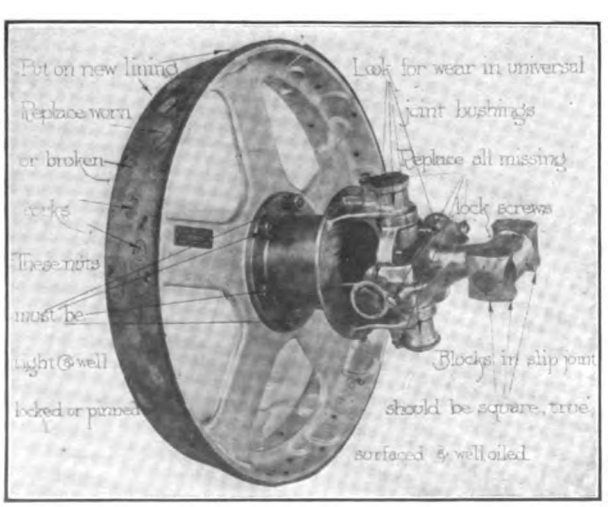


Fig. 1—Cone Clutch, with Suggestions as to Probable Repairs Needed.

If the garage be equipped with the proper tools as outlined in a recent issue of The Automobile Journal the work will be facilitated, although a successful overhaul may be accomplished with an ordinary set of tools, relying upon the machine shop for the more difficult work, such as on the transmission for example. Regarding this member as well as the rear axle, the amateur will do well to master its details of construction from the instruction book of the maker before dismantling, as with the rear axle housing in halves the differential is liable to drop out when the sections are separated, causing damage to the gears. It is a good plan for the novice to proceed slowly, studying the location of each component and its relation to the others, and noting carefully the means incorporated for adjusting and locking the parts securely. Before beginning the work a number of boxes should be procured for the small parts, and system should be the keynote throughout.

Stripping the Chassis.

All wiring, tubing and small parts should be removed from the chassis and the fuel pipes examined for chafed places. If the metal be worn slightly a few drops of solder applied properly will save purchasing a new pipe. It is a good idea to remove the fuel tank and clean this member thoroughly, as well as to inspect all connections. The filter in the line should be taken apart and all foreign elements displaced. If the tank be not fitted with a filter and water exists, it may be taken out by wrapping a piece of moist chamois on the end of a stick and inserting it in the container. The chamois will soak up the greater part, if not all of the water.

It is assumed that the front fenders have been taken off during the motor overhaul. The rear members also should be disconnected and if in need of repairs sent to a tinsmith. Their supports should be looked over carefully and if the nuts and bolts are very rusty these should be replaced with new ones. The next step is to dismantle the clutch before removing the transmission case. With cone clutches of the external type it is essential that the spring be rendered inoperative by compressing and tying it up or allowing it to expand fully. Compression may be

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accomplished by the pedal or a crowbar, and wire or a stout cord utilized for tying. With the internal type, when the spring is compressed, the clutch ring or female member can be removed and the spring gradually released. Those who have never had a clutch down should treat the spring cautiously, especially if it be a strong one.

In the event of a special clutch, such as a multiple disc, flat plate or internal expanding, a study of its construction will determine how best to proceed. Although the planetary type is not as prevalent as other forms, a word as to how to disconnect it will not be amiss. If fitted to the four-cylinder motor it is secured to the flywheel by bolts and nuts. On some types of two-cylinder cars it is attached to wear is due to lack of lubrication. Fitting a new bushing, however, should be done by an expert or a machinist.

At Fig. 2 is presented a type of multiple disc clutch and transmission with its components outlined. Before attempting to remove this the cover must be taken off and the gear shifting mechanism disconnected. A little study of the construction will enable the operator to accomplish the work successfully. Before removing the transmission the old lubricant should be cleaned out and the components of the gearbox washed with gasoline or kerosene so that the parts may be inspected. This may be done before the gear shifting lever is disconnected and the changing of gears tried to note if excessive play exist.

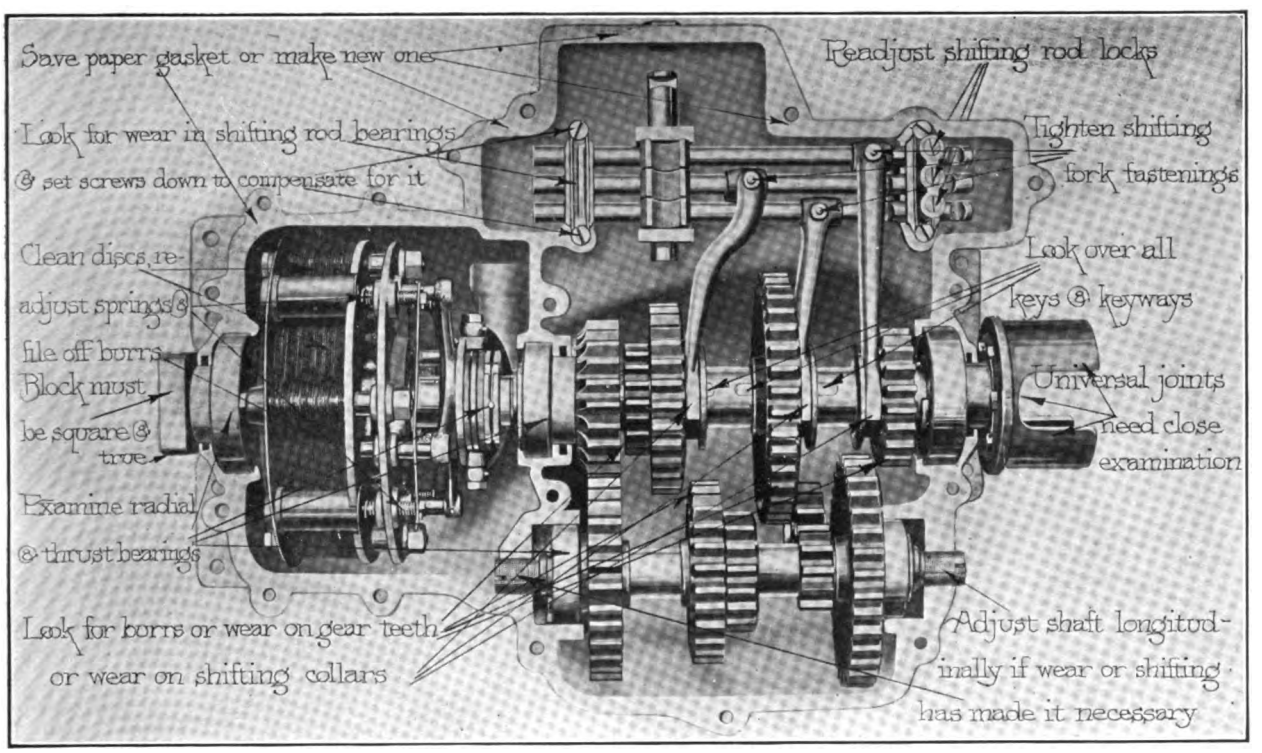


Fig. 2—Some Troubles Which May Exist in Disc Clutch Transmissions, Also Outlining Components Requiring Attention and Adjustment.

the engine shaft and will have to be removed with this member when dismantling the motor.

Clutch Troubles.

A type of cone clutch is depicted at Fig. 1 and some of the parts which wear and require attention are outlined. In fitting new leather, after cutting the material it should be soaked in water over night and in oil before applying. During the first 50 miles or so the leather should be oiled liberally. The clutch bushing should be examined for wear if difficulty has been experienced in changing gears. When this bushing is so worn as to allow the clutch to hang down on the spindle, the clutch will drag causing it to revolve. This bushing is overlooked as a rule because of its inaccessibility, and the excessive

The discs should be examined, and any burrs removed. The shifting rod bearings, keys and keyways and universal joints require attention and if these be worn badly the gearbox should be taken to the machine shop for repairs. While instructions could be given for this the amateur had best not undertake machine work of this nature.

The illustration outlines parts which may be worn or require adjustment and with the aid of the instruction book the owner should be able to readjust the components. Fig. 3 presents a clutch and gears removed from the box, and outlines excessive wear. It will be noted that the teeth of the gears are considerably worn and that burrs exist. The shifting collar is in bad condition as is the lever, the holes of the

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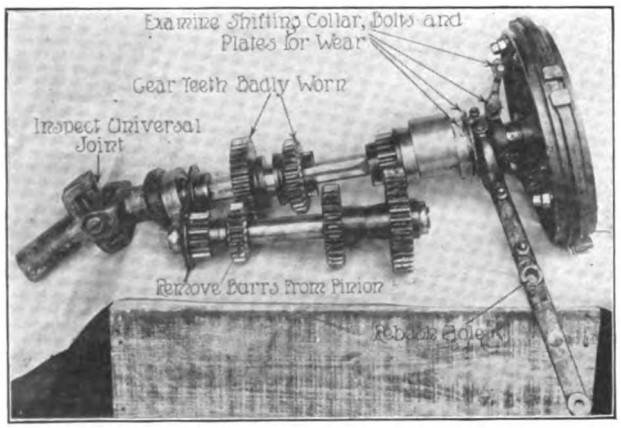


Fig. 3—Gears and Gear Shafts Removed from an Old Car to Show Excessive Wear.

latter being oblong. New parts should be secured or the collar repaired by adding plates and the holes fitted with a new bushing. The burrs may be removed by filing. If the universal joint be worn badly a new one should be fitted, but in case the part cannot be secured from the maker the old member will have to be taken to a machine shop, or a new joint must be made.

Removing the Gearbox.

In taking out the gearbox care should be exercised. This member is heavy, especially when a unit with the motor. Usually it is an easy matter to remove this, but if large and heavy, it will require at least two to lift it. Ordinarily it is secured by four bolts on the feet and when these have been taken out, as well as the universal joint and operating rod connections, little trouble will be experienced. If the lugs to the cross members are in the upper half of the housing, a little ingenuity will be required. A plan which may be tried with success comprises inflating the tires hard, placing a packing beneath the gearbox, then letting the air out of the shoes until the box has settled down on the support. The bolts may then be removed, and the top half of the case and the shafts taken out easily. The reverse process may be employed when assembling.

The operating mechanism of the levers may be worn and Fig. 4 illustrates components subject to wear and looseness. New pins may be required if much lost motion exists, and these should be of high grade material and hardened. New bushings also may be necessary. The nuts and bolts securing the quadrant should be examined for looseness and set up snugly.

Steering System Important.

Too much stress cannot be laid upon the necessity of examining carefully the components of the steering system. It is easily disassembled and should be when considerable lost motion is present, particularly with an old car. The work may involve taking it completely apart which may require the removal of the dash to disconnect the upper end of the post. The amount of wear or play may be ascertained by rotating the wheel and noting the lost motion. If the system is to be disassembled the reach rod and steering lever should be disconnected.

At Fig. 7 is depicted a conventional type of steering system with its components outlined, as well as suggestions for locating wear, etc. The gear carrying member may be removed by taking out the bolts holding it to frame or sub-frame. The screws of the wheel should be tested for tightness, keys and keyways looked over carefully, and thrust bearings adjusted. The reach rod, or the member connecting the steering lever with the spindle, is provided with ball and socket joints. These are secured by a nut and cotter pin and after taking these parts out the old lubricant should be removed and new inserted. The adjustment should be made so that the part moves freely yet without play. New cotter pins should be fitted in assembling and the ends turned over. If the leather coverings are worn new ones should be made or purchased.

How to Jack Up Wheels.

Before overhauling the steering system it is an excellent plan to jack up the front wheels. Wooden supports may be made and in raising the axle the lifting device should not be placed under the spring or spring clips. The brakes should be set, or rear wheels blocked so that the chassis will not roll and cause the axle to slide off the supports. Care should be exercised in placing the supports so that there is no possibility of their slipping. Having made sure of this feature a strip of wood should be inserted between the spindle and axle and the wheels tested for play. If any exist it should be removed.

The bearings are usually of the adjustable type, and with ball bearings it is an easy matter to reduce

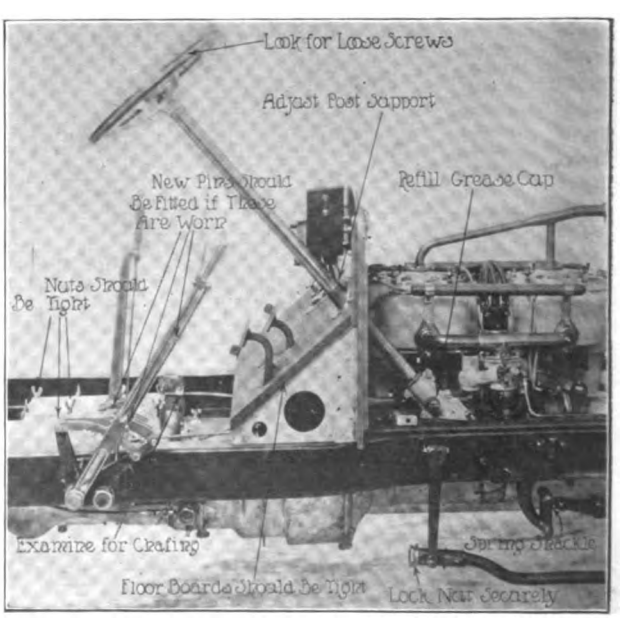


Fig 4—Outlining the Gear Shifting Lever and Quadrant, Steering Post and Wheel and Parts Requiring Attention.

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lost motion. It is a good plan to remove the wheel, take out the bearing retainer and clean out all old lubricant. The balls should be examined very carefully and if excoriations exist new ones procured—a full set, as it is not a good plan to use new balls with old ones. Worn races and cones should be replaced with new.

Removing Races.

Sometimes it is a difficult matter to drive out the the races and remove the cones from the spindle arm. The cone may be started by inserting a cold chisel between it and the spindle and tapping with a hammer.

If unable to drive the races out with a rod or cold chisel, it may be necessary to apply heat to draw the temper and then break them up. Usually, however, they will yield to driving methods. Should the race be crushed; that is, if the balls have worn through it and indented its seat, the heat method may have to be utilized or the hub removed. Some makers drill holes in the hub member so that the work is made easy. The hubs are taken out readily by removing the nuts and bolts. The latter should be set up securely in reassembling.

If the bearings require adjustment only, they should first be packed with grease. The adjusting member is then turned until the bearings appear to stick or lock, when the nut is slacked off about half a turn and secured. The wheel should next be revolved and it should rotate easily. The locking nut should be set up snugly and a new cotter pin fitted. In driving in new races a block of wood should be utilized and care taken not to break the part, as they are hardened and break very easily. Do not attempt to drive with a hammer unless it is of lead or copper. The race should be driven evenly and should fit snugly. If the felts are worn they should be replaced with new ones.

Tierod, Spindles, Etc.

The greater part of lost motion in the steering system may be in the spindles and tierod connections. If the operator has neglected to lubricate these members or they have been exposed to the dust without boots or covers, they are likely to be considerably worn. Having adjusted the bearings of the front wheels it is an easy matter to test for worn spindles and pins and this may be accomplished by holding the wheel securely and rocking it, noting at the same time the amount of play. If the bearings be plain members, the cotter pin and retaining nut on the bottom of the spindle pin is removed, the pin screwed out and examined. The spindle is usually fitted with bushings which may be driven out and new members fitted. If the pin be worn badly, however, new bushings will only partially take up the play and it is advisable to secure new pins and bushings as well. Before replacing the new parts the oil grooves and holes should be tested to note if any obstruction exist as dirt or sawdust may have found its way in when being packed at the factory for shipment. The pins should be well oiled before fitting, the retaining nut set up snugly and a new cotter pin used.

Coming to the tierod, it may be discovered that much of the play is due to this member. With the

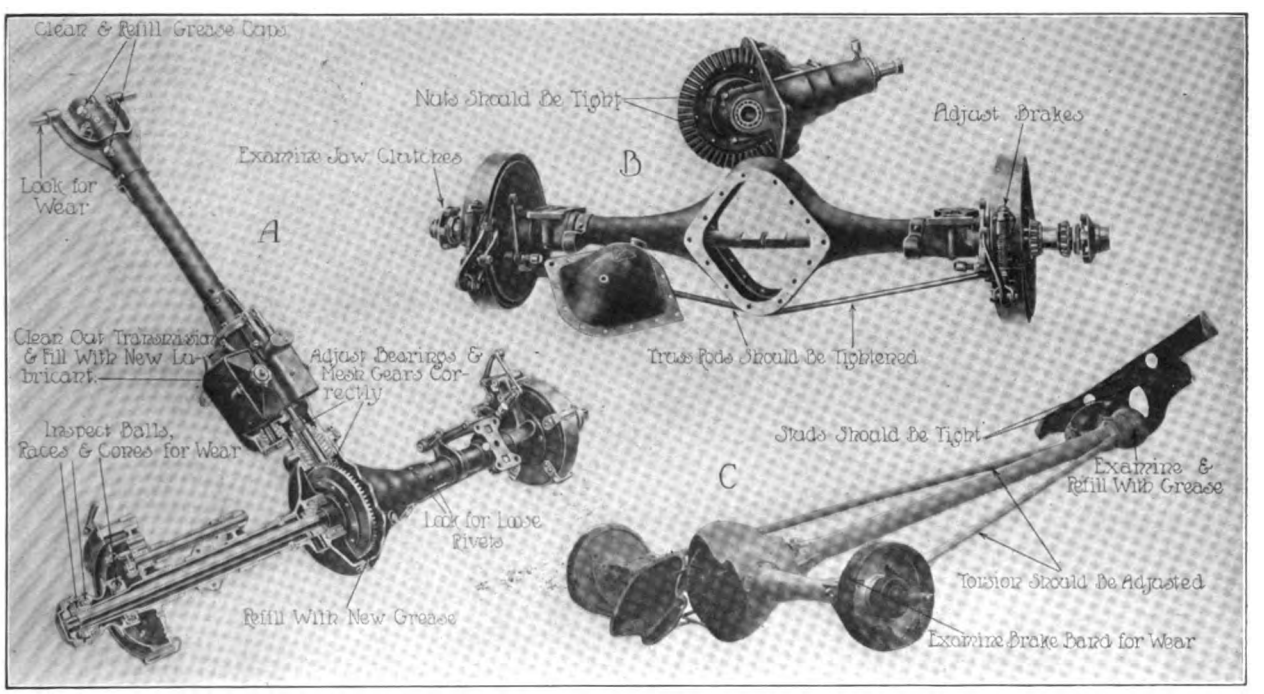


Fig. 5—The Overhaul of the Rear Axle Is an Important Detail: A, Illustrating Design of Transmission and Axle as a Unit; B, Full Floating Type Which Is Disassembled Easily; C, Another Form Having a Ball and Socket Member Carrying Universal Joint.

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wheels held securely the rod may be moved to and fro and the amount of lost motion noted. If the bushings and pins are worn new ones should be secured, or the spindles and the rod taken to the machine shop for repairs. The grease cups should be cleaned out thoroughly and new lubricant inserted in the reassembly of the parts.

Cleaning the Springs.

If the springs are to be removed for cleaning or repairs or new shackle bolts fitted, the front of the car will have to be supported. This may be accomplished by placing a piece of joist under the frame and jacking it up. The spring clips are then removed and examined and if cracked or the threads stripped new ones secured. Unless of special design they

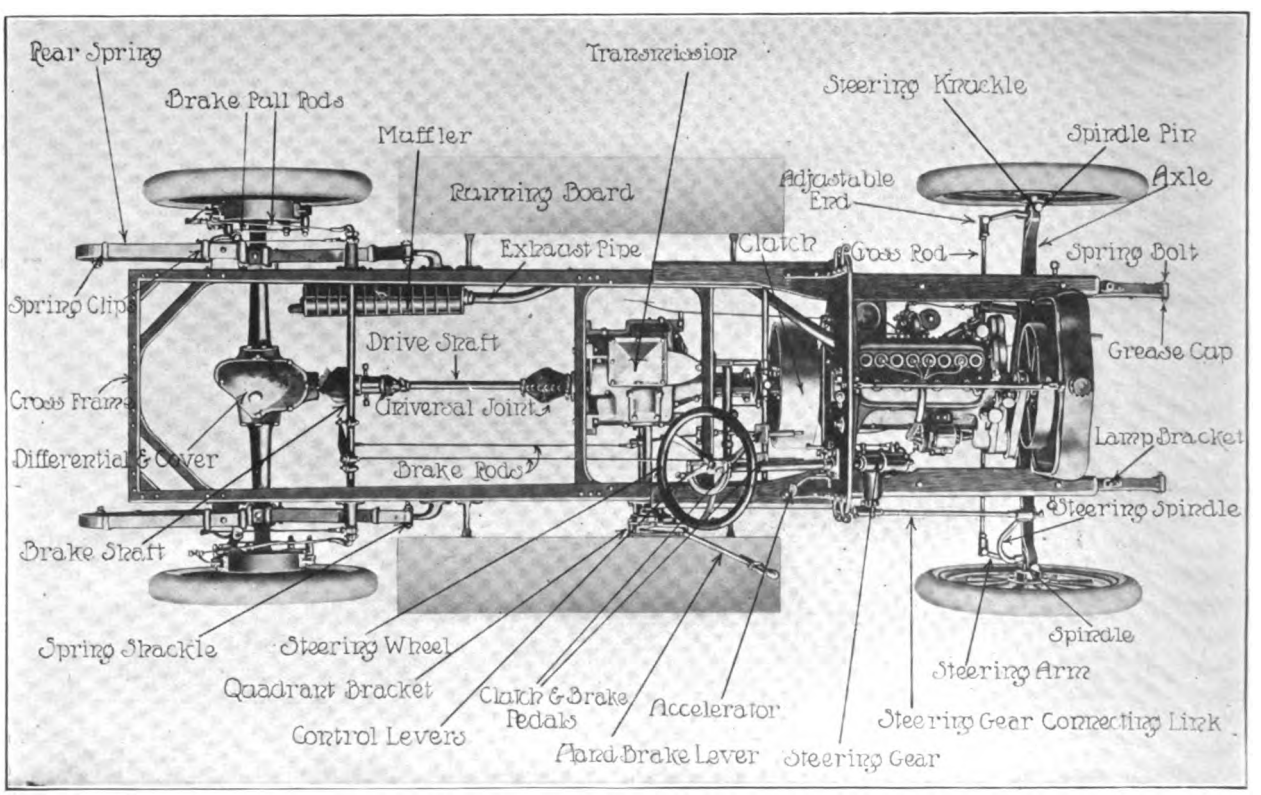


Fig. 6—Depicting the Components of a Chassis and Their Location to Facilitate the Work of Overhauling.

may be obtained at any carriage supply house. It is an excellent idea to take the old member when making the purchase to insure obtaining the correct size.

The spring pads should be looked over and it may be possible that one is broken. This will necessitate sending the axle to a welding concern. If the leather or canvas pads are damaged new ones should be made. In disassembling a spring it should be placed in a vise and the jaws of the latter compressed firmly. The retaining spring bolt is then removed and the vise opened slowly. In taking the leaves apart they should be marked so that they will not become mixed as each is bent to a special shape. The leaves should be marked with a prick punch, one dot on the outside edge of each leaf of the right hand spring, and two dots on the outside edge of the left spring. The springs should be cleaned thoroughly and lubricated with a paste of graphite and oil and plenty of the former should be used. In reassembling the leaves the vise is utilized as before. In replacing the springs upon the axle the spring clip nuts must be good and tight. The grease cups and grooves should be cleaned out and new lubricant inserted.

It will be found that springs that have been properly treated with lubricant will afford easier riding qualities than before. In overhauling the springs it may be found that the spring eyes are considerably worn and the bolts as well. New steel bushings may be made and forced in and in fitting new bolts provision should be made for the passage of lubricant. There is considerable wear to these members if they are not constructed of the proper material, and if grease cups are not provided it is an easy matter to drill and tap for the fitting of these members, taking care to make provision for the passage of the grease to the bearing parts.

Overhauling Rear System.

The labor involved in overhauling the rear system will depend upon its design and condition. It is difficult to disassemble some types, especially old styles of cars which are fitted with ball bearings of the same design as those employed in the front axle. The writer recalls particularly a car built in the early

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part of the '90's on which the use of the blow torch, drill and cold chisel were necessary to remove the races. The modern rear axles, however, present lit-

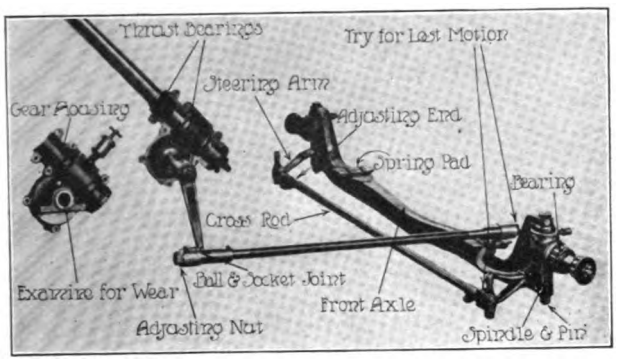


Fig. 7—Showing the Steering System and Components of the Front Axle Which Are Subject to Wear.

tle difficulty in taking apart and assembling if the amateur will study their construction before attempting the work.

Several conventional types are depicted at Fig. 5 and that at B is easily taken apart and adjusted, it being of the full floating design. The rear axle may have the transmission with it as outlined at A, or the construction may be as shown at C. That at A permits of the removal of the differential and driven axles without jacking up the wheels which will be necessary with the other types.

Care should be exercised in handling the components of the rear axle and they should be marked if in doubt as to their assembly. Assuming that an axle similar in design to that at B is to be overhauled, the frame should be jacked up until the wheels are almost clear of the floor; that is, if the springs are to be removed and treated as were the front members. The driving shaft is next disconnected and spring clips removed. Having made sure that the connections are all clear, the axle is rolled out, taking care that the exposed end of the differential member does not drop to the floor in the process. The old lubricant should be drained out of the differential housing and the cover removed. Before taking out the differential the driven axles should be slipped out, and this is accomplished easily.

Before disassembling the differential it should be washed with gasoline so that the adjustments of the crown and pinion gear may be noted and if not marked they should be, to insure correct meshing in the assembly. The ball bearings should be examined carefully for wear and if the crown or pinion gear is burred the rough places should be removed with a file. If the gear be hard, as it probably will be, emery or carborundum may be used with an old file. If the gears are worn new members should be fitted as the use of a new pinion with an old crown member is not recommended. After disassembling the rear axle an examination may be made of its components and a decision arrived at as to what parts, if any, will be necessary. If the amateur is in doubt some mechanical friend with a shop training can generally be found who will help with his advice, which will also have the merit of being disinterested.

Other Types of Axles.

Some machines have the transmission and rear axle as a unit as shown at A and the axle casing or housing in halves. The latter should be taken apart carefully, as the differential and crown gears may fall out suddenly with a gush of grease and oil. It is a good plan to steady the axle upright on one of its ends, and after the bolts holding the two halves together have been removed, the upper half can be lifted off, leaving the differential and crown gears lying in the lower half. A sharp lookout should be kept for ball races, thrust washers, or loose balls that may tumble out of the upper half as it is lifted away and which may be lost in the mass of grease and oil.

Axles similar to the design shown at C and connected with the transmission by a ball and socket arrangement are released by removing the nuts from the studs securing the retaining plate and by rolling the rear system out from beneath the chassis. In the examination of the components of the rear system the torsion rods should not be overlooked and any misalignment or extreme play should be remedied. Particular attention should be paid to the truss rods and these members should be snug but not too tight. They are usually equipped with turnbuckles which makes adjusting an easy matter.

Meshing the Gears.

After the necessary work on the axle has been completed it may be set up and new cotter pins used throughout, as well as new wire where the retaining nuts and bolts of the differential are thus retained. Some cars are so constructed that the meshing of the gears may be done with the axle assembled while

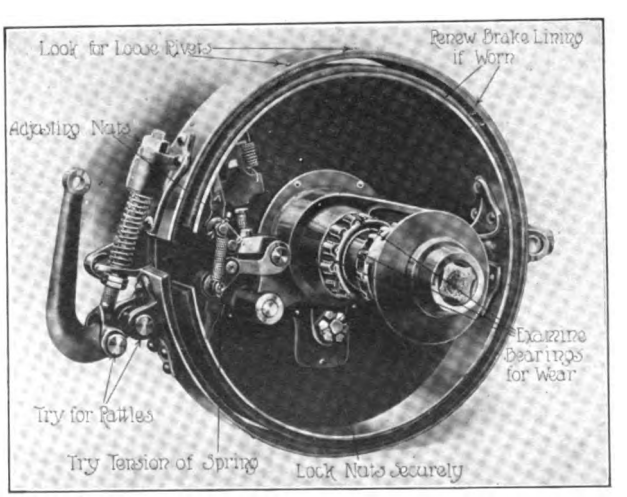


Fig. 8—A Conventional Type of Brakes, Illustrating Adjusting Members and Their Assembly.

others have to be set by "feel," or as one might say, by guess. The depth of the meshing on the teeth of the crown and pinion gear cannot be altered in any

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scientific way by either longitudinal or lateral adjustment alone. Considered theoretically the adjustment should be by a combination of the two so ar-

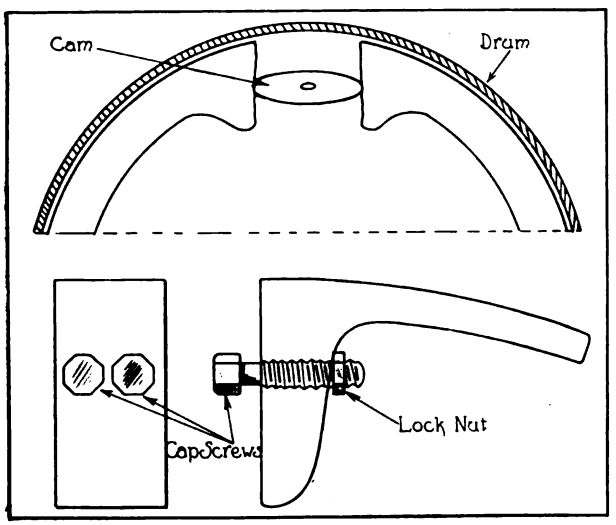


Fig. 9—Method of Repairing Expanding Brakes When Cams Are Badly Worn.

ranged that its direction is at right angles to the cone radius. Practically speaking, however, not much more can be done by the amateur than to adjust, then slacken a little beyond the point where the pinion turned by the hand with the wheels jacked up runs freely, with no binding or sticking. A certain amount of backlash will be perceptible in even a new axle. If the bevels hum unduly upon the road a slight modification of the adjustment should be tried, and if they were reasonably quiet before the overhaul they should be set up again as they were.

If the car be of the chain driven type the sprockets and chains should be cleaned and examined for wear and both replaced with new members if necessary. A new chain will not give satisfaction on an old sprocket or vice versa. Chains should be washed in gasoline and kerosene and boiled in a combination of mutton or beef tallow and graphite. This will penetrate the bearings and tend to keep out foreign elements.

Care of Brakes.

The brake linings should be looked over during the overhaul of the rear axle and if they be worn, replaced with new material. In riveting the new lining the holes should be countersunk so that the heads of the holding members will be well below the surface of the material. Some adjustments and repairs to brakes are suggested at Fig. 8. There are cars, however, which are fitted with the expanding type and the cams and blocks are so badly worn that further adjustment is impossible. At Fig. 9 is presented a plan of utilizing cap screws when the cam member is worn. The drum member is drilled and tapped and the screws fitted and held by a lock nut as depicted. If metal-to-metal drums are employed and worn they should be replaced with new ones. The springs actuating the parts should be tested and if they have lost their elasticity new ones should be fitted. Brakes are important, especially on a car with the sliding gear transmission and the amateur cannot be too careful in the overhaul of these members.

In the overhaul the muffler and exhaust pipe are frequently overlooked by the amateur who is apt to consider these components self-cleaning because of the pressure of the expanding gases. The novice will be surprised to note the amount of soot or carbon which collects here, obstructing the flow of the gases, also decreasing the power of the motor. The proper method is to disassemble the muffler to displace the accumulations, but the silencer may be cleaned by tapping it with a wooden mallet and emptying its contents. The pipe leading from the exhaust manifold to the muffler ought to be treated in a similar manner.

The frame and its cross members should be examined for cracks or breaks, and these welded. Parts held by rivets should be inspected, for these have been known to shear off or loosen. During the work of overhaul the tires and inner tubes should be looked over and sent to the tire man for needed repairs. The rims should be cleaned and while some advocate painting these members the writer utilizes a mixture of graphite and oil and polishes the rims thoroughly. This is water proof and prevents a shoe from freezing to the rim.

Lining Up the Wheels.

As adjustments have been made to the tierod, the wheels should be tested for alignment; in fact, it is an excellent plan even if parts have not been disturbed. A method is outlined at Fig. 10 and consists of stretching two pieces of string or cord across four chairs or boxes as indicated. The string is laid so that it is about .125 inch away from the tires and

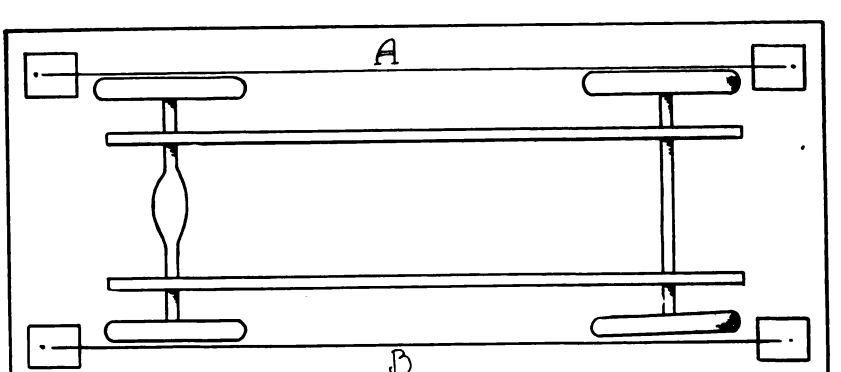


Fig 10—Illustrating How Alignment of Wheels May Be Tested with String Stretched on Chairs or Boxes.

it should be on a level with the floor at the height of the axles or above them. The two strings should be parallel, the same distance apart at one end of the car

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as the other; that is, if the front and rear axle are the same width. They also should be parallel with the side members of the frame of the machine.

The distance between the twine and the felloes of the wheels is measured on both side of the car. If a difference exists the wheels are out of true or misalignment is present. If the wheels be true the string will be as depicted at A. In assembling the tie-rod misalignment may be present as shown at B. Here the right front wheel is toed in and this should be corrected. The front wheels should toe in a trifle, about .125 inch for both; that is, the distance between the front of the wheels should be .125 inch less than that of the rear. Misalignment of the rear wheels may be detected by the string method and if any exist should be corrected. A little study of the diagram will enable the amateur to check up the alignment.

Testing Out the Car.

Before replacing the body the car should be taken out on the road and tested. It is an easy matter to make a testing seat by utilizing a couple of iron supports, bolting these to the frame and fastening a a board to them. A chair minus the legs may be bolted to the board, although this is optional. If the fuel tank is fastened or secured in the body, an emergency tank be made by soldering a metal tube to the side of a can and connecting it with the carburetor by a metal tube or rubber pipe. The screw cap of the can should be perforated to provide a vent.

Before starting out care should be taken to try the brakes and note if there is plenty of lubricant in the crankcase and oiler. The latter should be adjusted to feed more oil than ordinarily. During the first few miles of the testing trip the car should be driven slowly and carefully, and any strange noise should be investigated before trying its speed and hill climbing abilities. If no trouble develops the car should be returned to the garage and all nuts gone over. It will be found that some may be taken up a trifle. Minor adjustments probably will be required and these may be made more easily than if the body were returned before testing.

In replacing the body the bolts and nuts should be examined and if the threads are poor new ones should be fitted. In connecting up the fuel line each connection should be inspected for possible leaks and it is a good plan to drain off a little gasoline at the carburetor to remove any foreign elements which may be present in the piping. Lack of space prevents the writer from going into details regarding minor adjustments but these should be accomplished by anyone who has had experience in operating a motor car. Regarding the replacement of the accessories, this may be done without any suggestions other than that the speedometer cable and connections should be looked over for wear and lost motion, and the grease cups or lubricators utilized in connection with this device emptied and refilled. Overhauling the motor car not only increases the knowledge of each component but is a great saving in repair bills, to say nothing of the confidence developed in driving.

ENGINEERS TO MEET IN DETROIT.

The Society of Automobile Engineers has decided to hold its regular midsummer meeting in Detroit, June 27-29. This is in keeping with the policy of the organization to divide its meetings between the East and West.

RESPONSIBLE FOR COLE SUCCESS.

The remarkable success of the Cole Motor Car Company, Indianapolis, Ind., makes it interesting to consider for a moment the personality of the man behind the institution. President J. J. Cole, whose photograph is presented herewith, has been identified with the manufacture of Cole cars since the inception of the company. Heretofore, he has delegated the selling end of the business to others, devoting his entire time and attention to the production of cars, and as a result the various Cole models have represented the best that J. J. Cole was able to put into them.



J. J. Cole, President Cole Motor Car Company.

He is a modest man, little given to discussing the part he has played in the development of a successful business. The secret of his plan appears to have been the concentration of effort. During the period necessary for building up a business of this magnitude, it was his idea that a separation of the manufacturing and selling ends would result in permitting each employee to give better attention and more time to his individual duties. The wisdom of this suggestion is found in the splendid foundation of the Cole selling organization, backed by a coterie of Cole distributors and agents, which is hard to equal.

Under the new arrangement, which will go into effect July 1, the Cole Motor Car Company is to take over the sales branch, heretofore conducted under the name of the Henderson Motor Sales Company, but it will retain its individuality as before. President Cole will continue to devote his time and attention to manufacture, while the sales end will be in charge of Charles P. Henderson, as sales manager.

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TESTING REGISTRATION LAW.

It is not surprising that the motorists of Mississippi have decided to test the constitutionality of the recently enacted registration statute. That commonwealth has had no such law until the present, but the automobile owners have had abundant opportunity to see how the plan works in other sections of the country. It is understood that they do not object to the tax if it is so labelled, but they do object to a registration fee for highway improvement, unless the same action is taken with respect to horses, mules and ox teams.

This appears to be a point which has not been determined legally, simply because the motorists of other states have been content to submit to such laws through their interest in good roads. The time is rapidly approaching, however, when it will be necessary for somebody to take the initiative in carrying the point to a court qualified to settle the matter definitely.

There can be little doubt that horse drawn vehicles, and the entire public, reap the benefits from good roads. With the general use of motor trucks in commercial haulage, this position will become more and more apparent. If other states shall follow the example of Massachusetts, for instance, in attempting to restrict the use of mechanical transports, it will become absolutely necessary to have the courts define the status of such vehicles. Motorists everywhere will watch the outcome of the Mississippi case with interest.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

PUBLIC AUTOMOBILE SCHOOLS.

The suggestion of Mayor Fitzgerald of Boston, relative to the establishment of classes for instruction in automobile driving in the public schools, is worthy of serious consideration. The trend of the times is toward the teaching of subjects which will be of practical value to the child in after life, and it would seem that a thorough knowledge of the motor car and its components is of decided importance when viewed from this standpoint.

There can be no disputing the fact that the automobile is the modern method of transportation. This holds true particularly of the business world. Of course, it will be argued that the young men have an excellent opportunity before them for securing profitable employment as private chauffeurs, but they are quite as likely to realize upon their investment as operators of mechanical transports.

In addition, it has been demonstrated that the more an automobile owner knows about his machine, the less liable he is to disregard the rights of others, partly because he realizes that careless driving tends to increase the cost of motoring. It follows that if the next generation begins active life with a thorough working knowledge of the motor car, the dangerous operator will be eliminated, correspondingly.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

MONEY FOR GOOD ROADS.

The people in at least two states, New York and Maine, will have opportunity at the next general election to express their desires with respect to the use of large sums for the construction and maintenance of improved highways. This is a somewhat new departure and the outcome will be watched with interest.

The plan calls for issuing bonds, and appears to be based on the proper principle that the welfare of the whole people demands better means of trans-

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port. Heretofore, motorists have been expected to meet the entire expense of good road construction and maintenance, the amount of work to be done depending upon the fund which could be accumulated by increasing the registration fees on automobiles.

Maine has discovered that it pays to induce tourists to visit that commonwealth, just as some of the countries of Continental Europe have learned this same fact. Evidently, there has come with this new knowledge a realization of the injustice of compelling one class of its residents to pay the entire cost of securing this added business prosperity. The whole electorate is to determine whether or not Maine shall continue to foster this tourist trade.

Much the same condition prevails in New York State although not in such a marked degree. And it may be added that this rule might apply in other commonwealths as well. Motorists should watch the outcome of this new plan in these two states, and unless the results are very different from what is expected, they should see that their own legislatures are urged to adopt the same provisions another year.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

SAFEGUARDING AEROPLANES.

The discovery of Louis Bleriot with reference to the need for greater strength in the upper guy wires of monoplanes is one of the most important yet made in the study of aerial navigation. It hardly is to be doubted that the same conditions apply, at least in a measure, to the biplane, and it is probable that safeguarding aeroplanes in the manner suggested will be a long step forward in the field of aviation.

Much as it is to be regretted, it seems that progress in any line of endeavor is destined to be at the expense of human life. Those who confine their comment upon this subject to the number of accidents which have resulted in this newest science, lose sight of the fact that there remain certain unsolved problems in other fields. It is only necessary to recall events of the past two weeks to demonstrate this position.

It can be regarded as established that the aeroplane has an important part to play in the future development of the world. The Wright brothers and other pioneers have contended from the first that it can be made as safe as any other form of conveyance. It only remains to find the weaknesses and remedy them as they shall be made apparent. Wonderful progress has been made within the past year and a half. The latest discovery is along the same lines as others which have been overcome in a manner similar to that suggested in this instance.

Experimentation must be made along the lines of practical endeavor. There is a hopeful sign in the absence of altitude records and other so-called circus stunts during the past few months. The success of the aeroplane appears to hinge upon its ability to perform feats of stability and endurance. Practically all of the constructors are now, and have been for some time, working along these lines.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

THE TOURING SEASON.

There is every indication that 1912 is to be the greatest touring season the automobile industry has known. Business organizations throughout the entire country, and particularly in the West, have been extremely busy during the past winter in formulating plans which shall offer special inducements to American motorists, that they be encouraged to spend their vacations at home. "See America First" has become a national watchword.

The need for more uniform motoring laws has been remedied in a measure, but there is yet much to be done. Several legislatures, where work of this nature can be done most effectually, did not meet this year, and while many of those who did convene failed to enact expected legislation, the condition is much more satisfactory than ever before.

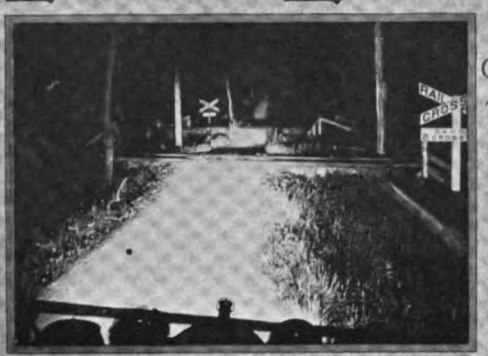
Perhaps the most important result of all is the reciprocity provision in the New Jersey law. The victory in this one state is sufficient to offset the failure to secure more liberal statutes in others. And when the whole situation is summed up, there is cause for congratulation in the fact that no state, thus far, has seen fit to change its regulations to the detriment of motoring. Of course, Massachusetts is yet to be heard from in this regard.

A word might be said with respect to universal lighting, easily one of the most important subjects affecting highway safety. Motorists will do well to agitate this subject energetically during the coming year.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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Electric Lighting of Motor Cars



Outlining Various Systems Employed and Methods of Operation.



By C. P. Shattuck



Part VI—The Rushmore Lighting System.

IT HAS been pointed out that the current output and voltage of dynamos of the ordinary type vary with the rotative speed of the armature, this fluctuation being due to the constantly changing speeds of the internal combustion engine propelling the automobile. Designers of electric lighting systems applicable to the motor car have overcome this difficulty by incorporating different devices to regulate the current flowing to the battery or lamps or both, and several of these types have been outlined in previous installments. When a mechanical generator is employed to

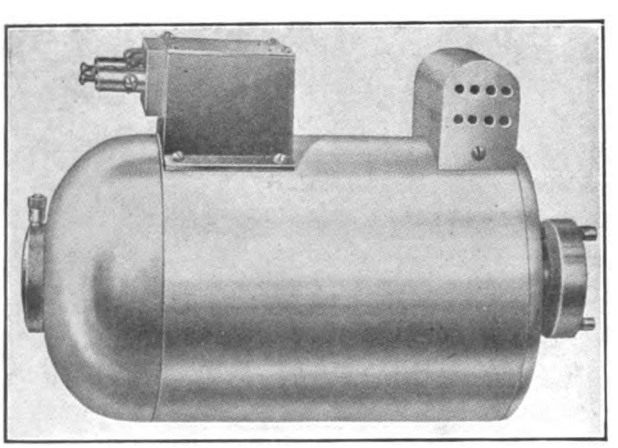


Fig. 40—Rushmore Dynamo, Having but One Moving Part, Which Supplies a Substantially Constant Current and Is Self-Regulating.

charge storage batteries and the latter utilized to supply current to the lamps, a substantially constant current is desired although the commercial battery of today permits of some variation.

Control of Current.

A device for controlling the charging current, which differs from those of ordinary construction, is noted in the electric lighting system manufactured by the Rushmore Dynamo Works, Plainfield, N. J., which produces a variable speed, constant current generator for motor cars and trains. It consists of the application of the high positive temperature resistance coefficient of iron and is the discovery and patent of S. W. Rushmore, who after much experimentation, found that iron possessed the desirable property of increasing greatly in electrical resistance from a certain critical temperature just below red heat. Below this point it is stated that the resistance is practically constant, and at or beyond, it increases and is augmented with each degree of temperature. While a thin coil of wire might be inserted in the circuit it was found that the surplus energy was wasted in heat at higher speeds and that a heavy machine would be required, since the shunt field winding would receive the full voltage normal to the speed at any moment.

Between the armature brushes of the generator and the storage battery to which it supplies current, is connected an iron wire resistor, the resistance of which increases rapidly when the current exceeds a certain value. An indication of this characteristic as claimed by the inventor is presented at Fig. 43, the curve showing that the voltage across the terminals of the resistor increases from 1.5 to 7.5 when the current increases from 12 to 16 amperes; that is to say, with an increase of 33 per cent. in the current the resistance increases 375 per cent., and the consumed voltage by 400 per cent. Thus even with constant field excitation, automatic increase in the resistance of the resistor would tend to limit the current delivered by the generator to the battery, although with extreme variation in generator speed, as with motor cars, the energy loss in the resistor would be excessive.

Function of Resistor.

The increase in voltage across the iron wire resistor is also used to produce a proportional decrease in the field excitation, so that the voltage of the generator tends to remain nearly constant, independent of the speed at which it is driven, and it is claimed that the energy loss in the resistor is but a small proportion of the total output. In shunt with the iron wire resistor is a field coil, the electromotive force of which is in a direction to oppose that of the

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main field coil which is connected directly across the terminals of the battery.

The resistance of the field or "bucking" coil is considerably greater than that of the ballast resistor when the latter is cold, or slightly heated. When the ballast resistor becomes heated with current its increased resistance forces the bulk of the current delivered by the generator to pass through the "bucking" coil, thereby augmenting the counter excitation produced by the latter. As the strength of the magnetic field is due to the difference between the exciting effect of the main shunt field winding and the "bucking" coil, by suitably proportioning the latter and the ballast coil to the other elements, it is claimed the variation in the current may be as small as desired.

At Fig. 40 is depicted the dynamo, which is designed to produce a small battery voltage at speeds of the automobile engine as low as 200 revolutions a minute. At higher speeds the current, but not the voltage, increases rapidly until about 12 amperes is reached, this corresponding to a car speed of about 15 miles an hour. At higher ratios the current remains approximately constant and the maximum is 14 amperes.

Components of Dynamo.

The dynamo is made in two sizes and these are numbered 1 and 2, respectively. The former is recommended for ordinary purposes and operates at from two to 2.5 times the crankshaft speed of the gasoline engine. Its capacity is 12 amperes at 6.5 volts and the instrument is eight inches long, exclusive of coupling, 5.5 in diameter and weighs 24 pounds. The other model delivers 15 amperes at 6.5 volts, is 10 inches long, six in diameter and weighs 35 pounds. This generator is driven at or about motor speed.

The dynamo has but one moving part, that of the armature, and the entire field magnet circuit, which also constitutes the main frame, is a simple steel shell, which is produced by cutting off and reaming to size a section of standard cold drawn seamless tubing. An end view of this member is shown at Fig. 41 A and the location of the field coils and drawn steel pole pieces is also outlined. These components are illustrated at B and C, respectively. The pole pieces are sections sliced off a steel bar cold drawn to exact shape. The field coils are wound in metal forms and are held in place by the pole members which they surround. The brass end castings, which carry the brush holders and ball bearings are shown at F and the simplicity of the parts and method regulating the tension of the brushes upon the commutator will be noted.

Automatic Cut-Out.

An automatic cut-out of the conventional type is provided, this member serving to connect the dynamo to the battery when the proper speed is reached, also to disconnect it when the voltage of the generator falls below that of the battery. This device is depicted at Fig. 42 A, and prevents the battery from discharging through the dynamo when the voltage of the latter is less than that of the former. The regulator is mounted upon the top of the dynamo in a little iron box, making for compactness and simplicity. The only device to be mounted upon the dash consists of the switch shown at B so that when current is not desired from the generator the field circuit is opened. It is a simple four-pole charging switch which is arranged to open both the main supply and dynamo field circuits, so that the generator runs "dead" and it is claimed that it consumes no power when not in service.

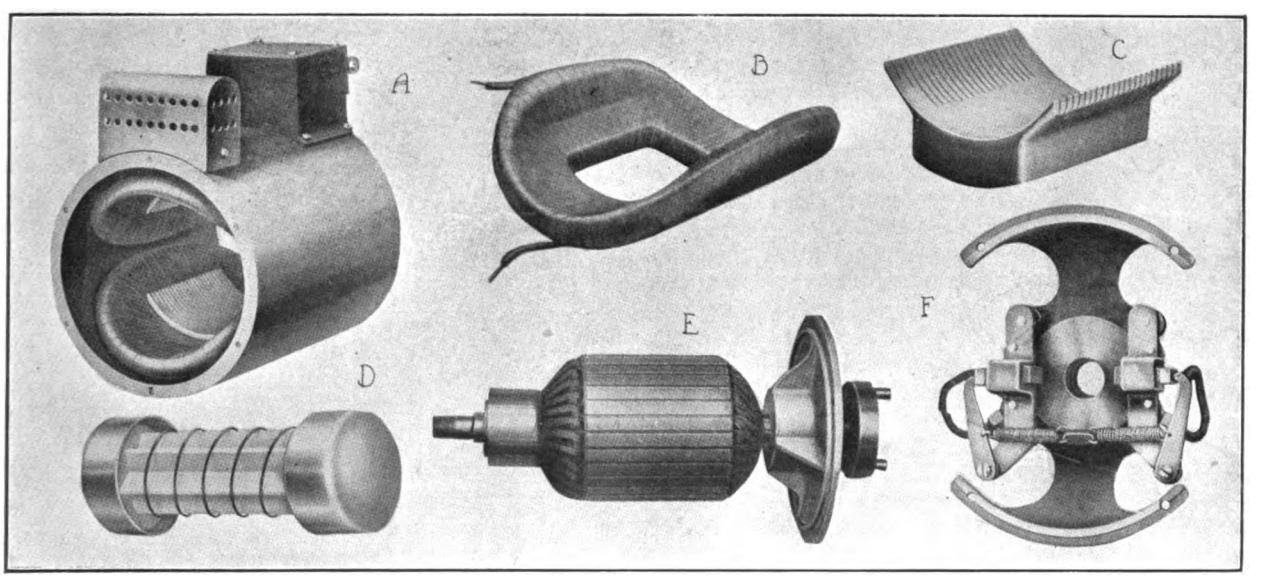


Fig. 41—Components of the Rushmore Dynamo: A, End View Showing Field Coil and Pole Piece, B and C; D, Ballast Coil; E, Armature; F, End Bearing and Brush Holders.

Operation of Ballast Coil.

Although the Rushmore dynamos are rated at

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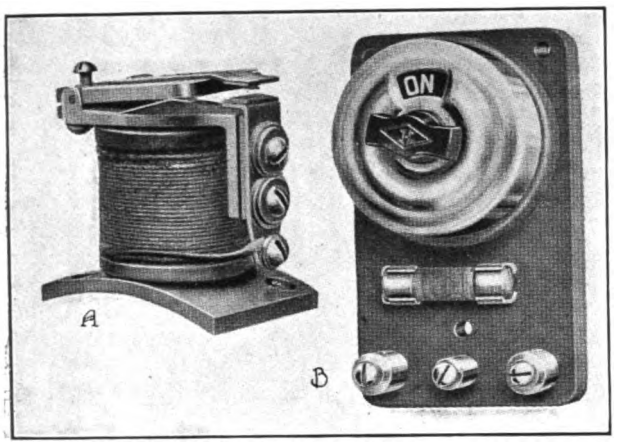


Fig. 42—Controlling Members of Rushmore Equipment: A, Automatic Cut-Out; B, Dashboard Switch.

their maximum normal output, they may be adjusted easily to give the current output desired. By simply removing the little iron ballast coil, which is shown at Fig. 41 D, and which is in the form of a cartridge fuse, the dynamo becomes a simple differential machine and will deliver practically a constant current of about 4.5 amperes at all speeds. The effect of the ballast coil is to form a shunt across the terminals of the field or "bucking" coil, and by providing spare ballast members of different capacities the machine may be regulated to deliver a current of a few amperes. This arrangement makes for a low consumption of current when the car is operated about the city and when the side and tail lamps are in service.

It is held by the maker that the dynamo requires no other attention than oiling a few times each season, that as all parts are fully enclosed it is impervious to moisture or foreign elements, that there is no sparking at the brushes and that these members and the commutator do not require any attention whatsoever. The instrument may be used readily in connection with a storage battery ignition system and the usual magneto discarded. When used as such the change involves but the altering of the magneto platform to meet the requirements of the dynamo. The maker recommends mounting the latter by boring its supporting platform to the radius of the field shell, and clamping the instrument by means of a holding strap.

It is pointed out that owing to the fact that the current, and consequently the voltage, remains nearly constant with increasing speed, the torque required to drive the dynamo actually decreases with this increasing speed. If a belt be employed it is only necessary to drive the dynamo without slipping at a speed corresponding to about 600 revolutions of the crankshaft of the gas engine, at which speed the ballast coil reaches its critical temperature. From that to the maximum speed the torque will fall off almost directly as the rise in speed, in spite of the slight increase in current and voltage, and this pronounced decrease in torque is said to more than offset the decreased belt cling due to centrifugal force.

Suitable Battery.

Any standard 80 or 100-ampere, six-volt battery may be utilized with the dynamo, the equipment not including these members or lighting switches, wires or lamps, although the company manufactures an excellent line of head, side and tail lamps. The latter are fitted with tungsten bulbs of two candlepower while the side members are equipped with two or four candlepower bulbs. The headlights are furnished with 15, 20 or 25 candlepower lamps, although on special order members are constructed for lamps of 50 to 75 candlepower.

(To Be Continued.)

REDUCTION IN TIRE PRICES.

A further reduction in tire prices, ranging from 20 to 25 per cent. went into effect with most of the manufacturers throughout the United States early in the month. The price of crude rubber and increased factory facilities are given as the reasons for the change.

CLEVELAND AUTOMOBLE CLUB.

The Cleveland Automobile Club, Cleveland, O., has undertaken a membership campaign, in which it is issuing a neat folder setting forth 12 pertinent reasons why motorists of that city and vicinity should become identified with this progressive organization. The officers of the club are: President, Fred C. Wood; vice president, Thomas P. Cagwin; treasurer, W. H. Wherry; secretary, Fred H. Caley; directors, W. C. Baker, F. J. Baird, H. M. Adams, T. P. Cagwin, M. L. Lawrence, R. C. Wetmore, W. H. Wherry, H. L. Vail and F. C. Wood.

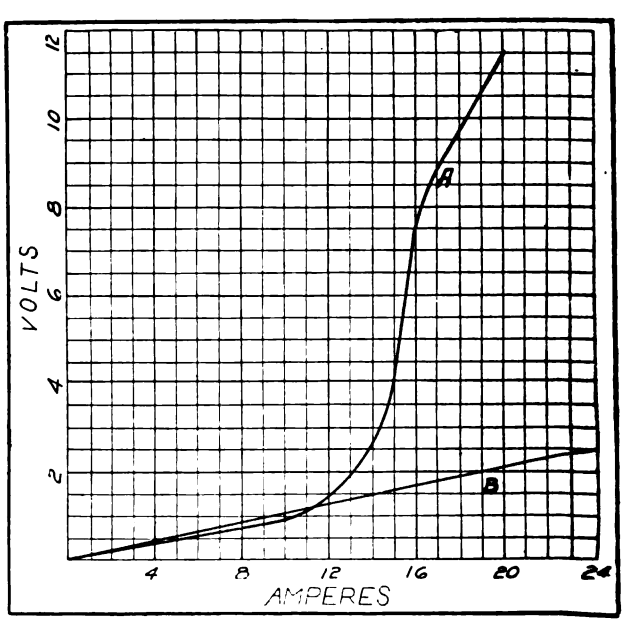


Fig. 43—Outlining Action of Rushmore Resistor: A, Curve Showing Effect of Increasing Current on Ballast Coil; B, Depicting That of German Silver with Increasing Current.

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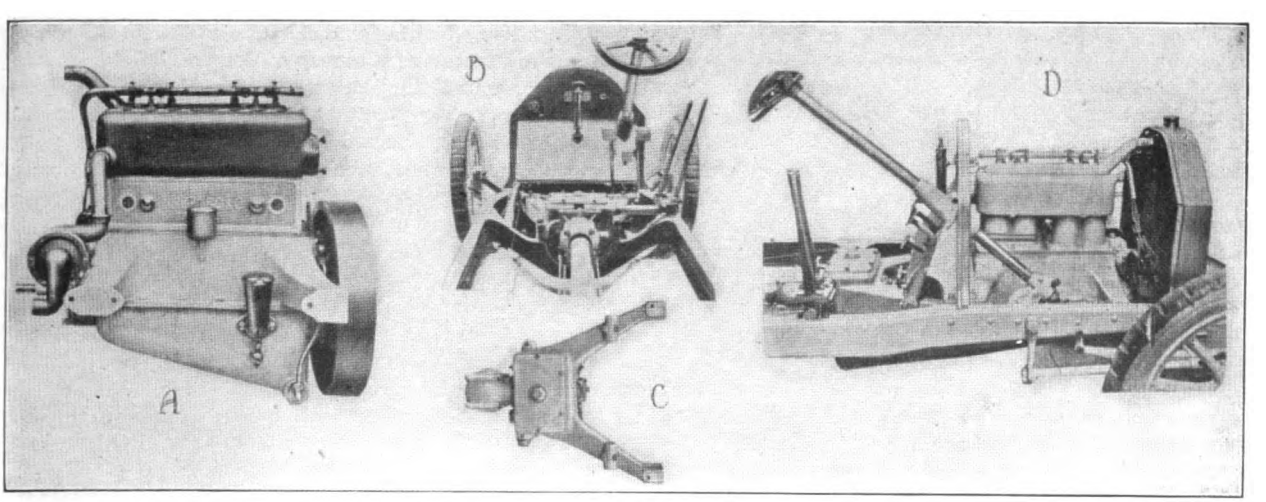


Considerable interest has been manifested in this country concerning the new car upon which Felice Nazzaro of Italy has been working during the past year. The numerous racing events in which Nazzaro has taken part in the United States have served in a measure to bring his work more generally to the attention of the American people, and it also is remembered that he has been studying matters of design in some of the best known plants here. The Nazzaro chassis does not reflect many American ideas, however, and may be regarded as entirely new. Accompanying illustrations set forth some of the distinguishing features.

The chassis is fitted with a four-cylinder motor, cast en bloc, with bore of 100 mm and stroke of 140 mm, rated at 20-30 horsepower. All valves are on one side, neatly encased. The Bosch magneto is driven from a cross shaft in front of the engine, on the other end of which is the water pump. The oil pump is driven separately off the camshaft, and is of the rotary gear type. Oil is circulated through the hollow crankshaft and the pump is easily detachable. The two-jet carburetor is so located that the mixing chamber is encased with the valve operating mechanism between the second and third cylinders, and only the float chamber is visible until the cover plate is removed.

The clutch is of the multiple disc type, and can be removed without disturbing the four speed gearbox. The latter is very small, and like the motor is suspended at four points. Though quite an independent unit, it is to all intents and purposes one with the engine, as it is carried at the back on the top of the central inverted arched member of the main frame, and in front by two wide spreading arms which are bolted to the chassis frame sides and abut against the two rear arms of the crankcase. The engine and gearbox are further united by the cast aluminum dash and the rear of the bonnet, which has wide spreading feet that bolt to both engine and gearbox arms. By this arrangement both units are kept in alignment, although it is said that either may be removed without disturbing the position of the other.

The inverted arch mentioned is the only cross member of the frame, except those at the extreme ends. The propeller shaft is enclosed in a tube with a spherical front end, which takes the driving thrust to this central frame member and also serves as the torque tube. The bevel driven rear axle is of the sleeve type, and these sleeves are of pressed steel.



Features of Nazzaro Chassis: A, Left Side of Motor; B, Inverted Arch Construction on Which Gearbox Is Suspended; C, Gearbox with Wide Spreading Arms; D, Right Side of Dash and Motor Assembly.

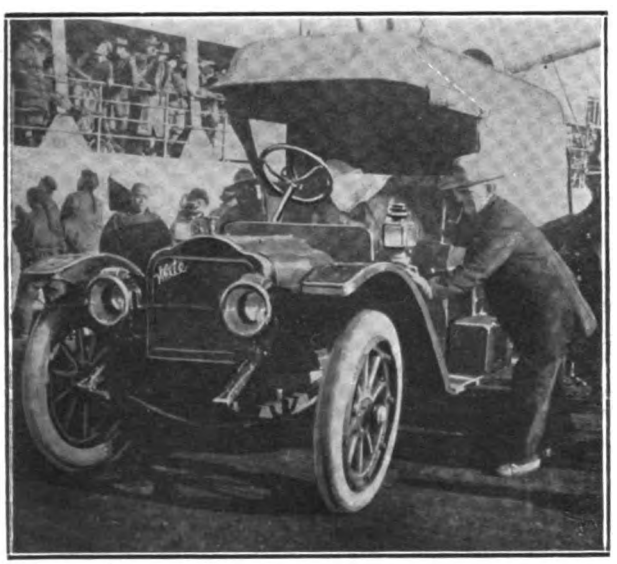
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The universal joint within the spherical head of the propeller shaft casing is hung on ball bearings. The rear springs are three-quarter elliptic, and all brakes are located on the rear wheel hubs. These are of the expanding band type, and are placed side by side in a large flanged drum in either wheel, these latter being of hollow stamped steel.

★

The progressiveness of the preesnt government of China is being reflected in its interest in automobiles. Great Britain reports that many inquiries for information have been received from all parts of the new republic, and it would appear that a splendid market is to be opened there in the near future.

Pleasure cars have been in more or less constant service in certain sections for some time, but the first truck to appear in northern China was the White, made by the White Company, Cleveland, O., and shown in the accompanying illustration. This machine is



White Truck at Chin Wang Tao, North China.

owned by the United States government and is in constant use in the Philippines, along with many others of the same make. When the American forces were sent to China during the recent disturbances, this car was sent with them as a commissary wagon.

The photograph shows the machine upon its arrival at Chin Wang Tao, as it was being prepared for its journey inland. As might be expected, it attracted widespread attention from the natives and it hardly needs to be added that the business men of the new China watched its performance with much interest.

★

Members of the Royal Automobile Club of Great Britain report that upon a recent visit to France they were informed that visitors staying at a hotel "en pension" must give three days' notice to the proprietor, or the latter is entitled to charge for three full days' board for the entire party. Inquiry among the legal fraternity in Paris results in the statement that it is the custom in France to accept notice given on any day before noon, and that any demand for three days' notice is not recognized in law. Motoring tourists are advised to be on the guard in this matter.

★

Eight years ago Miss Laura B. Starkey of Eastbourne, England, took her first lesson in driving a motor car, being among the first women in the British Isles to take up motoring. Her first machine was a 6.5 horsepower Peugeot, in which she took at least one long drive of 140 miles. Miss Starkey has just received her sixth machine, a 12-16 horsepower Sunbeam, with seating capacity for five persons.

★

Christchurch, New Zealand, has been enjoying its first reliability run, in which the contestants covered 300 miles, crossing numerous rivers and traversing rough mountainous country. Three Minerva cars finished first, second and third.

★

The first commercial vehicle operated by the banana growers of Jamaica was purchased recently in Baltimore, Md., this being a three-ton KisselKar, made by the Kissel Motor Car Company, Hartford, Wis. The results were so satisfactory that a repeat order has been placed with this concern for two more machines of the same capacity. The success of the American car in this work has aroused the interest of British manufacturers who already have begun to exploit the market.

★

The Chilean government has reduced materially the duty on automobiles, the new law going into effect last month. Under the present arrangements customs officials will collect 15 per cent. ad valorem instead of 60. The old classification was under the general heading of vehicles, while the new law provides specifically for motor cars, and it would appear that there is to be increased activity in the exploitation of such machines for all classes of service.

★

Flanders Colonial electric cars, made by the Flanders Manufacturing Company, Pontiac, Mich., are to be represented in Palestine, St. Petersburg and Christchurch, New Zealand, under a new arrangement which has been perfected by C. Piquette Mitchel, manager of the foreign department of the company. In addition, it is reported that this concern is doing a splendid business in Germany and France.

With regard to electrics, Mr. Mitchel says that foreign purchasers recognize that America leads in all branches of electrical development and that the pleasure cars of this type made in the United States are conceded as being far in advance of those constructed abroad. He adds:

"It is a fact not generally known that in several German cities gasoline cabs are not permitted on the streets. Electrics therefore have a great advantage. Inasmuch as we do not produce cabs we cannot avail ourselves of this peculiar condition, but we find that the legislation against vehicles for hire also has mili-

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tated against gasoline pleasure vehicles for city use there, and the electric with its silence and freedom from smoke and oil is rapidly growing in demand.

"Another feature of the Flanders electric that appeals to Europeans is the worm drive. That form of transmission has been much in favor abroad for some time, though we were the first to adopt it in America. Its absolute silence, its greater efficiency, its cleanliness and other advantages over chains and gears are recognized there, as these qualities are rapidly becoming appreciated at home."

★

An automobile course for police officers has been instituted at Vienna by the police presidency, and 180 officials have entered as pupils. The lessons comprise both theoretical and practical instruction, and conclude by the actual driving of cars.

★

The South African Mining Journal of Johannesburg, South Africa, states that the trade in motor cars in that city and vicinity is decidedly brisk, and that there is a good market for prominent makes of machines. The great demand is for cars costing about $1000.

★

The city council of Melbourne, Victoria, Australia, will receive bids until May 15 at 2 in the afternoon, for one electric motor car to accommodate three persons and capable of maintaining when fully loaded an average speed of 20 miles an hour, and two electric motor wagons complete, to carry loads of 2000 and 1000 pounds, respectively. Sealed bids are to be received by the Chairman, Electric Supply Committee, Town Hall, Melbourne.

★

The report of the Hungarian postal authorities for 1911 indicates that the experiment of utilizing motor vehicles has proved a decided success. Several additional light, fast, pneumatic tired vans have been ordered from the Benz-Werke Gaggenau. The first use of motors in the collection of mail in Hungary was begun in 1902, these being motorcycles with sidecars. The postal authorities say that the automobile fleet now in use effects a saving equal to 60 cents a day for each machine, as compared with horses.

★

Evidence of prosperity in Mozambique, Portuguese East Africa, may be gained from the fact that eight motor cabs are in service there, having been in use since 1909. The average business of these machines is about $500 a month. The first cabs purchased were of American manufacture, but these were considered too light, although they are still running. Subsequent purchases have been of German production.

★

Agents for the Overland cars, made by the Willys-Overland Company, Toledo, O., in Australia have increased their orders for 700 machines to 1200 for the 1912 season. These will be shipped at the rate of 12 cars a day until the entire allotment is taken. A second shipment of 30 Overlands was made from New York early in April.

★

L'Auto has awarded first prize to the three Benz cars in the recent Tour de France. In commenting upon the result of the contest this publication says: "The performance of this team was a revelation to all; for 4000 kilometers these silent, powerful and speedy cars never were more than 50 yards apart; they were always on time, had no mechanical troubles of any kind, and were voted the most beautiful cars of the whole 62."

PERFECTED REMY MAGNETO.

The accompanying illustration is that of I. J. Reuter, chief engineer of the Remy Electric Company, Anderson, Ind., to whom the company gives credit for developing and perfecting the present type of inductor magneto made by this concern. He succeeded President B. Perry Remy as engineer previous to the sale of the Anderson Electric Company.

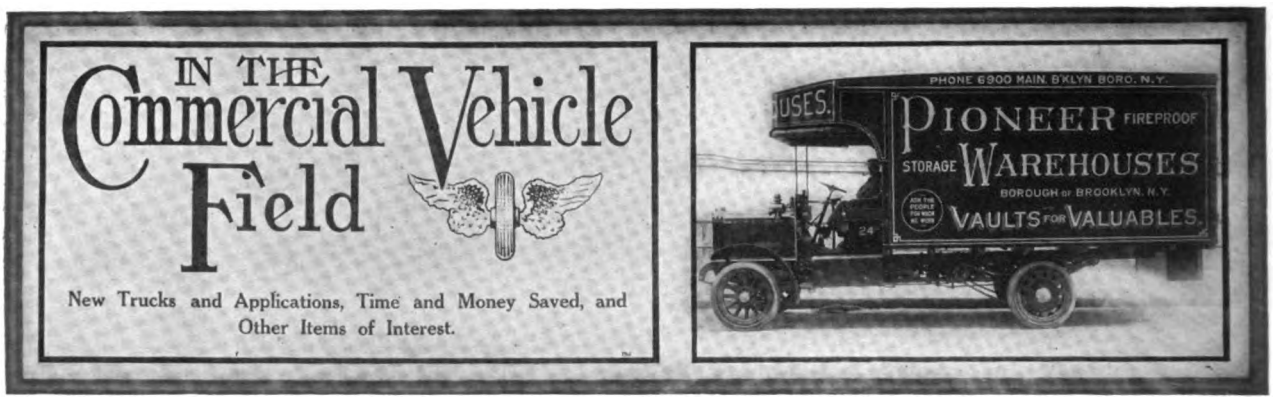


I. J. Reuter, Chief Engineer Remy Electric Company.

The new RD type of inductor magneto, bearing the Remy name, is the result of Mr. Reuter's genius. He has improved and refined the product of the company in many ways, among which may be mentioned the use of Bakelite instead of hard rubber for insulating material. He also has reduced the size of the instrument without decreasing its efficiency. Another improvement is the substitution of ball bearings, and one of his latest achievements is the new vibrator coil, especially adapted to self-starting devices, by means of which a shower of sparks is shot into the cylinder about to be fired, instead of the usual single spark.

Mr. Reuter was at one time designing engineer for the Willys-Overland Company, Toledo, O., and is more or less well known in the industry. He graduated from Purdue University in 1906 and is a member of the Society of Automobile Engineers and of the Indiana section, S. A. E.

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ECKHARD SIX-CYLINDER TRUCK.

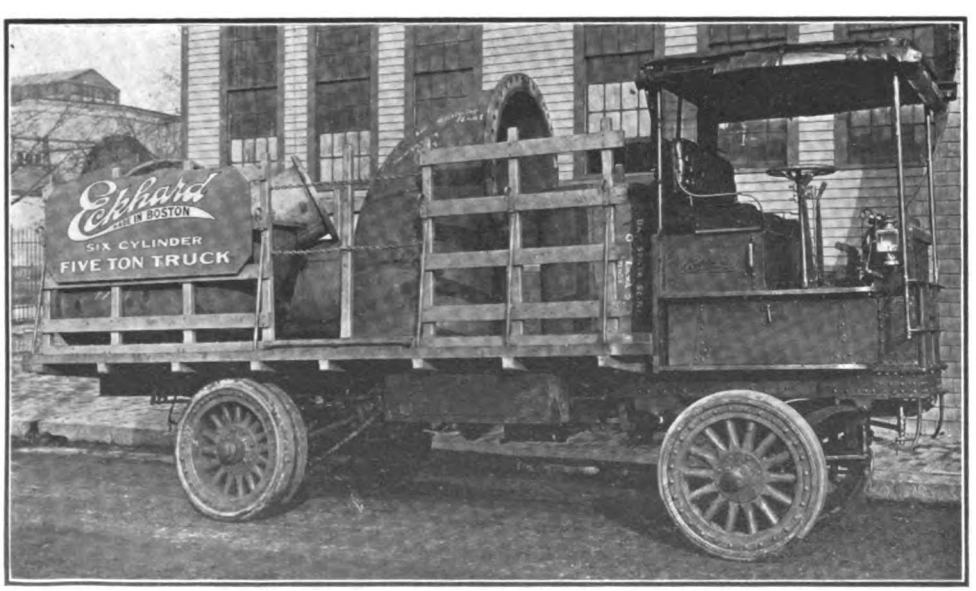
A five-ton vehicle which attracted considerable attention during its initial appearance at the recent Boston show was the six-cylinder Eckhard, made by the Hercules Motor Truck Company of that city. It is somewhat surprising to find an engine with six cylinders in a commercial vehicle, but the designer of this model, John Eckhard, who is not entirely unknown in the pleasure car field, expresses himself of the opinion that within a few years all the heavier machines will be thus equipped. However, the power plant is not the only interesting feature of the Eckhard.

The motor is of the valve-in-the-head type, with cylinders cast in pairs. The bore is 4.5 inches and the stroke five inches, giving an S. A. E. rating of 49.6 horsepower, although the maker claims it has developed 54 horsepower by brake test. The assembly is installed in a sub-frame that is mounted at the forward end of the heavy chassis frame, and is supported at either side by swivelled links from a wide yoke that is pivoted on a frame cross member.

The driving system is unique in that there are two cone clutches between the motor and the differential. These clutches are very large and both are of the reverse type. Between the forward member and the transmission is a universal joint, and the connection with the mainshaft of the transmission is flexible. The second clutch is between the differential and an extension of the main transmission shaft. There is an interlocking system by means of which when the clutches are disengaged, the transmission shaft is brought to an instant stop by a brake, and change of speed can only be made when the transmission gears are not moving.

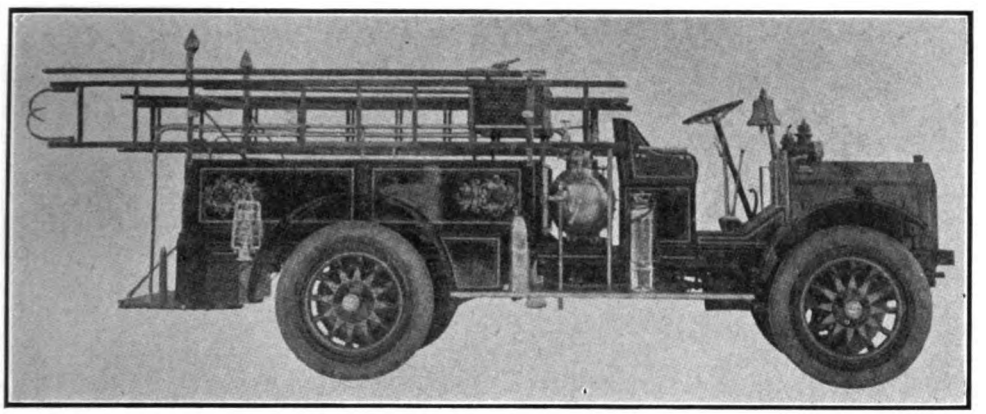
The transmission case is carried in a sub-frame, the forward end of which is suspended by swivelled links from the arms of a yoke pivoted to the heavy cross frame member, exactly in the same manner as with the motor. The rear end is suspended from a cross member behind the jackshaft. Final drive is by double side chains.

Extending from the centre of the rear axle to the centre of the front axle is a long rod that is fitted with a heavy spring buffer at the forward end. The function of this device is to carry the drive of the rear wheels to the forward axle, to distribute the road shocks on the front wheels to the rear construction, and to prevent unequal movement of the axles. In this respect it serves as a distance rod and has precisely the same effect as have the perches of the animal wagon. To prevent the turning movement of the rear axle, resulting from driving and brak-



Eckhard Six Cylinder Truck Which Possesses Several Novel Features of Design.

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Kelly 1.5-Ton Chassis Equipped as Combination Hose and Chemical Wagon.

ing action, a torsion chain is used, this being attached to the centre of the rear cross member of the frame and extended to the end of the stout arm mounted on the centre of the rear axle.

The frame is of heavy steel channel section, strongly reinforced and hot riveted. The wheels are 40 inches in diameter and the tires are six inches, being single in front and dual in rear. The wheelbase is 144 inches. Brakes are contracting and expanding on the jackshaft and rear wheel drums. Ignition is by two independent systems, with a double set of spark plugs. A Bosch high-tension magneto supplies the current for one, and a storage battery for the other.

KELLY FIRE WAGON.

The Kelly Motor Truck Company, Springfield, O., has been specializing in fire apparatus for some time, and a large number of these vehicles is in general use throughout the country. An accompanying illustration presents the standard model, fitted to a regulation 1.5-ton chassis, this being a combination hose and chemical wagon, with capacity for 1200 to 1500 feet of 2.5-inch fire hose and a 40-gallon chemical tank.

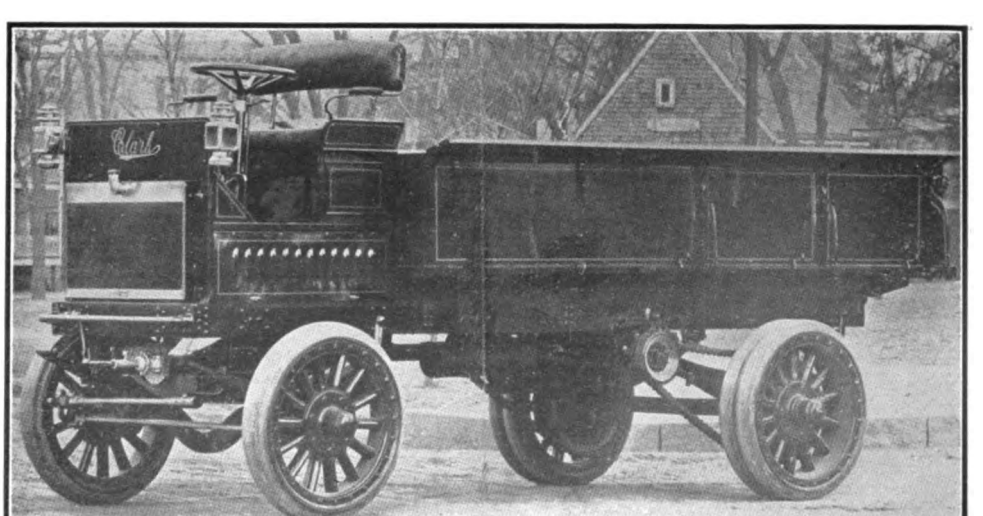
It will be noted that the body is extra long, with a 16-inch step at the rear. The tool box is located at the rear, and is equipped with spring hinges and lock and a drop door. The tank is made of the best cold rolled Lake Superior copper with the heads hammered, and is equipped with all the latest improved bipasses, valves, agitators, etc. All parts are nickel plated, including the tank itself.

Other equipment of the car includes: Two three-gallon extinguishers with brass receptacles carried on the running boards, a hose basket of perforated steel and ventilated bottom fitted with brass rollers, 200 feet of the best chemical hose, shut-off nozzle, 20-foot trussed extension ladder, 12-foot roof ladder with folding hooks, eight-foot combination plaster hook and pike pole, door opener, 10-inch locomotive gong or automatic multiple stroke gong, two axes, crowbar, two lanterns, two torches, two nozzle plugs, etc.

LATEST CLARK DESIGN.

While Edward S. Clark of Boston is best known in the industry as having specialized in the construction of steam pleasure cars, it is remembered that he brought out a gasoline power wagon equipped with a two-cycle motor about a year ago. However, this has been abandoned for two new models, one of three tons capacity and the other of five, which are being produced with four-cylinder, four-cycle engines. The accompanying illustration presents the three-ton vehicle.

In this the motor is cast en bloc with bore of 4.125 inches and stroke of 5.5, giving a rating of 35 horsepower. The casting is carefully finished and exceptionally fine workmanship is noted throughout the entire assembly. The water jackets are of liberal size and the cooling fluid is circulated by means of



Latest Clark Three-Ton Vehicle Fitted with Standard Furniture Body.

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a large centrifugal pump. The vertical tube radiator is of large dimensions and cooling is further aided by a belt driven fan mounted forward of the engine.

Lubrication is accomplished by two gear driven pumps operated by the camshaft. The oil is carried in a reservoir in the bottom of the crankcase, and from this it is drawn through filters and circulated through a system of tubes to a sight feed on the dash, and thence to the main bearings. Ignition is by a dual system, employing a Bosch high-tension magneto, special care being taken to protect all wiring from wear and saturation by water and oil. The carburetor is of the float feed type, provided with a water jacket to insure uniformity of mixture.

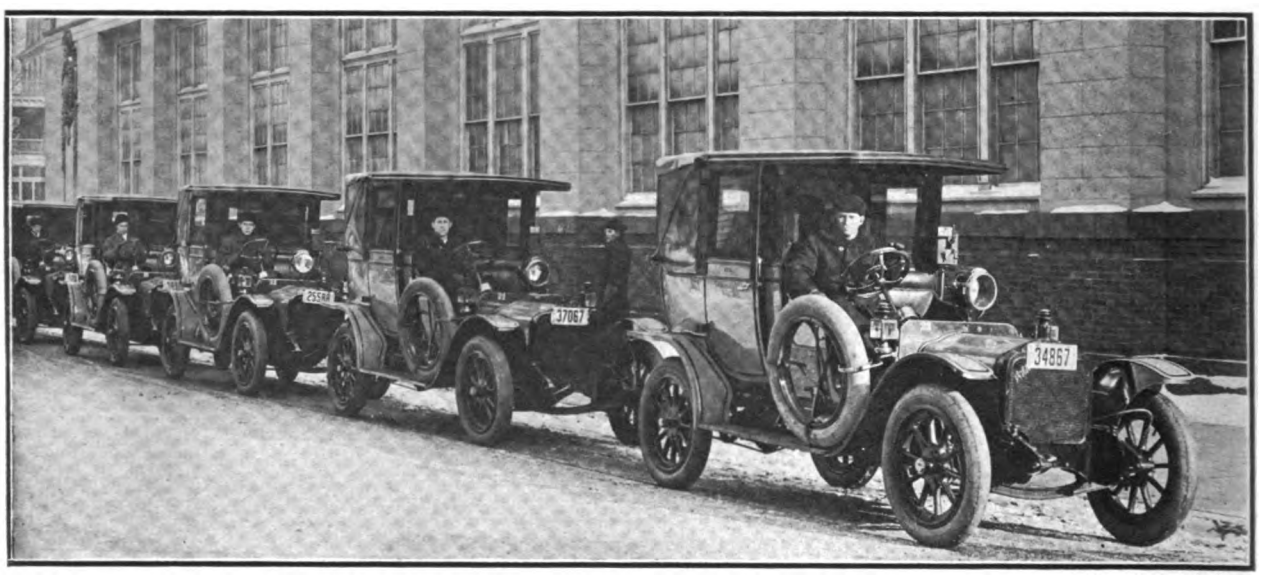
The clutch is a cone member, and under the leather facing flat springs are installed to prevent harsh engagement. The drive is by shaft to a Timken rear system, through a large jackshaft and double side chains to a dead rear axle. The transmission is of the selective type affording three speeds forward and reverse, it being fitted with Timken adjustable roller bearings throughout. The jackshaft is equipped with a locking device by which the differential may be locked and the rear wheels driven as a unit in the event of unequal traction. This arrangement is operated by a lever located at the left side of the chassis frame.

The service brake is on the jackshaft, operating on drums 12 inches in diameter and 2.25 inches in width, being actuated by pedal. The emergency member is expanding on rear wheel drums, 18 inches in diameter, operated by a hand lever which may be set by a pawl and notched quadrant.

The frame is six-inch rolled steel channel section, 42 inches in width and the length is proportionate to the body. The standard wheelbase is 120 or 130 inches, and the tread 68 inches. The frame is constructed with heavy cross members and is strongly braced. Springs are semi-elliptic, front and rear, the former being 42 inches long and the latter 52. The width is three inches. In addition the rear suspension is fitted with a heavy cross spring. The front axle is a drop forged steel, I section and the rear rectangular steel, 2.25 by 3.625 inches. The wheels are 36 inches in diameter, mounted on Timken roller bearings, with 36 by five-inch solid tires in front and 36 by four-inch dual members in the rear.

WHITE CABS SUCCESSFUL.

During the past year the White Company, Cleveland, O., maker of White pleasure and commercial lines, has been devoting a large part of its attention to the construction of taxicabs, having spent much time and effort in studying the needs of this particular field, both in this country and abroad. Herewith is shown a portion of the fleet of White cabs, operated by the Cleveland Taxicab Company of that city, which has found these machines very successful, both from the viewpoint of economy and efficiency.



White Taxicabs Operated by the Cleveland Taxicab Company with Splendid Success in Cleveland, O.

PEERLESS IN EXPRESS DELIVERY.

Express companies are looked upon as being thoroughly conversant with the needs of the transportation business. They must be supplied with absolutely dependable means of conveying goods at both the collecting and distributing ends, and when it is known that many of these concerns are replacing their horses with motor trucks, their action is worthy of consideration.

Some time ago the American Express Company, one of the leading organizations of its kind, decided to test out the Peerless truck, made by the Peerless

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Motor Car Company, Cleveland, O., and purchased five. These were given severe usage and engineers and traffic experts watched them carefully, making thorough estimates of their performances in comparison with horses and with other commercial vehicles.

The result was wholly gratifying to the Peerless company, as well as to the purchaser, judging from the fact that a repeat order for 11 machines has only recently been filled. The accompanying illustration shows a part of this fleet at the Peerles factory ready for the installation of special bodies.

INTRODUCING MOTOR PLOW.

California farmers are much interested in the demonstration of a new motor plow recently introduced in that territory by the Hackney Manufacturing Company, St. Paul, Minn. This machine is the invention of the president of the concern, Leslie S. Hackney, and is 14 feet long and six feet five inches wide. It is equipped with a four-cylinder, four-cycle motor, having a bore of five inches and a stroke of six. It can be utilized for a number of purposes, inasmuch as the plowshares are so arranged that they may be raised clear of the ground, when the machine becomes a tractor in every sense of the word.

COLORADO WOMAN MAKES TRUCKS.

Mrs. Nettie C. McIntyre of Denver, Col., claims to be the first woman in the country to engage in the manufacture of commercial motor vehicles. Until recently her home was in northern Colorado, and while on a business trip to Wichita Falls, Tex., she became interested in the invention of C. A. McKiernan of that city. Her knowledge of haulage problems led her to believe there was a splendid future in the truck field, and she enlisted the financial support of J. A. Kemp and Frank Kell in the organization of the Wichita Falls Manufacturing Company.

The first vehicles, of one and two tons capacity, were shown at the recent display in Kansas City. Their success seems to be assured, in view of the fact that 25 machines were sold during the progress of the exhibition. The Wichita Falls truck was next exhibited at Denver, where the Wichita Falls Motor Sales Company has been organized for the purpose of looking after the retail business in that city and vicinity.

TRUCKS FOR RAILROAD WORK.

The Groton & Stonington Street Railway Company, Groton, Conn., contemplates the installation of motor trucks in making delivery from its express trolley cars. The company handles considerable freight for a number of manufacturing plants, and these have asked for spur tracks leading into their yards. The trolley company thinks that by using automobiles it will be able to save expense and improve the service at the same time. A trial has been given, and the demonstration of the vehicle was satisfactory in every respect.



Part of a Fleet of Peerless Trucks Recently Placed in Service with the American Express Company.

SAURERS IN PORTO RICO.

After a thorough investigation of commercial vehicles for hauling freight long distances over poor roads, the Porto Rico Motor Company of San Juan and Ponce, Porto Rico, has ordered 30 five-ton Saurer trucks, made by the International Motor Company, New York City. These machines will be used in competing with railroads throughout the island, and the plans call for maintaining a given schedule covering many of the principal towns.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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It is expected that prizes aggregating $100,000 will be offered for competition in the 1800-mile cross country American circuit race, which will precede the international race for the Gordon-Bennett cup at Chicago in September. In staging this event the Aero Club of America will be assisted by the aero clubs of Illinois, Michigan, Milwaukee, Kansas City, St. Louis, Indiana, Cincinnati and Ohio.

Both the start and finish probably will be at the Cicero field, Chicago, where the international race will be flown. As now proposed, the race will be by daily stages, with controls as follows: Milwaukee, Cedar Rapids, Des Moines, Omaha, St. Joseph, Kansas City, Jefferson City, St. Louis, Charleston, Indianapolis, Cincinnati, Columbus, Cleveland, Toledo and Detroit.

An accompanying illustration is that of a decidedly novel monoplane constructed by Marcel Besson of France. No information is at hand as to how this machine has performed in flight, but there appears no reason why it should not prove entirely practical.

The principal feature is the formation of the wings, which are turned up slightly at the extreme ends. The arrangement of the pilot's cockpit and the motor and radiator mounting are not exactly clear in the photograph, but it would appear that this entire assembly was enclosed in the covered-in portion between the two sections of the main plane.

It will be noted that the fuselage is covered throughout its length, and the position of the skids of the landing chassis is such as to convey the impression that the machine is intended to be flown tail foremost. Still another feature is the method of carrying the empennage on a combination wheel and skid arrangement, which still further suggests a direction of flight opposite to that ordinarily expected.

The workmanship throughout is worthy of special comment and further developments with the Besson monoplane will be awaited with interest.

Commander Cleland Davis, U. S. N., has invented a new gun with which he expects to arm military aeroplanes. The new weapon is designed to destroy foes in the air, or to attack an enemy on the ground from a height where a gun, gunner and aeroplane will be an almost invisible target. It fires a 33-pound projectile and is said to have no perceptible recoil. The material is vanadium steel, and the gun is 12 feet long, weighing 150 pounds.



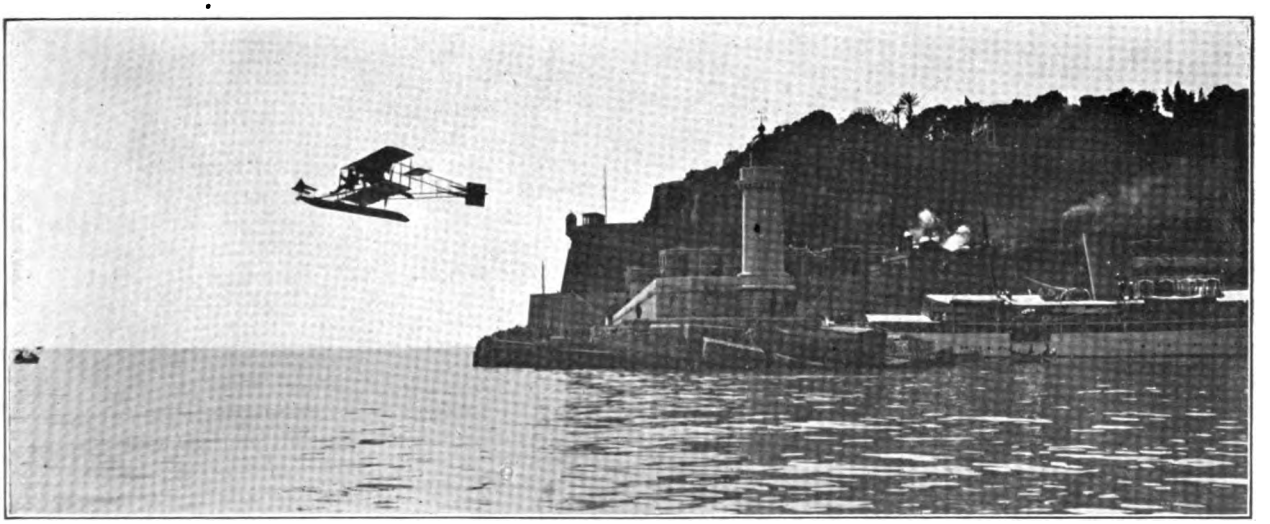
Novel Monoplane Produced by Marcel Besson in France, Which Presents Several Features of Originality in Construction.

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In a test held on a barge near Fisher's Island, N. Y., recently several United States military and naval officers were present. The gun was mounted on steel springs and was fired twice. Although the springs were of delicate moid, there was no recoil after either discharge. The test was in every way satisfactory, and arrangements are now being made for its further exploitation.

Hugh A. Robinson has returned from Europe, where he went to place a Curtiss hydraeroplane with the Russian government and where he took part in the first hydraeroplane meet ever held, at Monaco. An accompanying illustration shows Robinson and his Curtiss in flight off Monte Carlo. It develops that the rules for this competition were purposely made easy so as not to eliminate the French machines, which are mostly ordinary biplanes fitted with special pontoons.

The chief award was won on passenger carrying



Hugh Robinson of America, Flying a Curtiss Hydraeroplane at the Recent Meet for Air and Water Craft at Monte Carlo, Monaco.

points, many of the foreign machines being able to carry three or four persons, while the Curtiss hydraeroplane was never designed to carry more than two, this being all that the United States navy has required.

The first international aviation exhibit under the auspices of the Aero Club of America will be held in the new Grand Central Palace, New York City, May 9-18, and this promises to be the most representative showing of aeroplanes and hydraeroplanes ever held in this country. The list of exhibitors is by no means complete, but John Carrington Yates, under whose management the event is to be held, announces the following:

Aeroplanes—American Aeroplane Company, monoplanes; American Aeroplane Supply House, Bleriot type monoplane; Curtiss Aeroplane Company, two Curtiss biplanes, one with dual control; Christmas Aeroplane Company, Christmas biplane; Gallaudet Engineering Company, two-passenger steel monoplane fitted with 100 horsepower Gnome engine; H. W. Jacobs, metal multiplane with two motors; Queen Aeroplane Company, Queen monoplane with 30 horsepower Anzani motor; Rex Monoplane Company, Rex monoplane; Irving W. Twombly, monoplane; Wright Company, Wright biplane.

Hydraeroplanes—Max Ams Machine Company; Curtiss Aeroplane Company, Curtiss; Queen Aeroplane Company, Aeroboat; Wright Company, six-cylinder Wright.

Motors—Max Ams Machine Company, eight-cylinder V, 70-80 horsepower M. A. S.; Baby Engine Company, engines for models; Crane Company; Curtiss Motor Company, Curtiss motors, propellers, etc.; Frontier Iron Works, four and eight-cylinder Frontier; C. B. Kirkham, six-cylinder Kirkham; Roberts Motor Company, four-cylinder, 50 horsepower Roberts; six-cylinder 75 horsepower Roberts, 125 horsepower Roberts; B. F. Sturtevant Company, motors, propellers and motor parts; H. L. F. Trebert Engine Works, eight-cylinder V Trebert Justrite; Irving W. Twombly, seven-cylinder rotary Gnome; Mead Engine Company, rotary valve Mead.

Balloons—A. Leo Stevens, small complete hydrogen balloon; Goodyear Tire & Rubber Company, four model balloons and one large scale model dirigible.

Fabrics, etc—Goodyear Tire & Rubber Company, tires, tapes, springs, fabrics, pneumatic hydros; Pennsylvania Rubber Company, Pennacloth, tires; B. F. Goodrich Company, Lumins fabric, tires; Diamond Rubber Company, tires.

Miscellaneous—E. J. Willis Company, supplies, models; Marburg Bros., Inc., Mea magnetos, S. P. O. ball bearings; Electric Speedometer Company, tachometers; W. F. Mangels Company, teaching device; F. A. O. Schwartz, models; White Aeroplane Company, models; W. A. Crawford-Frost, models; G. A.

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Crayen & Co., magnalium metal castings.

Loan and historical exhibits—Curtiss 1909 Gordon-Bennett winner, Burgess "Flying Fish," Harkness' Antoinette (first machine to carry war messages), Nieuport monoplane, Davis aeroplane gun, new army aeroplane with 70 horsepower Renault engine built by the Burgess Co. & Curtis, Frank Coffyn's Wright hydraeroplane, Clifford B. Harmon's Henri Farman biplane, Romaine Grassier's Morane monoplane, Paul Lacroix's Paris-Madrid Bleriot winner, George M. Dyott's Deperdussin monoplane, Chanute gliders from Aero Club of Illinois, A. Leo Stevens' Zodiac dirigible, Horace A. Wild's Parseval, exhibit from the United States weather bureau, Law's parachute, A. Leo Stevens' assortment of balloon baskets, balloon basket and equipment loaned by Alan R. Hawley.

The Navy Department at Washington, D. C., has formally notified the Aero Club of America that it will co-operate with that organization in holding the first American hydraeroplane meet at New York City, May 4. This means that the United States government will patrol the course from the pier of the Columbia Yacht Club at the foot of West 86th street to that of the Atlantic Yacht Club at Sea Gate, Coney Island.

The principal event of the day will be a distance speed race, without passengers, which will carry with it a substantial cash award. A handsome trophy, emblematical of aviation presenting man with wings, will be the prize for a passenger carrying speed contest around the Statue of Liberty and return. Other events will include bomb dropping, quick get-away contests, accurate alighting competition, capturing toy balloons, carrying orders as scouts from battleships, etc.

Among the entrants are: Harry N. Atwood, Burgess-Wright; Frank C. Coffyn, Wright; Walter Brookins, Brookins; George W. Beatty, Beatty; Hugh Robinson, Curtiss; Grover C. Loening, Aeroboat.

The British war office has announced the organization of a royal flying corps, somewhat along the lines of the American aeronautical reserve. The corps, of which there will be army and navy wings, will be maintained and administered jointly by the admiralty and war office. The central flying schools will be located at Salisbury Plains. Claude Grahame-White is the first civilian to join the new corps.

Louis Bleriot and a number of military experts in France claim to have discovered that the accidents to monoplanes flown by military aviators in that country recently were due a peculiar strain from above. This in a measure explains the reason for the death of George Chavez, after his successful flight over the Alps, and may aid in explaining some of the mysterious accidents which have taken place in this country.

It will be remembered that at the time of Chavez's death it was announced that the wings of his Bleriot monoplane crumbled up as he was nearing the earth. This seemed impossible to the constructor who has been studying this and subsequent accidents ever since. He is now confirmed in the opinion that the trouble is due, not to the wings, but to the failure of the upper guys, which have not been designed to resist stresses from above.

In most instances, the machine has been so badly damaged that it was impossible to discover the cause. In one of the latest accidents to a military monoplane in France, sufficient information was at hand to enable Bleriot and the others to reach a conclusion. This opinion was borne out by the action of machines in other accidents.

As a result, in the future monoplanes will be tested with a top loading of the wings, as well as a bottom loading. This will mean an entirely new system of upper bracing. Bleriot concludes that it will be necessary to allow a factor of safety three times that now employed for the under surface.

The Paris Matin has announced a special prize for a flying race from Pekin to Paris, a distance of over 7500 miles. Bleriot, Vedrines and others claim the task is quite possible of accomplishment, although it is by no means regarded as easy.

According to a dispatch from Tokio, Japan, a company has been organized for $500,000 for the purpose of manufacturing aeroplanes in that country. It is announced that the stockholders will include Americans and Japanese, the Americans named being Capt. Baldwin and Lee Hammond.

Turkey has purchased an aeroplane for use in connection with the war in Tripoli, and as a result the oath of fealty in the Ottoman army has been changed to read as follows: "I do swear allegiance to the Padishah, on land, on sea and in the air." This new oath was administered last month for the first time to 400 recently promoted officers at Constantinople.

Flying a Morane monoplane, Maurice Tabuteau recently created a new cross country distance record, having gone from Pau to Paris, with one stop at Poitiers, a distance of 447.12 miles in 5:35:00. It is of particular interest to note that the machine was equipped with a Bosch magneto, which is particularly gratifying to the Bosch Magneto Company of New York City.

To Miss Harriet Quimby, an American woman, belongs the honor of being the first woman to fly her own machine across the English channel. Utilizing her Bleriot monoplane she left Dover, England, the morning of April 16, alighting at Hardelet, near Boulogne-sur-Mer, France, in a little less than two hours later. She was unaccompanied on her flight.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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K-W IGNITION CATALOGUE.

What is probably one of the most complete catalogues of ignition devices ever issued is being distributed to those who make application for it by the K-W Ignition Company, Cleveland, O., maker of K-W magnetos and other electrical apparatus for automobile use. Sixty-four pages are devoted to illustrating and describing the various products of the concern, and altogether the booklet is a decidedly interesting compilation concerning the manufacture and use of ignition equipment. Considerable space is devoted to the K-W lighting magneto, and five pages are filled with instructions for fitting this device to cars not already equipped with magnetos. The illustrations are in half-tone and line drawings, and the whole makes a very valuable addition to the motorist's library.

AUTOMOBILE EXPORTS AND IMPORTS.

The export of American automobiles continues to increase at a rapid rate, the figures for February showing that during that month there were 2403 cars exported, or over 100 per cent. more than during February, 1911. The table of values shows that the increase has been among the lower priced cars, the average value of these exported in February, 1911, being $1051, while the average for 1912 was $946. The import figures, which for some time had shown a decided decrease, are coming up, and during February, 73 cars, value $166,048, average $2560, were imported, as against 41, value $104,924, average $2560. The figures, classified by countries, are as follows:

February Exports.

	1911	1912	
Country	Value	No.	Value
United Kingdom	$150,142	664	$534,398
France	28,242	43	39,221
Germany	12,738	16	10,088
Italy	19,764	13	13,500
Other Europe	51,699	106	81,714
Canada	670,090	747	774,270
Mexico	34,772	33	44,737
West Indies and Bermuda	40,793	29	42,433
South America	107,880	143	211,183
British Oceania	101,728	428	334,831
Asia and other Oceania	53,013	119	119,185
Other countries	19,027	62	68,929
Totals	$1,075,690	2403	$2,274,489

February Imports.

	1911		1912	
Country	No.	Value	No.	Value
United Kingdom	10	$30,158	21	$45,278
France	21	46,813	40	101,696
Germany	1	2,856	4	4,854
Italy	2	4,050	6	9,818
Other countries	7	21,047	2	4,402
Totals	41	$104,924	73	$166,048

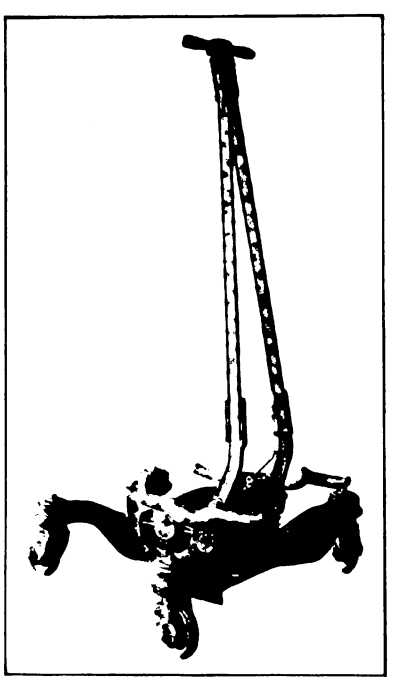
PREMIER CAR FOR REPORTERS.

The reporters of the Indianapolis News, Indianapolis, Ind., have been congratulating themselves recently on the purchase of a Premier seven-passenger touring car, which has been placed at the disposal of the editorial department. It is stated that the machine has already proved its value in quick emergency runs when it was necessary to get men on the spot in a hurry, and that it has made several scoops possible.

THE CANTON AUTO-JACK.

The jack for garage use must be sturdily constructed, capable of lifting heavy weights and adjustable to the different axle heights of all makes of machines. It may be utilized for elevating the front end of a light runabout or used to raise the rear of a heavy touring car. It should be adjusted easily and quickly to the different heights of axles; its operating mechanism should be simple and fool proof, and it should be capable of being handled by one person.

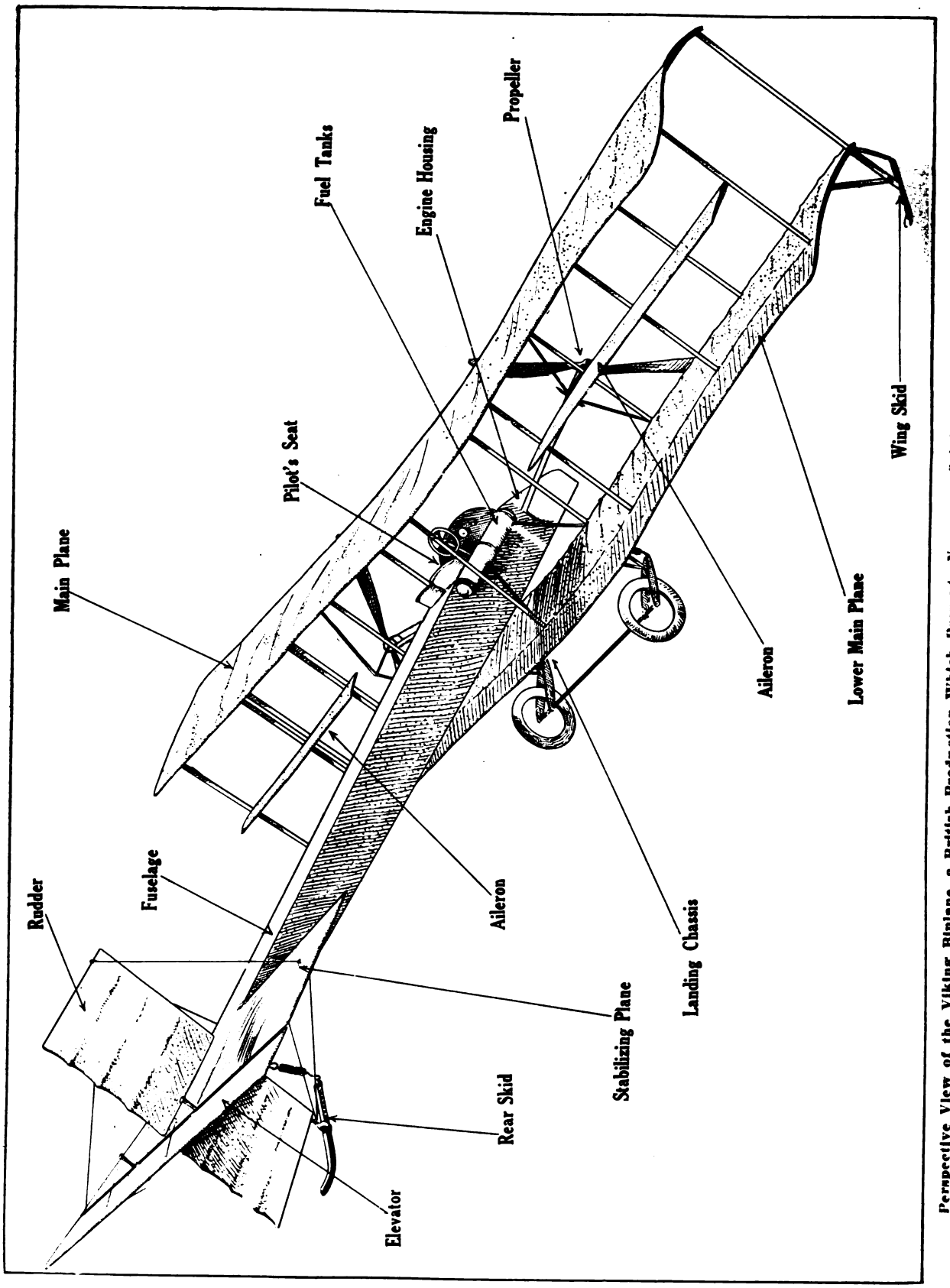
The Canton Foundry & Machine Company, Canton, O., manufactures what is termed an Auto-Jack which it states has been tested out under all makes of automobiles. It may be lowered to nine inches or elevated to 21.5. The construction is such that one man can raise weights of from 3000 to 4000 pounds. The lifting ratchets are controlled by a pawl, operated by the left hand when grasping the handlebar. The pawl member is easily released and operated, and obviates stooping as with the ordinary jack, thereby saving time and labor. The handlebar is four feet long, which affords good leverage and assists in guiding and propelling the jack with its load.



Auto-Jack Designed for Garage Use.

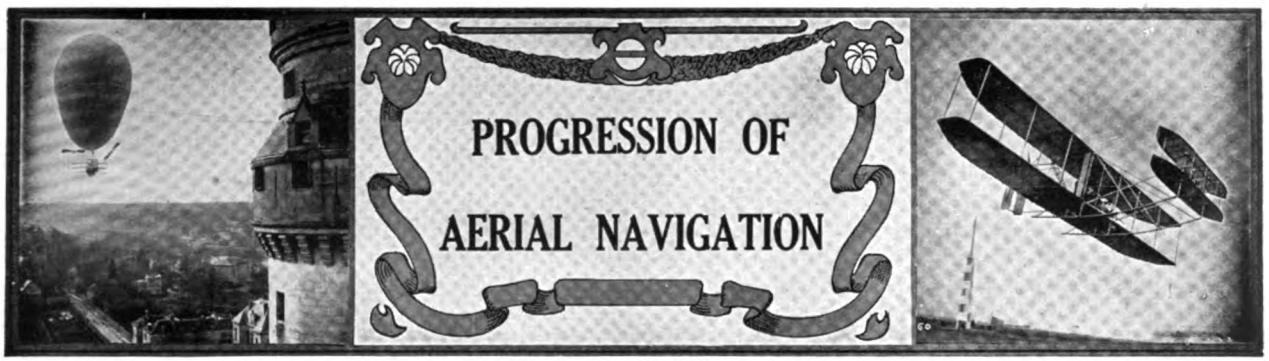
The supporting antlers and the stem have heavy square threads, these insuring durability. The long antlers will be noted in the accompanying illustration and these are utilized on the rear axle while the shorter members are for service when lifting the front axle. Both are adjustable as to height. When the motor car is elevated upon the jack, either the front or rear may be balanced, permitting the removal of wheels, also the moving of the machine to any desired place by means of the rollers or wheels attached to the jack. The device is constructed of high grade material throughout and is made with either three or four-wheel equipment.

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Perspective View of the Viking Biplane, a British Production Which Presents Numerous Original Features of Design and Construction.

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THE VIKING BIPLANE.

One of the latest machines produced by the Aeronautical Syndicate in England is a biplane bearing the official designation of Viking I. The designer is H. Barber, who has been turning his attention heretofore to the production of monoplanes, some of which have been arranged so as to fly tail foremost. The Viking may be said to be the result of long experimentation and a study of the accompanying sketches will disclose the fact that it presents a number of original features.

Briefly outlined, the biplane is of the definite fuselage type, completely enclosed, with engine in front, pilot's seat between the main planes and a non-lifting tail. The twin propellers are operated by chains as in the Wright biplane, although they are located in front instead of behind the main planes.

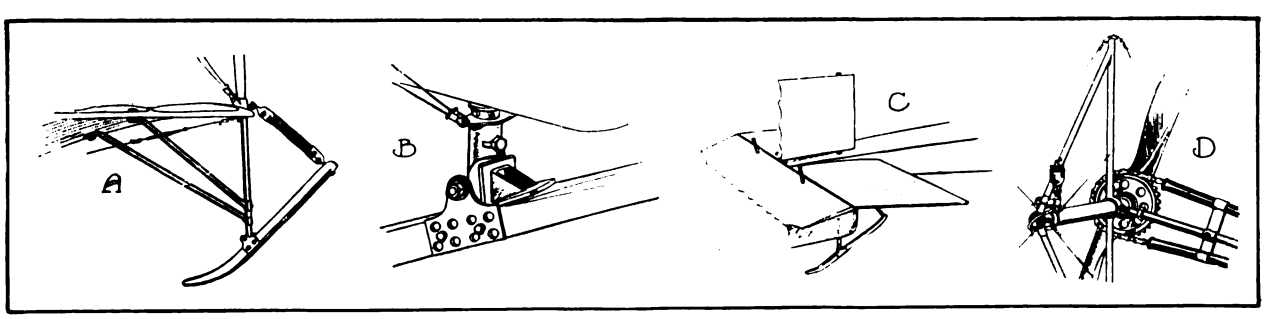
When seen from the front these planes appear to be in three sections, of which the central portion, that forming the main cellule, is horizontal, while those portions forming the wings are given a decided dihedral angle and a slight curvature. The planes themselves are single surfaced, the ribs lying in pockets of the fabric. The span is 31 feet and the chord five feet three inches. The middle section is exactly six feet span, while the two ends are 12 feet six inches.

Both planes are perfectly rigid, except for a slight flexibility at the trailing edge, by virtue of its overhang. These are held in position by a double row of struts, and it may be mentioned here that the propellers are secured by triangular skeletons of steel frame tubing rigidly mounted between the main planes, and braced thereto by steel tension wire. Their centres are separated by a distance of 14 feet.

One of the most interesting features of the entire construction is the method of lateral balance employed. Two ailerons of flexible balances, measuring eight feet six inches by two feet each, are arranged on the rear row of struts, midway between the two decks. These are hinged to the main spar, wires being taken from the trailing spar at the left in the accompanying sketch to the control lever for the purpose of altering their angle of incidence. As this member is pulled downward the spar at the opposite end is also pulled down, but only to one-seventh of the distance. The same action takes place when the member is pulled upward.

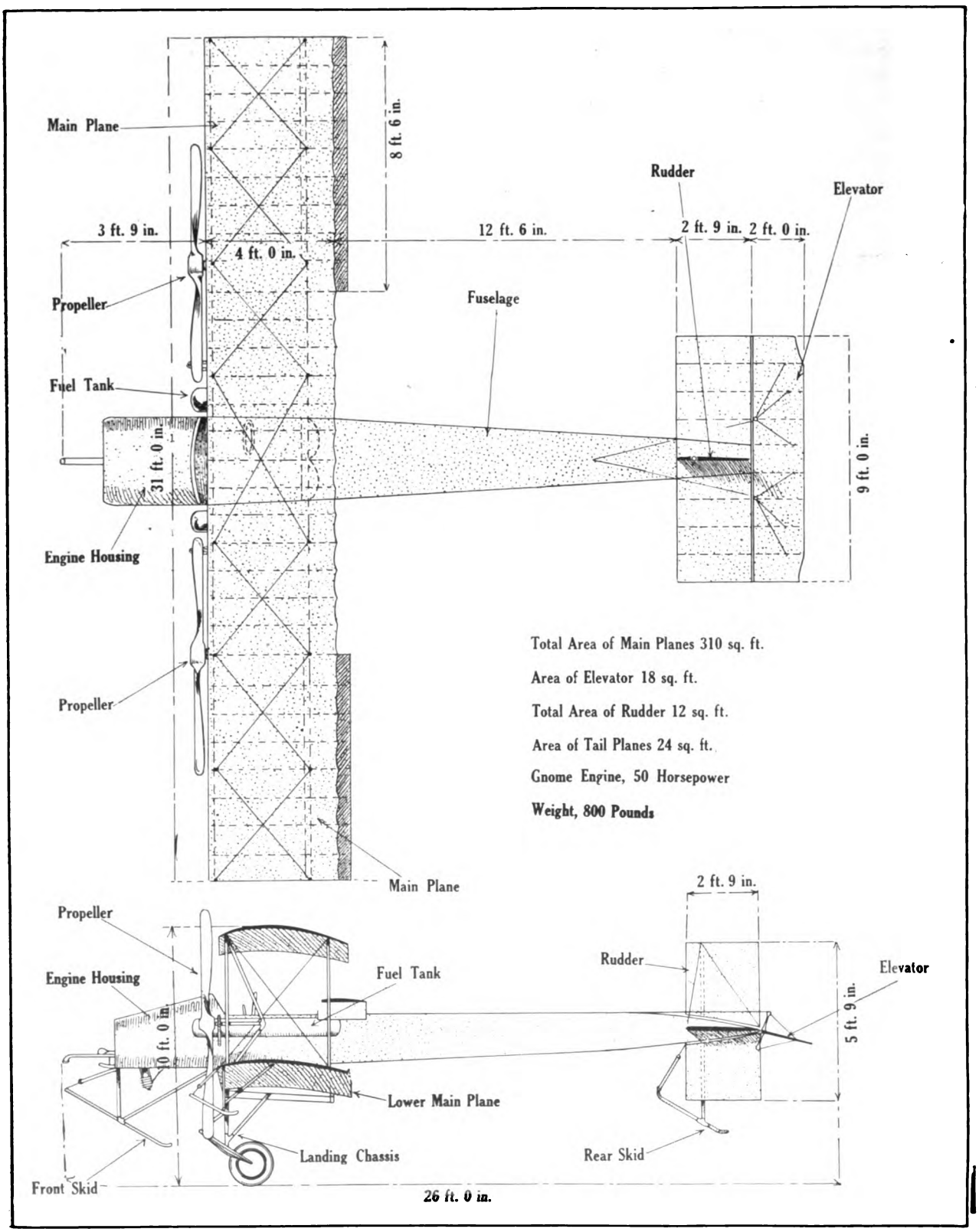
The main ribs of these ailerons are made with the usual skeleton formers, between which are arranged laminated strips of Malacca cane, which, when the plane is flexed, slide over one another and provide a species of elastic filling. The upper former is fixed to the main spar, its ends sliding in covered sides or tunnels cut in the trailing spars mentioned. As originally brought out the surface was of aluminum alloy, but the present construction is that of a special surface consisting of fabric sandwiched between two thin plies of wood.

Normally these ailerons have neither angle of incidence nor camber, but when put into action, one aileron is given a positive angle of incidence and a positive camber, while the other has a negative angle of incidence and a negative camber. It will thus be



Some Detailed Features of Viking Biplane: A, Wing Tip Skid; B, Tail Skid Joint; C, Empennage; D, Propeller Outrigger.

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Plan View and Elevation of the Viking Biplane, Showing Detailed Dimensions and Principles of Design.

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seen that the lateral control does not affect the even distribution of head resistance.

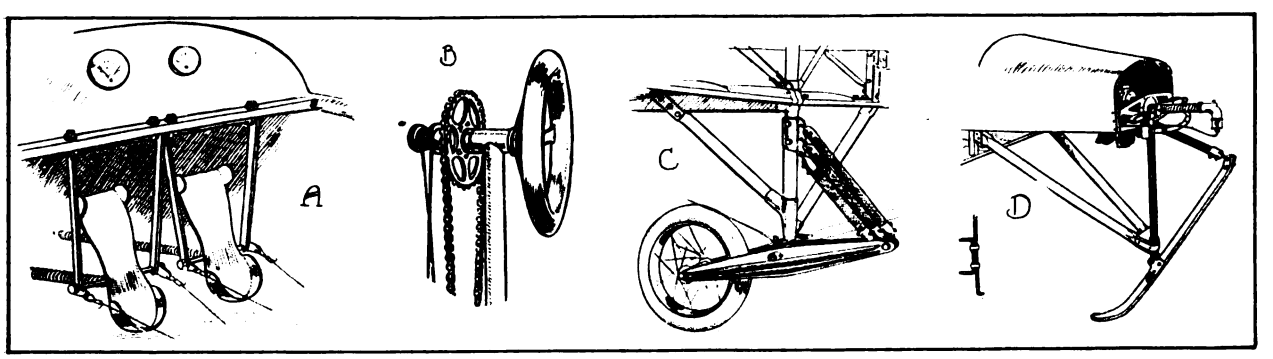
As has been stated the fuselage is entirely enclosed. Beginning at the forward end, a torpedo front of sheet aluminum is arranged over the engine, and this with a slanting screen of the same material behind the motor, protects the pilot and passenger, for this is a two-seated biplane, from any oil or exhaust fumes. The remainder of the surface is of fabric. The fuselage is of the rectangular section, tapering gradually from the pilot's cockpit to the empennage. The construction is of silver spruce except in the region of the engine mounting, where ash is employed to take care of the extra stresses at this point.

The tail is also novel. The elevator flap at the rear is entirely removable by withdrawing a single long wire bolt, and when this has been done each half of the fixed tail plane withdraws from the fuselage in exactly the same manner as the main planes in the ordinary collapsible monoplane. These fixed planes have no angle of incidence, but are cambered top and bottom, so as to have approximately a stream line form. In addition, the pivot rod of the vertical rudder is separated from the vertical rod which supports the small landing skid at this point.

The landing chassis is composed of a pair of wheels united by a wooden axle universally jointed at either end. These are carried on stout steel beams universally jointed to the triangulated upright, which descends from the main cellule. The rear diagonal strut is carried up at a rather sharp angle, to a strong ash filling piece, which forms the end rib of the fixed portion of the lower deck. For up and down motion, the wheel beam rocks on a long tubular bearing, while for swivelling castor wise it is carried on a vertical pin, supported inside the steel lug from which the vertical and diagonal struts spring. Three rubber buffers are arranged one behind the other, with a view to the maximum reduction of head resistance. Separate tracking springs are provided to hold the wheels parallel with the axis of the machine.

In addition to the wheels, there are four skids, one under the tail, one under the extreme forward end of the fuselage supporting the motor housing, and one at each end of the wing tips. All of these are of ash, shod with steel, and each is provided with freedom to swivel in any direction. Particular attention should be paid to the tail skid, which is jointed to a tube that slides over the stub end of the main tail king post, and has a slot in it to allow for the passage of a stud which holds it in position vertically and also provides a stop for its castor motion. The bracket is fitted very carefully so as to prevent any weakening of the tube through the hammer action imposed upon it by the rubber shock absorber.

The upper part of the control lever rocks back and forth to control the elevator, while the action of the ailerons is effected by rotating the hand wheel. This latter carries a chain wheel seven inches in diameter and a small drum one inch in diameter. The wires leading from the chain wheel are applied to the trailing spar of the ailerons, while the cable which passes over the small drum leads to the front spar of this plane. The two thus operate together and provide a simultaneous change in angle of incidence and degree of camber, as previously explained.



Additional Features of Viking Biplane: A, Rudder Control Pedals; B, Chain Wheel and Drum; C, Landing Chassis Construction; D, Motor Housing and Skid.

The rudder control is by a pair of pedals, mounted in hanging stirrups. To operate the rudder, a push forward of the whole foot is required. This naturally makes for very decided comfort on long flights.

The pilot and passenger sit side by side in a comfortable leather upholstered two-seated cockpit, in front of which is the dashboard containing an aneroid, an oil pressure gauge, and a counter indicating the number of revolutions of the motor. Gasoline and oil tanks are placed at each side of this seat.

The motor is a 50 horsepower revolving Gnome. This drives the two propellers by a plain and crossed chain, respectively. The propellers are so arranged that their line of thrust is approximately coincident with the centre of head resistance; which is to say, that it is slightly lower than halfway between the upper and lower planes. Their bearings are carried in the light steel tubular framework, and provision is made for lubricating both the thrust and journal bearings. An accompanying sketch shows the detailed arrangement of their attachment.

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MOTORING NEWS OF NATIONAL IMPORT.

National Association Refuses to Sanction Fall Shows---Cincinnati Would Become Industry's Centre---Interest in Transcontinental Touring---Census Figures Concerning Connecticut---Highway Construction Report.

The National Association of Automobile Manufacturers has refused to issue sanctions to Detroit, Chicago and Indianapolis for national motor car shows this fall. Of course this action does not in any way interfere with the promotion of local exhibitions, but such displays hardly would cover the original idea. It is understood that the makers foresaw a run of national shows that would take up time and cost a lot of money.

Detroit was planning to hold its show either in a temporary structure or in a permanent building to be erected for such purposes year after year. Chicago wanted to use the Coliseum, and failing in this, proposed an open air display in Grant Park, on the lake front. Indianapolis sought to hold its exhibition on the speedway grounds.

It is possible that each of these events will yet be held, but without the distinction of being recognized as national affairs. It is pointed out that the Boston show, always conceded the best business display of the year, has never had official sanction from the N. A. A. M. Promoters in the three cities of the Middle West see no reason why their shows should not prove of equal importance to the industry.

The whole point seems to hinge upon the question of date, the dealers in Detroit, Chicago and Indianapolis being convinced that the fall is the best time of year in which to stimulate business by calling attention to the models for the forthcoming season. Manager Chester I. Campbell of the Boston Automobile Dealers' Association has seen fit to express himself in this connection, maintaining that the experience of the Boston show has been such as to indicate that it is held at the very best time of all; namely, just before the opening of the active motoring season.

CINCINNATI AS MOTOR CENTRE.

Local Business Men Take Steps to Interest Manufacturers in City's Advantages.

The Commercial Association of Cincinnati, O., has started an aggressive campaign to interest automobile manufacturing concerns in locating in that city, with a view ultimately to make this the producing centre of the industry. Its members point out that there is no good reason why Detroit should house plants creating 75 per cent. of all the gasoline cars made in this country. Cincinnati is held by this association to be eminently better situated in every way to supply the market with cars.

It will be remembered that at one time Cincinnati was the leading carriage centre in the country. Apparently, its business men feel that it should have taken the same place when the motor car came into vogue. Members of the association have expressed themselves as convinced that they were a little slow in taking a chance with a new device and in responding to the risks involved. While they remained content with the production of carriages, other cities were experimenting with automobiles. Secretary Carl Dahoney says:

"If we can induce just one of the eminent motor car makers to locate here and enjoy the benefits we can offer, it seems to me a short time only will elapse until other producers follow suit. The Commercial Association has all the machinery needed to set in motion a plan of invitation. Let the civic spirit of the community assert itself and press us on to the mark. We will do the rest, and do it effectively."

TRANSCONTINENTAL TOURING.

American Automobile Association Estimates More Than a Million Will Be Expended.

The increasing interest in transcontinental touring has given rise to some careful estimates by the touring information bureau of the American Automobile Association, which has abundant means of determining the number of people who are expected to take these trips during the coming season. Its figures show that at least $1,000,000 will be expended in this manner during 1912. This is based upon the premises that no less than 500 cars will traverse the "Sunset Trail," according to its advance information each car carrying on an average of four persons. Past experiences indicate that this will mean the following expenditures:

Gasoline, $55,000; oil, $15,000; tires, $180,000; garage, $15,000; equipment for car, $25,000; equipment for passengers, $60,000; hotel bills, $320,000; incidentals, purchase of souvenirs, etc., $30,000; return railroad fares, $250,000; return freight on cars, $75,000; total, $1,025,000.

These figures, as large as they may seem at first thought, are decidedly conservative when viewed in connection with the report of Dr. F. L. Bartlett, good roads director of the Denver Chamber of Commerce,

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who claims that 6000 automobiles visited that state in 1911, leaving behind them no less than $2,700,000.

In the growth of transcontinental touring, it is quite common for California motorists to be seen in New England, and many New Englanders are making the journey to the coast. Some make the trip in both directions by automobiles, but a majority return to their homes by railroad. It is estimated that for every dollar expended in good roads, at least $20 is returned to the state, either directly or indirectly.

STRIKE OF PARTS MAKERS.

Action of Molders in Eleven Factories May Seriously Affect the Industry.

Molders in 11 factories of the Aluminum Castings Company, with headquarters in Cleveland, O., and plants in Cleveland, Buffalo and Syracuse, N. Y.; Fairfield, Conn.; New Kensington, Penn.; Manitowoc, Wis., and Detroit, have gone out on strike. Automobile manufacturers throughout the country are more or less interested, inasmuch as there is a possibility that serious results may obtain if the strike is prolonged a sufficient length of time to interfere with the production of cars during the rush period.

The Aluminum Castings Company produces a large number of parts that go into the construction of automobiles. Its products are very important, and its 11 factories supply a large portion of the makers in the industry. A long continued strike would affect seriously the business of nearly every motor car concern of prominence.

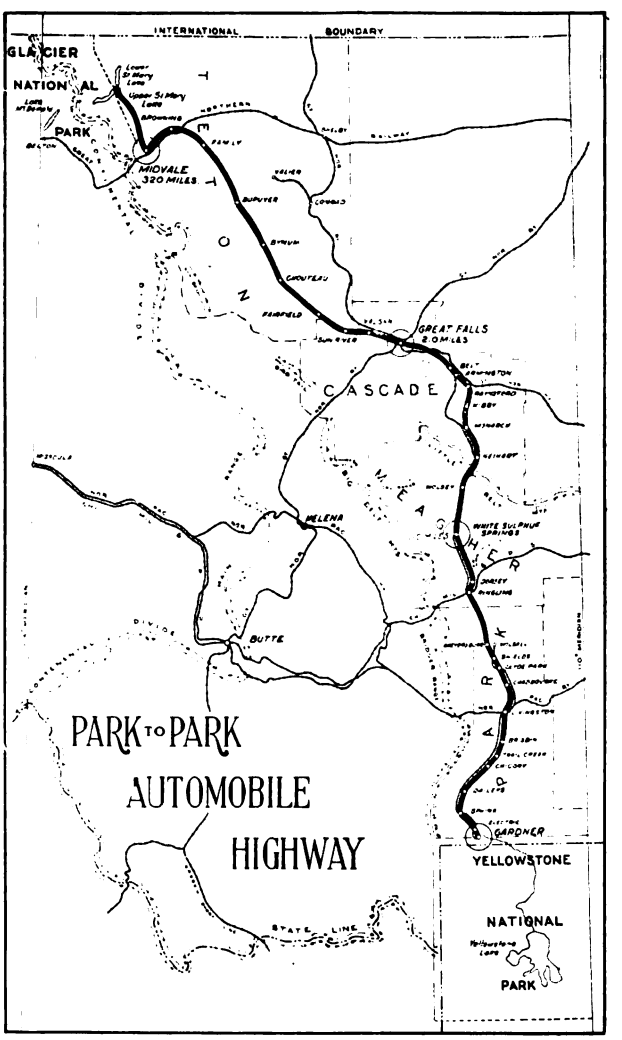
NEW SCENIC HIGHWAY.

Private and Public Enterprise Unite in Making Montana Attractive to Motorists.

As a concrete instance of the way in which the people of the West are encouraging automobile tourists, may be cited the new highway which is to connect Yellowstone and Glacier national parks in Wyoming and Montana. Part of this work has been completed, and it is of particular interest to note that Louis W. Hill, president of the Great Northern Railway, is to construct at his own expense, about $50,000, an extension of the original layout through 40 miles of Glacier park to the Two Medicine and St. Mary's lakes. An accompanying map gives an excellent idea of the section and the work contemplated.

This will make a splendid, scenic, automobile roadway from Gardiner, the northern gateway of Yellowstone park, up through the State of Montana to Great Falls, and thence along the eastern slope of the Continental Divide to Midvale, the eastern slope gateway to Glacier park, a distance of 360 miles, not including the extension mentioned above. The state is doing much of the work, but it is expected that the United States government will be asked to help.

Last fall, the first highway connecting these two parks was opened. It follows the old Lewis & Clark trail over the Rocky mountains to Missoula, thence along the western slope of the Divide, up through the Flathead country to Malispell and finally to Belton, the western slope gateway to Glacier park. Mr. Hill, piloting a party of motorists, officially opened the last 250 miles of this roadway as an extension run to the Twin City-Helena automobile tour.



Map of Highway Connecting National Parks in Montana.

The party abandoned the automobiles at Belton and crossed back over the Divide on cayuses, going over the picturesque trails through Glacier park. It is through this section that he will soon begin the work of hewing an automobile highway amid the fir timber of this magnificent park. If it is possible to obtain permission from the government to open Yellowstone park in the same manner, motorists will find this one of the most delightful touring places in the world. In any event the generosity of Mr. Hill will

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place the beauties of Glacier park within easy reach of every automobile owner.

OSWEGO'S FIRST SHOW.

Splendid Display of Cars and Accessories Interests Citizens of Central New York.

Mayor David D. Long of Oswego, N. Y., pressed the button which turned on the myriads of electric lights in the state armory, April 10, for the first show of the Oswego Automobile club, which closed April 13. It was a splendid display of the season's models, and some of the features were decidedly new, particularly that of society night, when the festivities concluded with a programme of dancing.

The event was under the management of W. R. Marshall, assisted by the following committee of the club: P. B. Keating, James Dunlap and N. L. Bates. In the hallway approaching the main drill shed an arbor of lattice work and southern smilax greeted the visitor. Inside, the entire ceiling was hidden by 10,000 yards of bunting, the prevailing color scheme being white and gold. More than 2000 lights helped to display the merits of the respective cars and accessories on exhibition.

Cars were shown by: Chase Motor Truck Company, Chase truck; J. I. Case Threshing Machine Company, Case; F. P. Anderson, Alco, Hupmobile; Keating Garage & Engine Company, Buick, Chalmers; James Auto Company, Hudson, Havers; H. R. Franklin, Reo; Overland-Syracuse Company, Overland; S. C. B. Garage, Ford, Cadillac; S. G. Dutcher, Elmore; Hazard & Ryan, Michigan; A. A. Ledermann, Pierce-Arrow; H. D. Pierce, Regal; F. D. Van Wagenen, Maxwell, E-M-F, Flanders; T. A. Young, R-C-H; J. C. Miller, Mitchell; National Motor Sales Company, National.

Other exhibitors were: Syracuse Rubber Company, accessories; Standard Oil Company, Polarine oils; M. W. Carlton, Harley-Davidson motorcycles; Baker Electric Company, lamps; M. T. Crimmins, Indian motorcycles; O-Tak-A Tire Remover Company, tire tools; J. H. Valentine Company, Hanna self-starter; S. F. Heydenfelt, Curtiss and Bleriot aeroplanes.

PRODUCTION IN CONNECTICUT.

Census Bulletin Discloses Remarkable Increase in Business During Last Five Years.

The bulletin concerning manufactures in Connecticut, as revealed in the 13th census, will prove interesting reading to those engaged in the automobile industry. This shows eight establishments reporting the manufacture of automobiles and 20, with about one-quarter of the total value of products for the whole industry, engaged in producing automobile bodies and parts as the most important product. A marked increase is shown in value of products and in value added by manufacture from 1904 to 1909.

With these 28 concerns, the average number of workmen employed in 1910 was 3815. The value of products for the year was $11,668,000, and the value added by manufacture, $6,812,000. This shows a percentage of increase in value of products of 341.3 and in value added by manufacture of 360.

The cities showing a gain in value of products in 1909 as compared with 1904, due in a measure to the automobile industry were: Bridgeport with 47.1 per cent.; New Haven, 28.8; Hartford, 56.6, and New Britain, 34.2.

A comparison of the automobile industry for the state, as between 1904 and 1909, shows that there were manufactured in the former year 386 gasoline and 319 electric cars, and in the latter, 2913 of both types, these not being separated in the report for 1909. Steam vehicles to the number of 127 were produced in 1904, but this appears to have become a lost art in 1909. The average value a machine in 1909 was $2564 as against $2354 five years previous. The report concludes:

"Although the electric machine was the type first produced in Connecticut, practically all machines built in the state in 1909 were of the gasoline type. A detailed statement by classes of the automobiles manufactured is not presented, because to do so would disclose the operations of the individual establishments. Touring cars rank first in number, runabouts second, and closed pleasure and family vehicles third. Cabs, patrol wagons and ambulances rank in the order named. Nearly all the machines were equipped with engines of from 30 to 50 horsepower, although a few pleasure and family vehicles exceeded that rating and a limited number fell below it."

DISCUSS SPEED REGULATION.

Conference of Motorists and Law Makers Seek Plan to Reduce Possibility of Accident.

A conference for the purpose of arriving at some definite plan with regard to the regulation of automobile speed in New York City was held in the City Club, 55 West 44th street, April 16, at which the following were present: Chief Magistrate William G. McAdoo, Ralph Folks, leader of the majority in the board of aldermen; Frank L. Dowling, minority leader; Otto C. Gelbe, chairman of the aldermanic committee on police; Police Commissioner Waldo, President Conde Nast, Secretary Frederick H. Elliott and Joseph Tracy of the Touring Club of America, M. J. Budlong and John F. Plummer of the Automobile Dealers' Association, President H. F. Donaldson and General Manager Coker F. Clarkson of the Society of Automobile Engineers, Foster Gilroy and C. R. McMillen, representing other interests.

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Various methods have been suggested for reducing the number of accidents which have been the subject of much comment in the metropolis of late. It is admitted on all sides that the average motorist is not to blame, but the question is one rather of attempting to reach the reckless operator or owner who has given abundant evidence of his lack of respect for the rights of others. The board of aldermen has before it an ordinance seeking to fix a speed limit which shall be both reasonable and safe.

Naturally, this has brought up the whole matter of speed limitation and there is a wide difference of opinion as to whether it would be best to fix a limit of say 15 or 20 miles an hour. The chief magistrate laid before the conference the conflict in ideas now existing among the various magistrates under the "reasonable and proper" regulation of automobiles. it is hoped that some scheme may be devised whereby there will be uniform ruling upon the subject.

Among the suggestions offered is that of amending the city charter so as to give the police power to issue and revoke licenses for driving, this applying to the owner as well as the professional chauffeur. It is expected that in this manner it will prove an easy matter to reach the reckless operator.

IMPROVED ROAD STATISTICS.

National Board Gives Some Decidedly Interesting Figures Concerning Highway Work.

According to the figures submitted in the report of the office of public roads, Department of Agriculture, the total public highways in the United States at the close of 1909, the latest date for which information is available, was 2,199,695.14, which exceeds the mileage in 1904 by 48,266.14. Of this total, 109,476.32 miles were improved, 102,870.44 miles being surfaced with gravel, 59,237.35 with stone and 28,372.52 with other materials.

As a great deal of good roads work has been accomplished during the past two years, it is probable that these figures will have changed materially by the time the next report is made. However, some facts stand out very prominently in this statement.

Indiana led all other states in the total mileage of improved roads with 24,955.75 miles. Ohio remained in second place with 24,106 miles. New York was third with 12,787.36, Wisconsin fourth with 10,167.33, Kentucky fifth with 10,114.95, Illinois sixth with 8914, California seventh with 8587.75, and Massachusetts eighth with 8463.18. The greatest progress in road improvement was made in New York.

The table below gives the mileage statistics for all of the states, in order of their percentage of improved roads. It will be seen that Massachusetts has yielded first place to Rhode Island, which was second in 1904. Indiana remains in third place and Ohio in fourth. The position of the other states has changed very materially:

State	Total Mileage 1904	Total Mileage 1909	Per Cent. Improved 1904	Per Cent. Improved 1909
Rhode Island	2,361	2,120	43.27	49.14
Massachusetts	17,092	17,272	45.89	49.00
Indiana	68,306	67,996	34.96	36.70
Ohio	69,439	88,861	33.79	27.13
Connecticut	14,088	12,583	16.75	24.08
New Jersey	14,842	14,842	16.32	22.76
Kentucky	57,137	53,744	16.60	18.82
Vermont	14,521	14,406	13.45	18.40
California	46,653	48,069	18.87	17.87
Wisconsin	63,593	61,090	16.72	16.64
New York	73,798	79,279	7.96	16.13
Washington	31,998	34,283	6.17	13.19
Maryland	16,773	16,773	9.36	12.77
Utah	7,090	8,320	8.57	12.23
Tennessee	48,989	45,913	8.75	11.66
South Carolina	41,830	32,075	4.49	11.02
Maine	25,528	25,528	9.10	10.59
Michigan	69,296	68,906	10.14	10.01
Florida	17,374	17,579	5.10	9.97
New Hampshire	15,116	15,116	8.55	9.58
Oregon	34,258	29,475	7.56	9.49
Illinois	94,141	94,141	8.42	9.47
Georgia	57,203	82,230	2.86	7.27
Minnesota	79,324	79,322	7.87	6.83
Alabama	50,089	49,639	3.43	6.58
Delaware	3,000	3,000	2.20	6.22
North Carolina	49,763	48,285	2.53	4.79
Arizona	5,987	5,987	3.62	4.56
Missouri	108,133	107,923	2.53	4.40
Virginia	51,812	43,399	3.09	4.38
Wyoming	10,447	10,569	1.46	3.94
Pennsylvania	99,777	87,386	2.17	3.84
Texas	121,409	128,971	1.75	3.80
Arkansas	36,445	36,445	.64	2.97
Idaho	18,163	18,403	1.16	2.77
Iowa	102,448	102,427	1.62	2.45
West Virginia	26,178	32,109	.97	1.84
Louisiana	24,897	24,962	.14	1.32
Colorado	30,214	29,693	.59	1.08
Mississippi	38,698	39,619	.31	.86
New Mexico	15,326	16,920	.01	.61
Oklahoma	43,554	71,325	..	.50
South Dakota	59,295	56,354	.25	.50
Montana	22,419	23,319	.28	.41
Kansas	101,196	98,302	.27	.38
Nevada	12,585	12,751	.51	.36
Nebraska	79,462	80,338	.03	.31
North Dakota	59,332	61,593	.36	.23
Totals	2,151,379	2,199,645	7.14	8.66

NEW TIRE PRICES.

Figures Show Substantial Reduction Put in Force by Some of the Leading Manufacturers.

The new prices which went into effect with many of the leading tire manufacturers of the country early in the month vary decidedly, but in no case it is understood the cut will be less than 10 per cent. The old prices were as follows: Size, 32 by 3.5 inches, $24.40; 34 by four, $37.75; 36 by four, $40.25; 36 by 4.5, $50.75; 36 by five, $62.30. Two firms have arranged a new scale as follows: Size, 32 by 3.5, $21.20 and $21.70, respectively; 34 by four, $31.30 and $33.60; 36 by four, $33.35 and $35.80; 36 by 4.5, $42.05 and $45.20; 36 by five, $51.65 and $55.50. Others have announced a straight reduction of 10 per cent. and still others have not made public the new schedule, but promise it in the very near future.

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GROWTH OF THE ACCESSORY INDUSTRIES.

Demand for European Equipment for Motor Vehicles as Exemplified by Marburg Brothers, Importer and Sales Agent for Mea Magnetos, Lodge Spark Plugs, S. R. O. Ball Bearings and Marburg-Hagen Springs.

NO DEMONSTRATION of the wonderful industrial progress of the world has been as complete as that made by the adoption of the automobile. The

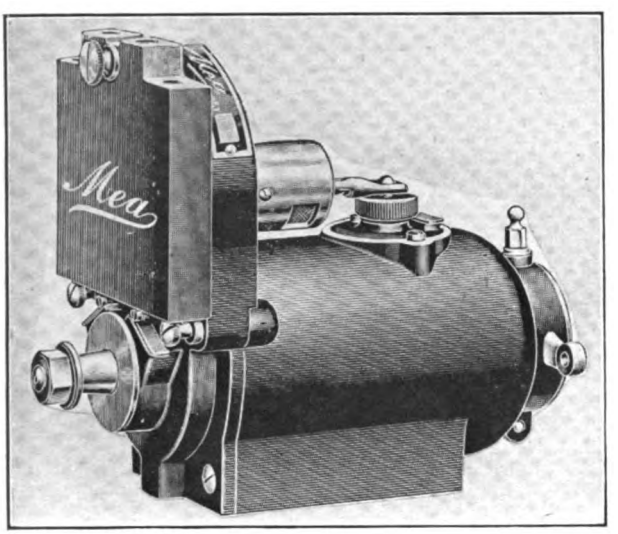


Fig. 1—The Mea Magneto, Type A 4.

endeavors to perfect the mechanical conveyance have brought developments that are seemingly commonplace enough to those who engaged in or observed the work. This applies to industry and engineering. The periods of transition have been marvellous when measured by the standard of weeks and months. Gigantic enterprises and mammoth factories have been created and without in any material degree satiating the demand. It is possible to point to hundreds of instances where enterprises have been developed to large proportions from an initial business based entirely on the merit of a single product, sold in a market in which the competition has been particularly keen.

An illustration in point is the business of Marburg Brothers, engineers and importers, a firm that but little more than two years ago established itself in an office having floor area of 240 square feet in the automobile district of New York City. The company now occupies a double suite of offices in the same building with nearly 3000 square feet of floor space, which has been found inadequate, and it has arranged to locate in an office suite in the new United States Rubber Company's building, at Broadway and 58th street, June 1, where an area of 4000 square feet of floor space will be occupied.

But this does not represent the true growth, for during the past year offices have been established in Chicago and Detroit because of the demand from the trade for personal attention, and the firm has been increased by the admission of a third brother.

Undoubtedly a large measure of the success in this case has been due to the business methods of the firm, which were adopted after careful study of the demands of the market and the merits of the lines available, and arrangements were made for handling exclusively some of the standard products manufactured by leading European firms.

Of these probably the best known is the Mea magneto, made by the Mea Works, Stuttgart, Germany, it being claimed for this instrument that its design and construction insures a better spark at all positions of advance and retard than can be obtained with the horseshoe type magnetos, even with heavier magnets.

A second line is the S. R. O. ball bearings, made by the Schmid-Roost Company at Oerlikon, Switzerland. The factory where the S. R. O. bearings are produced is the oldest in Europe, which means the oldest in the

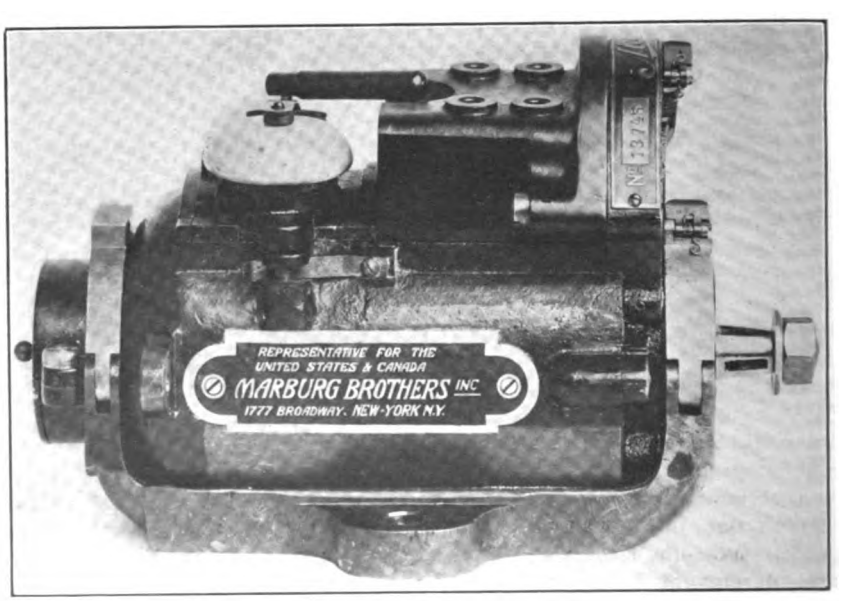


Fig. 2—The Mea Magneto, Type B H 4.

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world, and these bearings are famous for the workmanship and the high grade material.

The third product is the Lodge double-pole spark

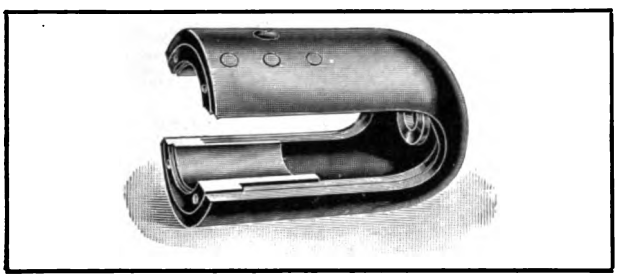


Fig. 3—The Bell Shaped Magnet of the Mea Magneto.

plugs, made by Lodge Brothers, Birmingham, England, a leading firm of English automobile engineers, a description of which, with the benefits derived from two point ignition, is given later.

The fourth is the Marburg-Hagen springs, produced at Hagen, Germany, where spring making has been the chief industry for generations. The qualities of these springs are amply proven by the European automobile manufacturers who use them.

The demands of the motor vehicle industry have been considered by the firm in its activities, although of course the S. R. O. bearings are just as suitable as any others of standard makes for all manufactures, and the springs can be made to suit any design submitted by vehicle manufacturers, whether motor driven or not. It is an acknowledged fact that the Mea magneto, besides its recognition in the American automobile world, has attained an enviable position in the aeronautic field, and in the motor boat industry it is very widely known.

The Mea Magneto.

For energizing the explosion engine the magneto has been generally adopted by designers, engineers and builders, because of the elimination of many elements of uncertainty obtaining with the use of the battery and the possibilities for simplifying construction. Regarded as more reliable, and having especial endurance, the magneto is necessary unless a cheaper installation is made through economy. Magnetos are numerous in types and constructions, although there are really two classes, in which the varied forms may be grouped: viz., low-tension magnetos and high-tension magnetos. There are two types of low-tension magnetos, the first used in connection with a step-up coil, furnishing a jump spark, and the other used in connection with the make and break system. The strictly high-tension magneto furnishes a jump spark. Further distinctions and divisions can be specified as the armature and inductor divisions. The armature division may be sub-divided into the primary and the compound armature types, and the latter into low and high-tension forms.

All magnetos are made with permanent magnets and the current present in these magnets flows from the positive to the negative poles. The stronger the magnetic influence the more efficient the instrument. The "cutting" or breaking of the current of magnetism creates an interval or interruption that, if the current is induced to flow through a circuit in which there is an air gap (which in the ignition circuit of an explosion engine is between the electrodes of the spark plug) will arc or "jump" and cause a spark of varying intensity. The current as it is generated by a magneto is seldom of proportions to be noticeable until it has been intensified. This is accomplished by the use of a rotating member between stationary windings, or windings rotating between the poles of the magnets.

With the armature types of instruments that which has an armature composed of the core of soft iron wire, wound with a number of layers of smaller wire, each winding being separated by insulation, is known as the primary form. The current generated by it must be increased in potential and so it is carried to the transformer coil, composed of a considerable number of layers of smaller wire carefully insulated, and it is then directed through a distributor to the engine in a satisfactory manner. The primary armature magneto is always low tension.

The compound form may be practically the same in general appearance, but the armature is composed of the core and the primary and secondary windings, and the current may be sent out direct without the use of the coil, this being replaced by the second winding on the armature.

The inductor types may be similarly low and high tension. The form differs with the armature instruments in that the rotor is caused to revolve between the stationary windings. If the windings be the core and the first, or primary, winding only, it is necessary to employ a transformer coil to properly intensify the current, but if the windings are both primary and secondary the current may be used direct and the instrument is high tension. With the high-tension magneto the vibrator coil and the timer are eliminated, the distributor supplying the place of both.

So far as low-tension magnetos may be used they may be likened to the ordinary dry cell generator or liquid accumulator (both being termed batteries) in that the energy available, to be useful, must be intensified. The low-tension magneto is merely a source of current in which the energy is generated as the instrument is driven.

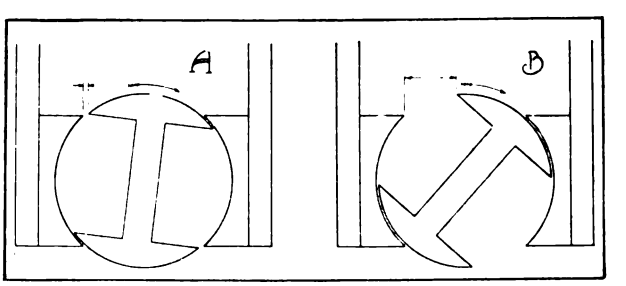


Fig. 4—Relative Position of Mea Magneto Magnets and Armature at Spark Production: A, Advanced; B, Retarded.

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The facts summarized will differentiate each form or class of magneto sufficiently to permit description of the high-tension types of Mea magnetos, imported

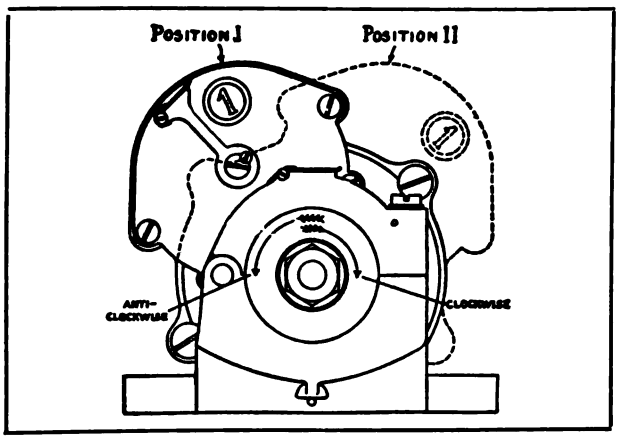


Fig. 5—Spark Advance with Mea Magneto. Advanced at Position 1 with Clockwise Instruments, Retarded at Position 2. Drawing Shows Driven End of Magneto.

by Marburg Brothers. In all there are 22 different machines, adapted for use with one, two, three, four, six or eight-cylinder motors, and these are small, medium, large or very large, as the proportions of the engines demand. To illustrate: There are three sizes of single-cylinder magnetos, three of two-cylinder, two of three-cylinder, four of four-cylinder, three of six-cylinder and one of eight. Obviously all of these differ, but so far as principle of design is concerned they do not vary to any appreciable extent.

The Mea magneto differs with all other instruments in that its construction permits the simultaneous movement of the magnets and the breaker, instead of the movement of the breaker only, as is the conventional practise. The value of this quality necessitates an explanation in brief relative to high-tension magnetos. Taking the armature type with the winding connected in series, the low tension or primary winding is ordinarily short circuited by a breaker that opens at certain points each revolution, generating a high voltage in the secondary or high-tension winding at the instant of the break in the current and causing a spark at the gap between the electrodes. The quality of the spark, its heat value to be precise, is dependent largely upon the position of the armature with reference to the magnetic field, or the relation of the armature and the field, when the spark is created.

With the high-tension magneto the correct relation or position is established twice each revolution, or at intervals of 180 degrees, and two sparks may be obtained each time the armature has revolved once. The production or timing of the spark is by opening the breaker earlier or later, and if the magnetic field (the magnets) cannot be moved the relation between the armature and the field must be changed if the spark be advanced or retarded.

The design of the Mea magneto mechanically insures a uniformity of spark in all positions of timing, as the breaker is attached to the magnet and is advanced and retarded simultaneously with it, thus establishing retarded positions between the magnet and the armature field that cannot vary. The value of this quality is shown in diagram at Fig. 4. The range of timing of the Mea magneto is from 45 to 70 degrees, depending upon the size and type of the instrument. However, the timing range can be increased to any number of degrees desired. In other words the relations are not changed and there should be the same value of spark at all times. The value of the equally hot spark in all positions of timing is well understood. The magneto can be put in full retard and the engine started easily if there is an explosive mixture in the cylinders. As the requirements for driving slowly with a heavy load are the same as those of starting, the same benefits are obtainable under these conditions. The loss of possible high speed need not be feared, as the Mea spark is of the same intensity in the maximum advance of the magneto, and its range of timing is ample to reach the limits of any motor.

In contrasting this value it is maintained by the maker of the Mea instruments that the only time the retarded spark is desired is when the engine is running slowly or the car is moving slow, and that it should be just as reliable as at any other time of operation. The feature of the Mea magneto is a bell shaped magnet that is placed in the axis of the armature, a distinct contrast with the horseshoe type of magnet, which is installed at right angles to the armature. The magnets are claimed to have great magnetic permanency because of the form, which is a factor of material importance. The magnetos, it is maintained, will produce a spark of constant intensity, assuming constant speed, independent of the timing.

The following description of the four-cylinder magneto will be of interest: Referring to Fig. 8 it will be noted that the bell shaped magnet 100, with the poles in a horizontal line near the driven end of

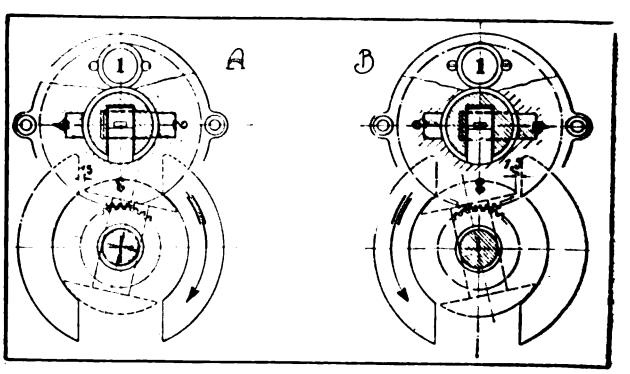


Fig. 6—Position of Armature and Distributor at Firing Point: A, Clockwise Magneto; B, Anti-Clockwise Magneto.

the magneto, partly encloses the armature 1. This armature is mounted in the ball bearings 17 and 18. The armature consists of a spindle or shaft carrying an

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I shaped iron core, which is wound with a heavy primary winding of a few turns of wire and a light secondary winding of many turns of wire. This arma-

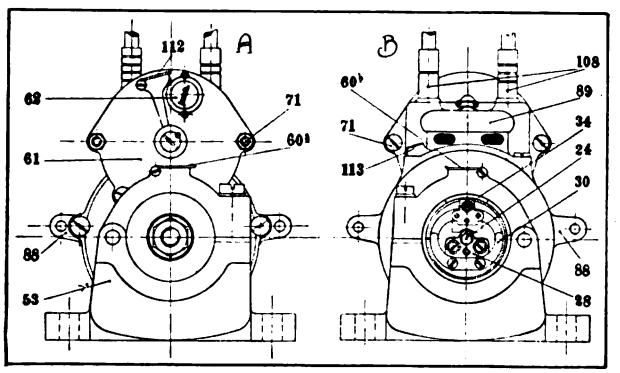


Fig. 7—Mea Magneto, Types B and C: A, Front, or Driven End; B, Rear or Breaker End.

ture shaft also carries the condenser 12, the collector ring 4, and the low-tension circuit breaker 26-39. The circuit breaker is composed of the disc 27 which carries the short platinum contact 33, and the insulated plate 28 which holds the spring 30 which supports the other platinum contact point 34. This platinum point is adjustable. The circuit breaker is operated by the fibre roller 31, in connection with the cam disc 40, which is provided with two cams and is located within the breaker. The circuit breaker is parallel to the primary winding outside of the case 96, and is covered with a brass case. In the operation of the circuit breaker the fibre roller 31 presses against the cam disc and lifts the disc supporting the spring and brings the contact points together.

The circuit breaker box is closed by the cover 74, which supports at its centre the carbon holder 47, by which the carbon 46 is pressed against the screw 24. The screw 24 connects at one end with the low-tension winding of the armature and at the other end with the core of the armature. The entire circuit breaker can be removed by the removal of the screw 24. The condenser 12 is in parallel circuit with circuit breaker and is fitted to the right armature cap. This serves to absorb the excess current induced by breaking of primary circuit. The ends of the primary and the secondary windings are metallically connected with armature core consequently with the body of the magneto. The joint of the two wires is connected with the metal piece 4 of the condenser 12, which is insulated from the armature shaft. The secondary wire is connected with a slip ring that is fitted to the vulcanite member 6, which is insulated from the armature shaft. From this slip ring the high-tension current is conducted through the carbon cylinder 77, carried by a holder and insulated from the cover 91, and thence to the distributor 70. A second carbon 78, which is not insulated, slides on the right cap of the shuttle and serves to conduct the current from the armature to the body of the magneto.

The high-tension current is collected from the collector ring 4 by the brush 77, which is carried in the brush holder 76 which is also supported by the removable cover 91, the low-tension grounding brush 78 being carried by this same cover, which relieves the ball bearings of all current that might have a deteriorating effect. The cover 91 also carries the safety gap 89, which protects the armature from excess of voltage should the magneto become disconnected from the spark plugs.

The distributor is attached directly above the armature and it consists of the shell 70, the rotating member 66, which is driven by the steel and bronze gears 7 and 72 from the armature shaft, and the distributor finger 23, the shell and the rotating member being of the best insulating material. Imbedded in the shell are four contact plates which are in metallic contact with the lead terminals at the top of the distributor, into which the ends of the cables connected with the different engine cylinders are inserted and made fast.

The high-tension current is collected from the collector ring 4 by the brush 77 and the brush holder 76 and reaches the distributor from the carbon 77 through the bridge 84 and the carbon 69. It is conducted to the brushes 68, placed at right angles to each other, which make contact alternately with the four contact plates in the distributor shell 70.

In the operation of the instrument the circuit breaker ordinarily short circuits the low-tension winding of the armature and this short circuit is only broken when the breaker opens. When the screw 24 is grounded through the terminal 50 and the low-tension switch to which it is connected, the low-tension

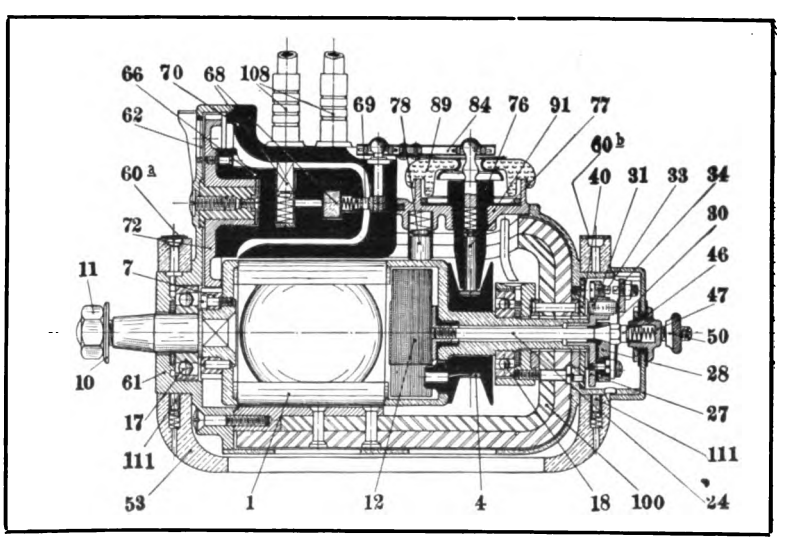


Fig. 8—Section of B H 4 Mea Magneto. Lower Half of Drawing at Right Angle to Upper Half, to Show Pole Piece Construction.

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winding is permanently short circuited so that the magneto will not create energy.

Any desired variation in timing is accomplished by

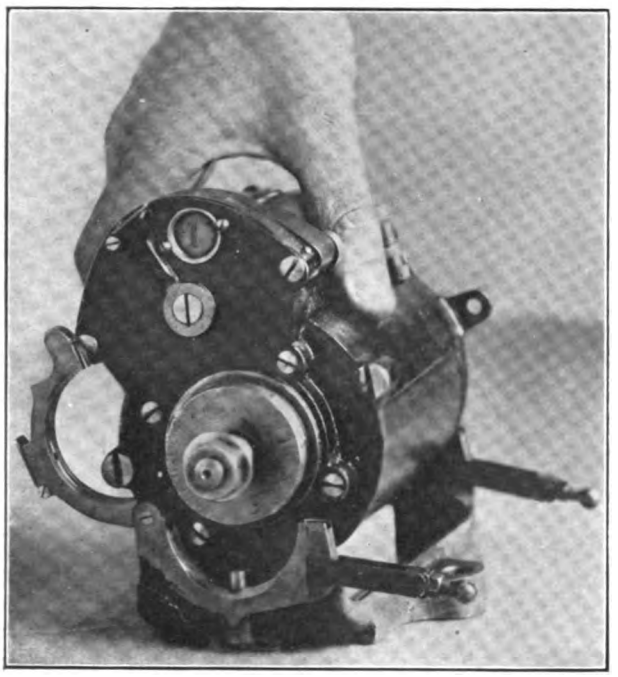


Fig. 9—Mea Frame or Base Unclamped for the Removal of the Magneto, Illustrating the Accessibility of the Instrument.

turning or rocking the bell shaped magnets in the stationary base by means of the lever connections at the side lugs, shown as 88 in Fig. 5. The spark is advanced by turning the magnet in the direction opposite to the rotation of the armature, and it is retarded by turning it in the direction of the rotation of the armature. The range of timing obtained with all medium and large size magnetos for three, four, six and eight-cyclinder motors is about 70 degrees, or very nearly the fifth of the circumference of a circle.

The magneto is mounted in the frame or base 53 so that the entire construction may be turned or revolved partially on its axis. The installation is such that the magneto may be removed from the frame with the greatest ease, by removing the top parts, 60a and 60b, of the bearings. Not only is the weight small but the protection from water, dust and road accumulations is ample. The breaker construction is such that even at the highest speeds the lightness of the parts insures accurate operation, while the centrifugal force has no undue influence upon the circuit breaker because the circuit is broken parallel to the axis.

In Fig. 5 will be noted a circular indicator that is protected by glass through which may be seen the numbers marked on the distributor gear, which correspond to the number of the cylinder the magneto is firing. This has a special value in that it permits the magneto to be positively set after it has been removed from the base, this obviating the trouble of learning the position of the distributor by opening the distributor case. The cables are all marked so as to make replacement a certainty.

The type A magnetos are all small and with these the case is stationary and is designed to be fitted to the engine without a separate base. The timing range of this type is about 45 degrees. With the types B and C the magnetos are turned in the base as has been described. With the single-cylinder magnetos the distributor and distributor gears are not used, the current being taken from the carbon holder 70 direct. The two-cylinder magnetos are similar to the single-cylinder instruments save that the metal part of the slip ring 4 extends only over about 100 degrees and the two collecting carbons are placed at an angle. But one carbon is connected with the high-tension winding at a time and the current is alternately sent to one or the other cylinder.

As summarized the advantages claimed for the Mea magnetos are increased flexibility of the car, safe and easy cranking, greater power, quick acceleration, and that no battery is required for starting. To further emphasize these it is maintained that with a retarded spark the engine may be operated at the slowest speed it will draw a charge of fuel; the necessity of gear changing is reduced; no matter how high a speed the magneto is timed for it may be retarded to a position safe for firing and started on a quarter turn of the crank, that the power is increased with a retarded spark, and in hill climbing for instance driving can be made on the high speed; that quick acceleration is positive because of the certainty of the spark.

Because of the adoption by a considerable number of makers of equipment employing acetylene gas for the initial impulse in starting necessitating the creation of a spark without the use of the starting crank,

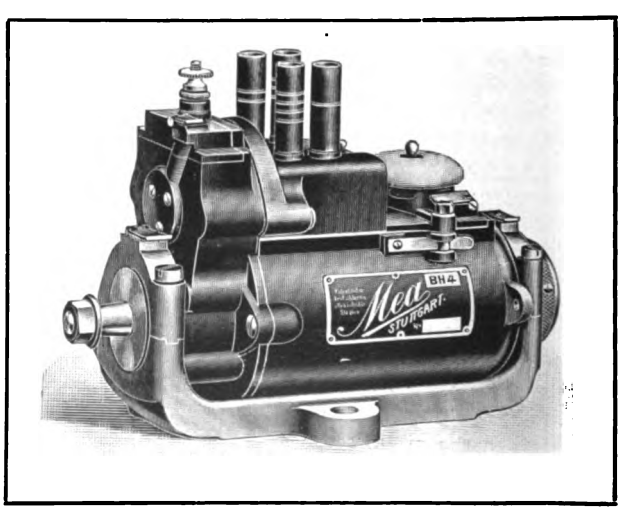


Fig. 10—Mea Magneto, Type B H 4, as Equipped for Dual Ignition.

the Mea dual magneto has been placed on the market. This installation includes a Mea coil switch and a Mea magneto dynamo, which in the main does not dif-

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fer with the Mea high-tension magneto or independent type, but is provided with a battery breaker. The system of connections differs somewhat with the two

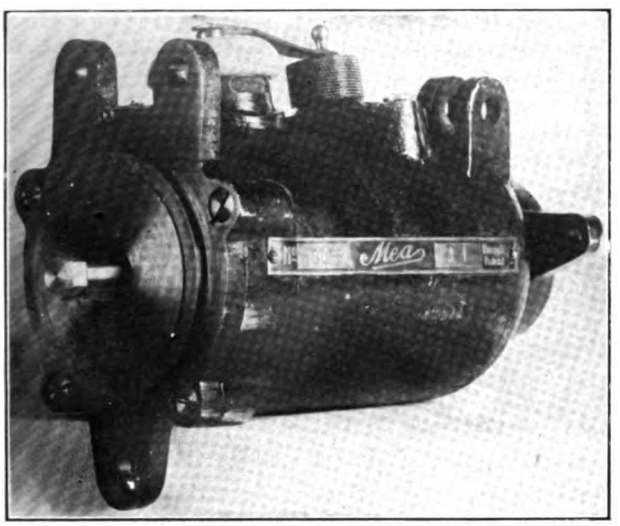


Fig 11—Mea Magneto, Type G1, Built for Use with Gnome Aeroplane Motors.

types described and in these particulars:

The secondary (high-tension) connection includes wiring from the distributor to the spark plugs, which is the same as used with the independent magnetos, a connection from the high-tension switch to the magneto distributor, and from this switch to the high-tension carbon holder. The primary wiring includes a connection from the circuit breaker of the magneto to the switch used for grounding the magneto identical with the wiring used for this purpose with the independent magneto. Other connections unite the battery, coil and the battery breaker of the magneto.

Through these connections the distributor is connected either to the magneto or to the high-tension side of the coil. Whenever the distributor is connected to the coil the low-tension part of the switch grounds the breaker of the magneto and closes the circuit to the battery breaker. When the distributor is connected to the magneto the switch disconnects the battery and opens the battery ground connection. In this manner the distributor will be connected to the magneto armature whenever the magneto fires, and it is connected to the coil whenever the coil is operated. The Mea dual installations are furnished for four and six-cylinder engines, in sizes for medium, large and very large motors.

The standard Mea dual equipment includes a coil of the vibrator type, but if desired single spark coils can be furnished, these affording a single spark for each firing stroke, and fitted with an attachment that will create a very rapid succession of sparks for starting purposes. Both coils are of the horizontal dashboard type that may be easily installed. The magneto dynamos of the two types differ only in the arrangement of the battery breaker. With the vibrator type of coil the breaker closes when the spark is created, while with the single spark form the breaker is normally closed and is opened at the instant of firing. The vibrator coil was adopted with the Mea equipment because of greater simplicity in construction and operation, and the fact that if through oversight the coil remained connected with the battery with the motor stalled it would not heat as would a single spark coil. The only advantage of the single coil—greater motor efficiency—is regarded as of little value with the Mea magneto, because its qualities are such that the battery would seldom be used save for an emergency, when fast work or great power is not so important.

With the type SC Mea coil and switch all terminal posts are placed in the periphery of the coil close to the dashboard, and the vibrator is located at the end of the coil where it may be easily reached for adjusting. The switch has three positions—magneto, battery and off. No push button or special starting device is required. To start the battery from the seat the switch is moved to the battery position and, after starting, changed to the magneto. When cranking

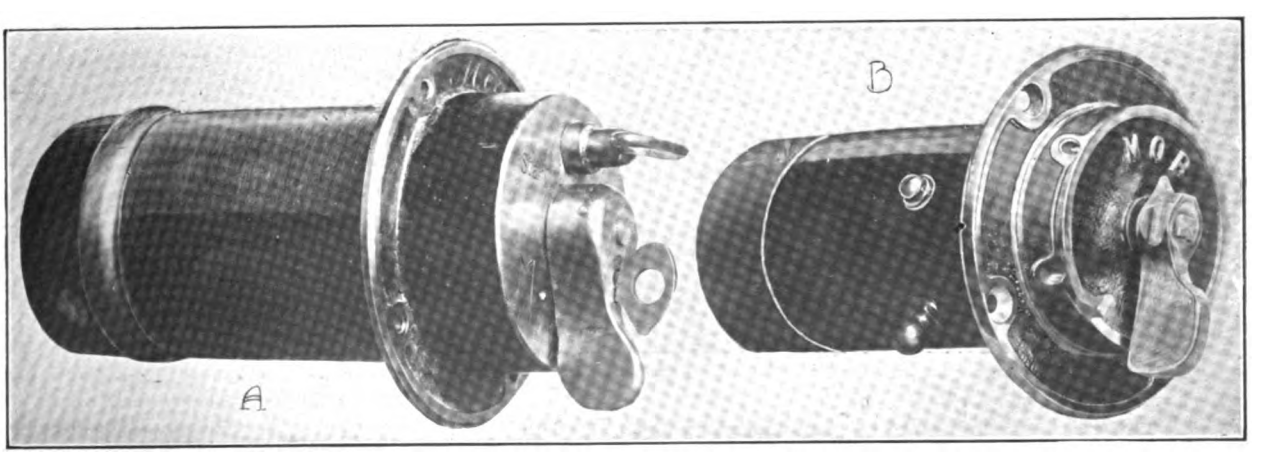


Fig 12—Dash Coils for Mea Dual Ignition: A, Type SS; B, Type SC.

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the engine the switch may be on either battery or magneto. When starting from the seat or cranking, on either battery or magneto, the timing lever should

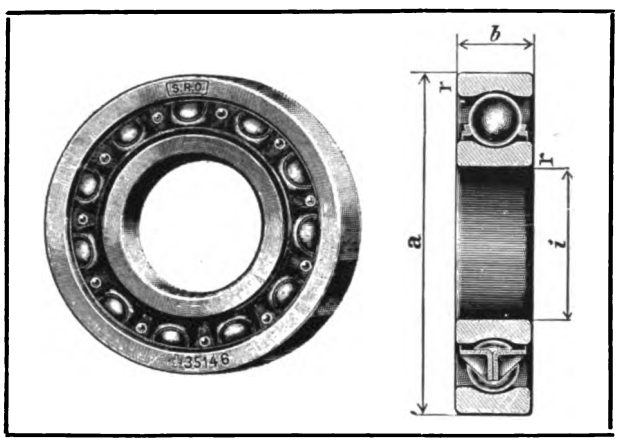


Fig. 13—Side View and Cross Section of S. R. O. Ball Bearing.

be placed in the position of full retard.

With the type SS all terminals are located at the rear end of the coil, while at the front are the switch and starting device. The latter is a mechanically actuated vibrator, by which one or a succession of sparks may be produced. In starting the switch is turned to the battery position and the starter slightly turned. When starting from the seat or cranking the timing lever should be full retarded.

For use in connection with the Gnome and Anzani aeroplane motors a special Mea magneto has been constructed. This instrument is built with a face plate that serves as a bracket. The magneto, of cylindrical form, is screwed against the housing of the motor, while a bracket has been cast in the magneto shell so that a special rod may be used as a brace. The form of the magneto is especially suited to aeroplane service. The retard and advance of the spark is the same as with all type A machines.

Lodge Double-Pole Spark Plugs.

The Lodge double-pole spark plugs are the product

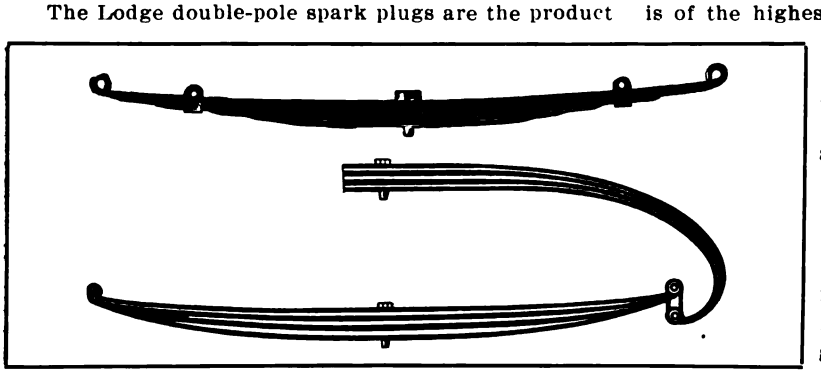


Fig. 14—Semi-Elliptic and Three-Quarter Elliptic Marburg-Hagen Automobile Springs.

of Lodge Brothers, Birmingham, England, a concern that has for years been known for the quality and character of its products. The advantage of increased power and efficiency of two point ignition, without the expense of using special double-commutator magnetos and double the number of wires from the magnetos to the cylinders, and additional wires from the magnetos to the switches, is obtained with the use of these plugs. These plugs are made with two concentric electrodes at the base of the core, both well insulated from each other and from the ground. There are two terminals above the shell or bushing. The main feature with these plugs is that there is no connection between the ground or between either of the electrodes. The usual form of plugs have one electrode grounded and the other insulated. It is maintained that these plugs give unusually efficient results and that with their use two point ignition may be obtained with the standard single point magnetos.

All that is required to obtain two point ignition with Lodge double-pole spark plugs is to have two standard plug holes in each cylinder and to connect the magneto and the plugs in such a manner that one electrode of the double-pole plug is connected to the magneto and the other electrode of the double-pole plug to the insulated electrode of the ordinary plug. The current from the magneto will thus pass through both plugs in series and fire both plugs at the same time. Of course the gain in power to be derived from the addition of a second plug in each cylinder will depend a great deal on the design of the motor and the condition of the mixture. Generally speaking, it will be greater.



Fig. 15 — Lodge Spark Plug.

S. R. O. Ball Bearings.

The S. R. O. ball bearings, made by the Schmid-Roost Works, Oerlikon, Switzerland, are produced by the oldest ball bearing maker in Europe. The workers have been specially trained and the workmanship is of the highest character. The bearings are all cut from solid steel, involving more work and greater loss of material than any other manner of manufacture. The limits for accuracy are guaranteed and the bearings are maintained to be as close as are made. The ball races are uninterrupted, as the notches for introducing the balls are shallow and do not reach the bottom of the races. The cage consists of two strong I shaped steel stampings riveted together, forming a T shape, which keeps perfect alignment. All bearings are carefully heat treated. The form of the ball races insures the least wear and the highest guarantee for end thrust endurance. The selection of the cage material prevents the formation of injurious

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metallic dust, liberal lubrication is insured and a quality of service guaranteed that is supported by the experience of many concerns covering many years. A feature of particular interest in these bearings is that lubrication is forced, as the cage acts as a scoop. A proof of accuracy of the S. R. O. bearing is to remove carefully the brass rivets and take out the two halves of the cage. It will then be observed that the balls do not fall together, retaining their positions. The bearings are made for annular and thrust service in all standard sizes, and particular attention is given to orders for special sizes. The number of European firms now using the S. R. O. ball bearings evidences that the claims made for the bearings are justified by use.

Marburg-Hagen Springs.

The Marburg-Hagen springs, the product of a noted firm at Hagen, Germany, a city that is as celebrated in the spring industry as Sheffield and Solingen are in cutlery making, is another product exclusively imported by this firm. Spring making has been the chief industry of Hagen for generations and the workmanship is maintained to be unexcelled. The springs are made of pure carbon steel, no alloy of any kind being used, which ensures a far greater uniformity of product than is otherwise possible, with much less chance of the "off heats" that cause so much trouble. The temper of the springs is a vital factor and temper for them is so scientifically obtained that they are guaranteed to have an elastic limit of from 190,000 to 195,000 pounds per square inch. This high quality is regarded as explanation of the generally speaking considerably lighter weight of European automobile springs. The Marburg-Hagen springs are used on more than 50 per cent. of all the trucks and cars made in Belgium, France and Italy. These springs are specified for all the trucks required by the German war department.

The possibilities open to anyone with intelligence and foresight who engage in the automobile industry is certainly well exemplified by Marburg Brothers, sole agent in America for such accessories as the Mea magneto and the Lodge spark plugs, and for such essentials as the S. R. O. ball bearings and the Marburg-Hagen springs. Their business is established and assured while the explosive motor is used on land, water or in the air.

NEW FLANDERS ELECTRIC.

The Flanders Manufacturing Company, Detroit, is producing a new electric. Besides being higher in price than the previous model, it has a battery of 30 cells, distributed 20 in front and 10 in the rear, a larger motor and a better controller mounted on top of the steering column. The body design, altered to accommodate the new distribution of the batteries, is on the Colonial style of the previous model. The wheelbase has been lengthened by three inches, and the car will no doubt be popular among users of the electric vehicle throughout the country.

JERSEYMEN TO CELEBRATE RECIPROCITY.

The three automobile organizations of New Jersey are planning to celebrate on May 4 the passage of the new reciprocity bill for which the motorists of the state have worked so hard. A big testimonial dinner is to be tendered to Assemblyman Stickel and the other legislators who gave the bill their support and made its passage possible. Invitations went to 4000 or 5000 motorists, and it is expected that there will be a generous response, judging by the way the affair has appealed to the men who have been approached upon the subject.

Assemblyman Stickel is to be presented with the gold fountain pen with which the governor signed the bill, and Senators Colgate and Edge are also to be remembered. In fact, all concerned with the passage of the bill will no doubt come in for their share of the reward, and the occasion will be a notable one. Arrangements are in charge of a committee of 15, five from each of three clubs, as follows: W. Clide Crosby, chairman; Richard C. Jenkinson, Horace C. Cook, Ira Kipp, G. O. Groebe and Melville A. Carpenter of the New Jersey Automobile and Motor Club; Joseph H. Wood, Hon. W. Eugene Turton, J. H. Edwards, George A. Post, W. C. Crosby of the Associated Automobile Clubs of New Jersey, and George E. Blakeslee, George H. Smith, W. H. Ellis and C. Louis Fitzgerald of the New Jersey Automobile Trade Association.

HEARST TO BUILD MOTOR MART.

William Randolph Hearst is planning to reach the automobile industry by means of a building, in addition to his many newspapers No very detailed plans have been given out as yet, but so far it would appear that New York is to have a structure similar to Boston's well known Motor Mart. A building is to be erected on the block bounded by Columbus Circle, Central Park West, Broadway, and 61st street, especially designed for use by automobile dealers. It is said that the ground floor will accommodate 19 firms, and that the height will be four stories, faced with marble.

NEW ELGIN ASSOCIATION OFFICERS.

The annual meeting of the Elgin National Road Race Association was held recently, and officers elected as follows: President, Harry D. Hemmens; vice president, T. J. Schmitz; secretary, Wallace C. Wilson; treasurer, Philip Freiler; general manager, F. W. Jenks. The proposal of the Chicago Motor Club to hold five events, including a free-for-all, on the Elgin course, Aug. 23-24, was considered without any definite conclusion being reached. It was stated, however, that if it were found that the free-for-all would rob the Elgin National Trophy race of any glory, it would be eliminated.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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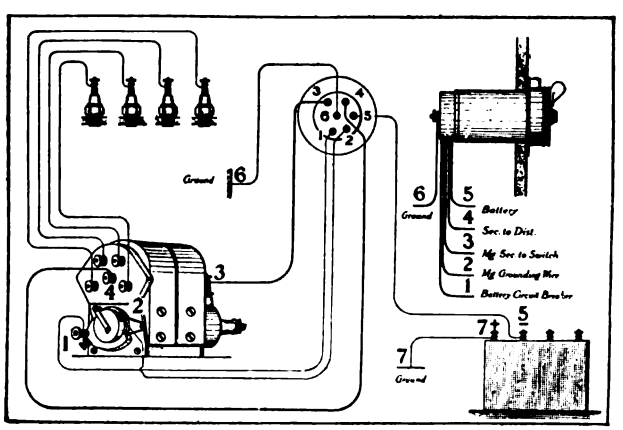
CORRESPONDENCE WITH THE READER

Wiring Dual System.

(1360)—I have a ——— car fitted with the Bosch dual ignition system and in overhauling did not mark the wires. I have tried several ways of connecting them up but fail to get any results. Being a subscriber of your magazine, and noting you answer similar questions am writing to know if you will furnish me with directions for doing the work right. IRVING W. BLISS.

Pensacola, Fla., April 11.

The wiring diagram of the ignition system referred to is outlined in an accompanying illustration and it will be noted that four connections are required between the magneto and switch. Two of these are high-tension members and consist of wire No. 3 by which the high-tension current from the magneto is led to the switch contact, and wire No. 4 by which the high-tension current from either the magneto or coil goes to the distributor. Wire No. 1 is low-tension, and conducts the battery current from the primary winding of the coil to the battery interrupter. Low-tension wire No. 2 is the grounding wire by which the primary circuit of the magneto is grounded when the switch is thrown to "off," or to the battery position. Wire No. 5 leads from the negative terminal of the battery to the coil, and the positive terminal of the battery is grounded by wire No. 7. A second ground wire, No. 6, is connected to the coil terminal.



Depicting Method of Wiring Bosch Dual Ignition System.

In connecting up the leads to the spark plugs it should be borne in mind that the motor fires as follows: 1, 3, 4, 2. The dust cover is removed exposing the distributor member. The motor is then cranked until the No. 1 cylinder, that nearest the radiator, is compressing and the piston is at the top of its stroke. The distributor segment should be in the centre or approximately, this depending upon the original setting at the factory.

Assuming that the position is correct, the secondary cable is attached to the terminal and connected with the spark plug of the No. 1 cylinder. As the magneto rotates clockwise, the distributor segment will next come in contact with the No. 2 block. The cable connecting this should be led to the No. 3 cylinder, which is the order of firing, and not to the No. 2. The next contact point is the No. 3 and the wire leading from this is attached to the spark plug of the No. 4 cylinder. As the last cylinder to fire is the No. 2, and there is but one wire left to connect it will be an easy matter. In connecting secondary leads mistakes will be prevented if the firing order of the cylinders is considered in wiring. As the engine referred to fires 1, 3, 4, 2, the distributor numbers being 1, 2, 3, 4, are apt to be confusing to the novice. It will simplify matters by connecting the leads as follows:

Magneto terminal 1 to cylinder 1.
Magneto terminal 2 to cylinder 3.
Magneto terminal 3 to cylinder 4.
Magneto terminal 4 to cylinder 2.

Advance and Retard of Spark.

(1361)—Why do we advance and retard the spark, and what effect does it have in operating a motor?

F. H. K.

New Bedford, Mass., April 14.

Advancing or retarding the spark is incorporated in the ignition system of the internal combustion engine to cause the ignition of the mixture to take place theoretically when the piston is at the top or dead centre on the compression stroke. The maximum power is developed by the production of heat in the combustion chamber, or in other words, when a greater portion of the charge is burned. Part of the heat that is released by the combustion of the mixture expands the gases and produces pressure against the piston, while the balance is lost through the cylinder walls or passes out through the exhaust. The proportion of heat actually applied is very small. The highest possible efficiency would be obtained if the charge could be ignited and burned completely at the instant the piston was at the top of the compression stroke, but this condition does not exist in practise because of the time required for the flame to travel through the vapor from the point of ignition.

In order to bring about a complete combustion it is necessary to ignite the charge before the piston reaches the end of its compression stroke, so that during the latter part of this operation, and while the member is moving upward, the charge has begun to burn and the gases to expand. The amount of the advance necessary to bring about proper combustion varies according to the design of the motor.

With the single point ignition, the spark occurs in the cylinder at some point near the completion of the

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compression stroke, this being such that the vapor will be completely ignited at the instant the piston attains dead centre. With a single spark plug located at one side of the cylinder, the flame must travel to the opposite side of the member in order to consume the mixture. This loss in time is offset by advancing the time of ignition, commonly known as "advancing the spark."

Screw Cutting Lathe.

(1362)—Can you inform me of any books on the operation of the screw cutting lathe that would be of any benefit to anyone in gas engine construction and repairing? Also, where can I obtain the necessary jigs and dogs to clamp on face plates, etc., to hold engine cranks, shafts, etc., for turning? P. J. FOSTER.

Throckmorton, Tex., April 12.

The Hill Publishing Company, New York City, publishes information of this nature. Regarding the jigs and dogs, these could be secured from any of the many concerns making these tools. The Braunsdorf-Mueller Company, Elizabeth, N. J., manufactures lathe appliances.

Power Tire Pumps.

(1363)—I wish to inquire regarding the probable outcome or effect of inflating a tire with a power pump that will pump in gas from a cylinder of an internal combustion engine. I have constructed a power pump out of an old spark plug to which I connect a tube leading to the shoe. In inflating I run the motor on three cylinders and find that I can inflate a tire in a very short time, and the operation does away with the drudgery of pumping. This of course pumps the tire with the gas and by compression from the cylinder. Is there any danger of the gas exploding and will the tire get hot enough to bring about an ignition of the mixture? Will the gas or compressed air injure the tube if no lubricating oil exists? J. R. SPANN.

Anderson, Cal., April 13.

According to a leading tire manufacturer the gasoline in the mixture will cause a rapid deterioration of the inner tubes. Regarding combustion, it is questionable if the car could be driven fast enough to produce friction that would ignite the mixture in the inner tube. If oil finds its way past the rings of the piston and thence into the inner tube it probably would injure the rubber in time.

Changing over Rims.

(1364)—I have a model ——— car and it is fitted with ——— rims. Am contemplating changing these for a quick detachable type. Was informed by the proprietor of the garage that it would require new wheels. Will you tell me if the work can be done without this added expense? C. E. READER.

Wilmington, Del., April 20.

To fit the rims desired the felloe will have to be built up about .5 inch or more. This work can be done successfully by any competent wheelwright and the expense will not be prohibitive. A strip of wood is steamed and fitted over the felloe and when the rim is shrunk on it will hold the auxiliary piece securely. The writer had similar work performed several years ago and the wheels are still substantial.

Covers for Tires.

(1365)—Having a car fitted with demountable rims, and carrying two extra members on the running board I wish to know if I should fit covers to these members? I was told that the air and sun had a deteriorating effect upon the rubber and that covers should be employed. I notice many cars carrying extra casings which are not covered. W. L. WOOD.

Washington, D. C., April 18.

Oxygen in the air hardens rubber which is also affected by oil or greases. The tires should be protected by covers as moisture is kept from the rims and in addition the appearance of the machine is considerably improved.

MILLER'S 22ND ANNUAL.

The 22nd annual catalogue of Chas. E. Miller, 97-103 Reade street, New York City, is a neat volume of 256 pages, filled with important news of the automobile accessory industry. The cover sets forth in a measure the nature of the contents—everything for motor cars, motor boats, motorcycles and motor planes. Chas. E. Miller is not only the largest automobile supply house in America, but it was the first, and its 15 stores in nine states gives it an enviable position in the supply business of the country.

The 256 pages of the 1912 catalogue will prove of double interest to the motorist. Not only will it be possible to find practically every article of merit with which he is familiar, but he will discover a wide variety of new things, which never have been called to his attention before. In short, it is a remarkable compendium of automobile accessories and supplies, as would be expected with the largest house in America.

Among the better known articles listed may be mentioned: Brampton chains, Sager equalizing springs, Truffault-Hartford shock absorbers, F. & S. ball bearings, Bowden wire, R. I. V. bearings, Duplex brakes, Gyrex the mixer, Rayfield carburetors, Dover funnels, Panhard oils, Pan-American lubricants, Dixon's graphite, Blue Ribbon polishes, Coes wrenches, Mea, Bosch and Splitdorf magnetos, Geiszler batteries, Firestone rims, Weed chains, United States, Firestone, Goodyear, Michelin and Motz tires, Sager bumpers, Jericho and Newtone horns, Jones and Stewart speedometers, Gray & Davis lamps, etc. A full list would read like an index of the accessory business. The book should be in the possession of every motorist, and will be mailed upon request.

FLAGG ON KNIGHT ENGINES.

James Montgomery Flagg, well known as a humorist and artist of distinction, recently purchased a Columbia-Knight touring car, made by the Columbia Motor Car Company, Hartford, Conn. His description of the silent running qualities of the machine is decidedly distinctive, as follows: "The operation of the Columbia-Knight reminds me of a deathlike quiet; like a man walking on rubber heels. I must blow the horn to avoid running down people, and you know a man does not like to be continually blowing his own horn."

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RECENT MOTOR VEHICLE PATENTS

Nichols Mud Guard.

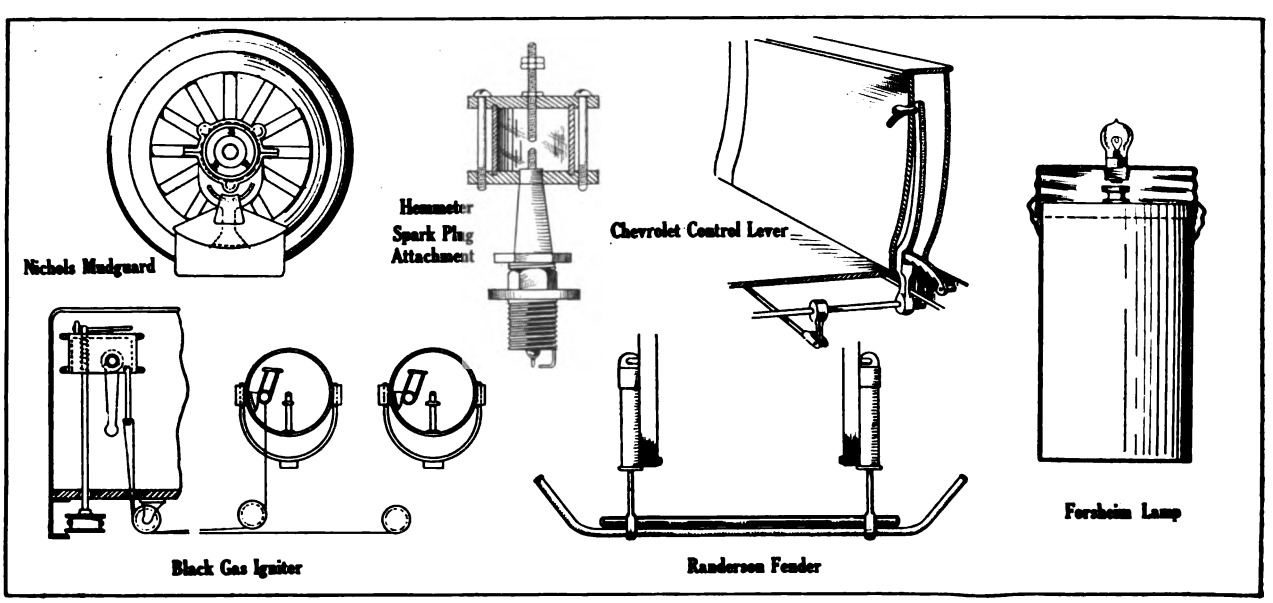
There has been considerable agitation abroad regarding the splashing of mud upon pedestrians by the wheels of motor cars and the subject has received some attention in this country. Charles Hillyard Nichols, Wolverton, England, has patented a mud guard which is attached to the hub of the road wheels, this consisting of a ring having adjustable means incorporated and interposed between it and the hub of the wheel, also a method of retaining these in this position. A rotating ring is mounted upon the first and attached to this is a weight which keeps the guard in normal position. It is claimed by the inventor that any mud or water splashed by the wheel will strike the guard and be deflected inwardly toward the wheel.

Hemmeter Spark Plug Attachment.

An attachment for a spark plug has been patented by Henry C. Hemmeter, Pontiac, Mich., assignor of one-half to Cassius C. Van Wagoner of the same place. It differs from the usual spark gap device inasmuch as it is attached to the plug itself and means are provided to prevent the spark from igniting any gasoline vapor which may be in the vicinity of the flame. The device comprises two circular plates of non-conducting material and these are recessed to take a glass tube. The parts are held securely by screws. The lower insulated plate is fitted over the binding nut of the electrode from which the terminal is removed in practise. The upper plate carries an adjustable threaded member and when a space is left between it and the regular electrode, the spark will jump across the gap. It is claimed by the inventor that the action of the current may be noted readily and that any soot or oil between the points of the spark plug will be removed by the device. Means are provided for fastening the attachment to the spark plug.

Chevrolet Control Lever.

Louis Chevrolet and Etienne Planche, Detroit, assignors to the Chevrolet Motor Company of that city, have been granted a patent for a control lever which is unique in its location, inasmuch as only that portion grasped by the hand is in view. The device consists of a false door formed with an inner and outer wall in which space the control lever is concealed, as is the gate or quadrant. The lever is curved to conform with the shape of the fore door and is operated by means of a horizontal handle extending inwardly through a curved slot. It is claimed by the inventors that concealing the lever not only improves the appearance of the car but inside control is obtained



Outlining Some of the Recent Ideas of Inventors of Parts and Accessories Applicable to the Automobile, Including Control Lever, Fender, Electric Lamp and Gas Igniter.

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without interfering with the comfort of the operator or occupant of the other front seat. It is also pointed out that the member is less likely to be tampered with when the machine is left unattended on the street.

Black Gas Igniter.

In these days of refinement considerable attention is being paid to devices which will control, light and extinguish acetylene headlights from the seat. Allen G. Black, Springfield, Mass., has patented a gas controlling and lighting apparatus for motor cars which is operated by a handle or lever convenient to the driver. The gas tank is fitted with a valve having a rotative stem and another similar wheel is attached near the front seat. These members are connected and operated by a cord. The latter is actuated by a lever or shaft by means of which the flow of acetylene is controlled. The lighting device consists of a spring wire, the middle portion of which is coiled, while its extremities are approximately parallel. These ends are fitted with means for igniting the gas, combustion taking place when one of the pivotally mounted legs is actuated. A retracting spring is provided to return the device into its normal position. The other leg is connected with the controlling mechanism and means are incorporated for operating the cord.

Randerson Fender.

Letters patent have been granted to John P. Randerson, Albany, N. Y., for an automobile fender in which is incorporated means for not only resisting the shock of compact but taking care of the recoil. Two fender bars are utilized, these being similar in construction to the usual devices of this nature. These rods are supported by hinged members, extensions of which are fitted to tubes containing cushioning springs. The spring carrying members are fastened to the vehicle. When the fender comes in contact with an object it is claimed by the inventor that the springs absorb the shock and eliminate any danger from recoil.

Forsheim Electric Lamp.

Joseph Forsheim, New York City, has been granted a patent for an attachment to a dry cell which presents practical features, inasmuch as the device is simple and attached easily. It consists of a cap or casing having spring like retaining arms and so arranged that the terminals of the positive and negative poles come in contact with similar members of the device. Means are also incorporated whereby the supply of current may be cut off as desired. The electric bulb is screwed into the top of the casing and when the components are assembled the dry cell may be utilized for an inspection lamp and for other purposes as well. The inventor points out that with his device a motorist may utilize one or all of the dry cells in the car for lighting purposes whereas with the ordinary inspection lamp with battery self-contained, the service is limited.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

THE MILLIONTH BOSCH MAGNETO.

Those who seek to estimate the extent of the production and popularity of the international combustion magneto will be interested to note that March 25 marked the completion of 1,000,000 Bosch magnetos, by the Bosch Magneto Company of New York City. In this connection, it may be mentioned that the demand for this ignition equipment is increasing to an extent that requires continual additions to the factory sites.

WORLD'S FAIR OF AUTOMOBILES.

As a name for the proposed national exhibition of motor cars in Detroit next fall, R. C. Hupp, president of the R-C-H Corporation, maker of R-C-H gasoline and Hupp-Yeats electric cars, suggests "World's Fair of Automobiles." He believes that much of the value of the display will be lost if a name is selected which conveys a local meaning. In addition, he believes that advertising the exposition in this manner will impress upon the motoring world the place Detroit holds in the automobile industry.

L B A BATTERY BUSINESS GROWS.

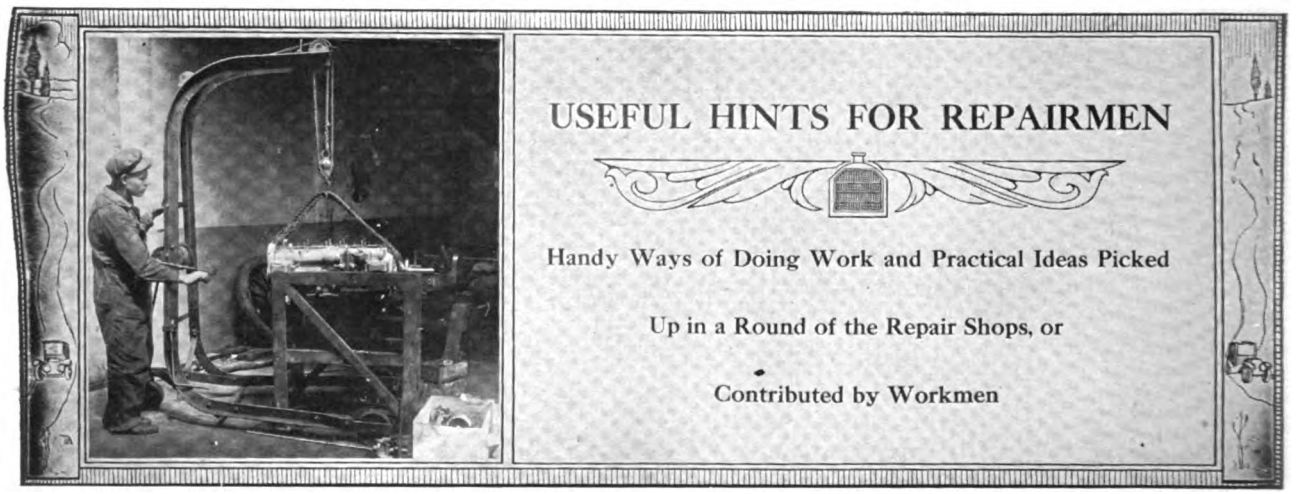
As an indication of the amount of interest being developed in electric lighting throughout the country, it is worthy of note that the Willard Storage Battery Company, Cleveland, O., maker of L B A batteries for lighting and starting, has been forced to give up its present office space to the manufacture of additional equipment. The executive offices are now located at 5716 Euclid avenue, and the old quarters are being utilized in the production of batteries. The rapidly growing business of the concern makes it necessary to secure more room at once, and ground has been broken for a factory extension which will add approximately 25,000 square feet to the present facilities.

GOODYEAR TIRE PRODUCTION.

Few motorists appreciate the number of tires represented in the daily output of some of the larger manufacturers. The Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, in celebrating its birthday recently, made arrangements to increase its production of 4000 tires a day to 5000. P. W. Litchfield, factory manager, offers an interesting suggestion in the following:

"If a procession of automobiles 1.5 miles long were lined up in front of the Goodyear plant, the daily output would equip these machines with a gang of men steadily affixing the tires. The aggregate output for the year would equip a string of automobiles that would reach almost from New York City to San Francisco. By piling the 1912 production of tires on top of each other, they would reach a height 40 times that of the Singer building in New York City."

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TOOLS FOR THE SHOP.

As business increases the proprietor of the small repair shop will add to his equipment from time to time, purchasing small tools as the work requires. There are a number of small tools which are indispensable, such as drills, reamers, taps, etc., and these may be bought singly or in sets, according to the convenience of the owner.

A scriber is a very useful instrument and is made in two forms, one a single point member for ordinary use and the other a double point. The tool depicted at Fig. 1 A, has points made of tool steel, finely tempered, threaded to screw into the holder which is knurled for a finger grip. The holder has long bearings to support the points firmly when in place and is of a suitable size to be held conveniently.

Reamers are made in several forms for different work, and are useful for enlarging holes. At B is shown a type of solid hand reamer while that at F is for roughing and finishing. In fitting taper pins the tool illustrated at E will be required. As the machine equipment of the shop is increased other tools of this nature will be added such as rose, expansion, chucking, shell, etc.

Drills.

With the drill equipment should be included a countersink, and a tool combining a centre drill and countersink is shown at Fig. 2 C. When very true work is required it is preferable to so shape the countersink that the lathe centre will first bear at the smallest part of the cone. This will cause the countersink to wear and keep true with the hole. If the centre drilling is to be done by hand it is important to relax every few seconds the hold upon the work to permit it to make about one-third of a revolution, which may be done while the other hand is supplying oil to the drill. The object and effect of this is to cause the centre drilling to be true, which otherwise it would not be, especially if the work be comparatively heavy, or one side heavier than on another.

Twist drills when utilized with power, come in sets, and with each is a steel socket which fits the drill press spindle at one end, and at the other the recess takes all drills in the set. One of the holders is outlined at Fig. 1 C, and to enable the drill to be extracted easily from the socket, the latter is provided with a slot, which passes entirely through it. The drill end protrudes into this slot, so that if a key or wedge be driven into the opening, the drill will be forced out. Conventional types of drills are shown at Fig. 2, A and B, the former being adapted to the drill holder mentioned above.

Taps.

Machinists' hand taps are made in three different styles, taper, plug and bottoming, and these are de-

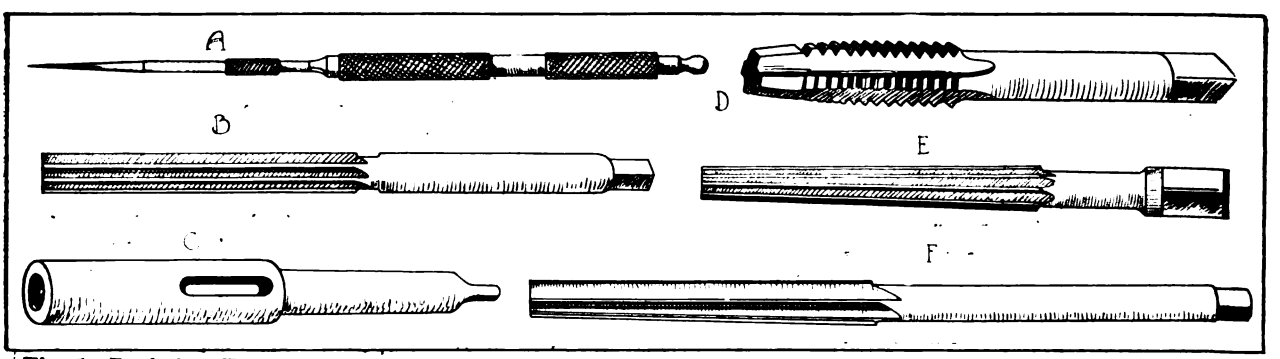


Fig. 1—Depicting Tools for the Shop Equipment: A, Scriber; B, E and F, Reamers; C, Drill Holder; D, Short Hob or Master Tap.

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picted at Fig. 2, D, E and F. Tools for use in holes to be tapped deeply should be of slightly larger diameter than those employed for shallow ones, because in deep holes the tap is held steady by its depth in the hole, and whatever variations there may be between the pitch of the threads in the hole and those on the bolt, is experienced to a greater extent as the length of the thread increases. A short Hob or master tap is outlined at Fig. 1 D.

QUIETING NOISY VALVE ACTION.

With the introduction of the sleeve valve motors the manufacturers of engines utilizing the poppet valve have brought out refinements which render the action of the valve mechanism noiseless. Some makers enclose the valves, which not only deadens any existing noise, but protects the parts from wear by excluding dust attracted by the oil. Many motors, however, especially those of early designs, are not constructed so that a plate may be fitted without considerable work. To meet the demand for a valve quieting device, an English concern has brought out what is termed a "silent tappet sock," and its principle is similar to a device outlined in The Automobile Journal recently.

The attachment is made in two styles and these are depicted at Fig. 3. That at A shows a method which includes the use of two tubes of different diameters, one being threaded externally at the lower end and the other internally at its upper end. To place the device in position it is necessary to remove the valve, and with the two tubes telescoped one within the other, as shown at B, they can be slipped over the valve spring and held against the valve guide while the valve, cap and cotter key are replaced. The larger tube is then allowed to drop down and enclose the lower part of the valve stem and spring, and is screwed onto the external thread of the smaller tube, as outlined at A. The lower tube is equipped with a hexagon to permit of the parts being screwed together. The valve tappet guide is altered slightly to provide a good seat.

The other design is illustrated at C and consists of a single tube which is split longitudinally, the abutting halves being formed as shown at D. The tube is chamfered top and bottom and the latter is held firmly in place by a coned nut, which is intended to be screwed onto the top of the tappet guide. This guide should have sufficient substance to allow a thread to be cut, and will have to be removed for the work.

METHOD OF DRILLING GLASS.

Although the repairman is seldom called upon to make repairs to the accessories constructed of glass such as the windshield and lamps, the fitting of sight feed oiler tubes and dials requires a knowledge of how to handle glass, such as cutting, drilling, etc. Where a slight crack appears in a windshield further damage is prevented by drilling two small holes and fitting a device similar to that utilized on large store windows. It may be possible that an owner desires an opening cut in the windshield for use in stormy weather.

Glass may be drilled with a small tool by using turpentine as a lubricant, but this has its disadvantages inasmuch as the tool has to be resharpened frequently as well as that the diameter of the hole is apt to be larger at the top than at the bottom, also it is difficult to drill holes of equal size.

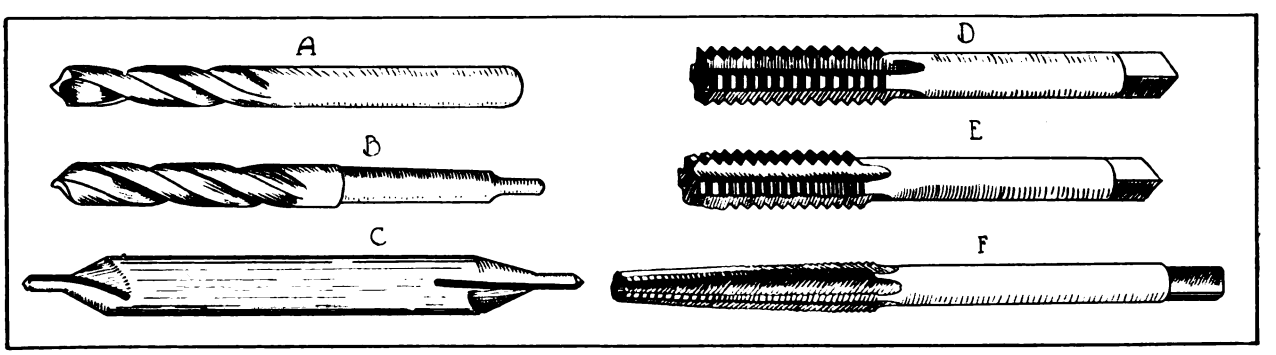


Fig. 2—Tools for the Repair Shop: A and B, Twist Drills; C, Combined Drill and Countersink; D, E and F, Taper, Plug and Machinists' Bottoming Taps.

Drilling may be accomplished successfully by utilizing a brass tube of the diameter of the desired hole. The end of the pipe is trued up to secure an even bearing upon the glass and a small opening made in the side of the tube through which the abrasive is introduced during the process, this being done so that the tool will not have to be lifted during the work.

In starting the drill a piece of wood is utilized having an opening of the same diameter as the tube and the guide is attached to the work. The drill may be operated by a drill press or hand drill and during the operation the cutting paste may be fed to the tube by an oil can. If a sharp edged hole is desired, a thin piece of glass may be placed over the work and held in position by French copal varnish.

In fitting glasses to lamps, such as head or side members, if the circles be cut by the repairman the

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edges are likely to be jagged or rough. It is essential that the glass fit accurately and sometimes a trifle has to be removed. The rough edges may be smoothed by utilizing a bastard file kept liberally moistened with the following solution: Pulverized camphor, two ounces; sulphuric ether, six drams, and enough oil of turpentine to fill the remainder of a six-ounce bottle.

CLEANING OUT RADIATORS.

A repairman of considerable experience recommends the use of sal-ammoniac for cleaning out the circulating system of a motor and states that a pound of this material dissolved in water and poured into the cooler will remove "fur" and incrustations. The fluid should be left in the system and the car operated for two or three days, then removed. If chemical action is going on it will be noted by the odor of ammonia.

BALL BEARING LUBRICATION.

In assembling components of the car fitted with ball bearings some repairmen employ any kind of oil

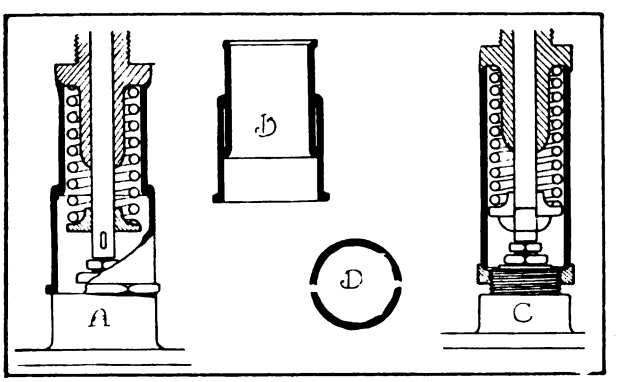


Fig. 3—Methods of Quieting Noisy Valve Action: A, Telescoping Tubes; B, Outlining Operation of Assembly; C, Employing Split Tubes; D, Showing How Tubes Are Constructed.

or grease, usually that which is the handiest. Makers of ball bearings state that the parts must be protected from the atmosphere and that the lubricant should be a small amount of light oil. The latter should be particularly efficacious against the action of water and one having a very small percentage of oleic acid. When the bearings are small, they should be lubricated with an oil recommended by the maker of these components.

STRETCHING VALVE SPRINGS.

Sometimes the clattering noise of the valve mechanism is due to the weakness of the springs. When such a condition exists the best method is to fit new members. Sometimes an owner will object to the expense and the only alternative for the repairman is to renovate the old springs. This may be accomplished by removing and stretching the members, by securing one end in a vise and tying a cord to the other extremity. Care should be exercised, however, not to increase the tension to a point where the springs will close the valve with so much force as to break the stems. In addition, too stiff a spring consumes extra power. Another method is to insert washers under the lower end of the spring.

LONG WITH NATIONAL CARS.

There is a certain value in the cumulative experience that comes with long association with the same company in studying problems affecting the product of that concern, and it is with considerable pride that the National Motor Vehicle Company, Indianapolis, Ind., maker of National cars, points to the fact that its executives have splendid records for long continuous service. President A. C. Newby has been at the head of the company for years, George M. Dickson, general manager, has been with it since 1902, and W. G. Wall has been chief engineer since the company was organized.

TO TEST REGISTRATION LAW.

Preparations are being made by a number of motorists in Jackson, Miss., to test the constitutionality of the recently enacted registration law in that state, and the outcome of the case will be watched with interest by automobile owners throughout the country. It is understood that these men do not object to a tax on automobiles, as such, but they believe that the act can be construed as class legislation and propose to determine whether or not it is constitutional to tax automobiles for using the highway without imposing like fees upon horses, mules or ox teams.

HIGHER GARAGE RATES IN HARTFORD.

Motorists in Hartford, Conn., will hereafter have to pay higher rates for garage service, six of the principal garages having decided to raise their charges. According to the new figures, cars with a wheelbase up to 112 inches will cost $15 a month for storage; those of a greater wheelbase, $20 a month; and limousines and all closed cars, $25 a month. Washing and polishing is included in the service given at these figures.

LONG TRIP IN BRUSH.

F. H. Bachmann, a travelling salesman who uses a Brush runabout, made by the Brush Runabout Company, Detroit, to cover his territory, recently made a round trip between San Antonio, Tex., and Detroit, thus adding some 6000 miles to a record of 5000 made before the journey. The car found some bad roads in the South, particularly in Oklahoma, Mississippi, Missouri, Kansas and Iowa, but came through without difficulty.

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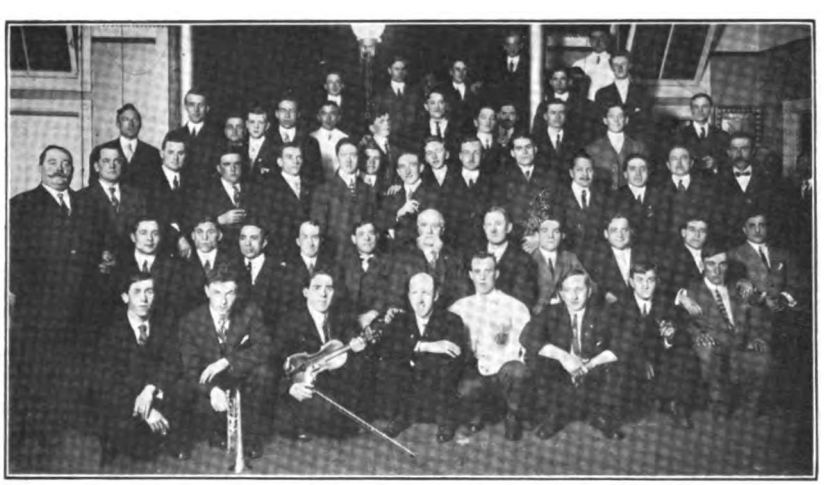
ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



Dealer as Recruiting Officer.

There is abundant evidence throughout the country that the dealer realizes the importance of the local motorcycle club in increasing his facilities for doing business. This does not mean that the club is considered in any way as a means of working the members for the personal ends of the dealer. It is true, however, that the agent can make legitimate use of the good fellowship represented by the organization in securing and retaining the interest of men who are not riders and who are not in any way identified with the club.

By this is meant that no wide awake dealer will lose sight of the fact that a mention of the club and its activities, as well as of the Federation of American Motorcyclists and its splendid work for the benefit of motorcycling in general, will serve as an added inducement to the man who is considering the purchase of a machine. If the latter is assured that through the possession of a mount and membership card in the local club he becomes identified with the thousands of riders throughout the country, who are banded together in the interests of good roads, better legislation and a wider friendship, he is more easily induced to invest.



Members and Friends of the Rhode Island Motorcycle Club at Their Annual Smoker.

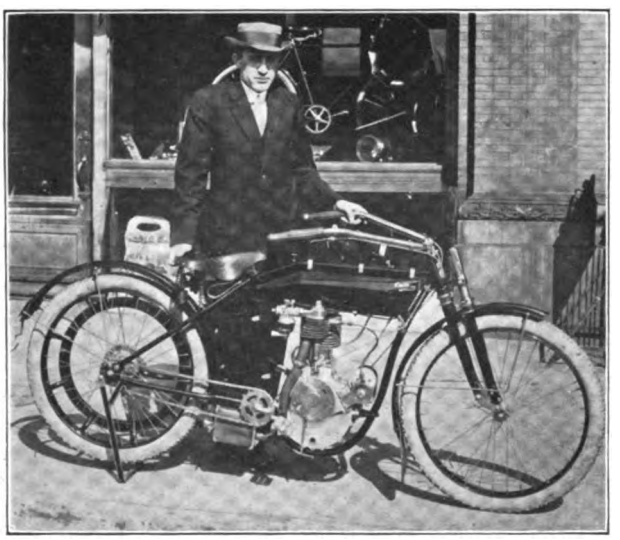
Some dealers have found it a profitable experiment to present the new purchaser with a club membership. The least they can do is to call the attention of their prospects to the benefits accruing to them through identification with the local body and the national federation, both of which are now, and have been for some time, working for his interests indirectly. If he be so inclined the dealer may become the best recruiting officer the club can secure.

Rhode Island Club's Smoker.

The annual smoker of the Rhode Island Motorcycle Club, Providence, R. I., was held April 17, some 75 members and their friends enjoying the affair, despite the stormy weather. The event was quite in keeping with the standard set in past years, and reflected much credit upon the committee, which consisted of President Ryder, Vice President Halstead, Secretary Medhurst and Hirah G. Baxter. An accompanying illustration presents a photograph taken during the progress of the festivities and gives an excellent idea of the class of men which compose this affiliated club No. 9. While the boys were engaged in burning up the excellent cigars provided by the committee, they were entertained by a programme of song, orchestral music, and vaudeville acts, and later a Dutch supper was served. Perhaps the most interesting feature of the evening was the presence of W. L. W. Hillman, who, it will be remembered, suffered a fracture of the neck in one of the club runs last June. He had so far recovered from his experience as to take a ride in a sidecar with J. C. Loftus on a Harley-Davidson, less than a week before the smoker. His remarkable recovery was a subject for much congratulation on the part of the other members, as well as for Mr. Hillman himself, and he was heartily greeted by all present. In the picture President Ryder is the gentleman in the centre with side whiskers, while Mr. Hillman is the second man on his right.

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James H. Shippee, one of the older members of the club, now located in Los Angeles, Cal., as special representative of the Pope, sent a letter, which was



G. H. Bangham, Secretary-Treasurer Columbus Motorcycle Club, and His Emblem.

read by President Ryder. He informed the boys that even though the members of the Los Angeles Motorcycle Club had treated him royally since his arrival in that city, he always would have a warm spot in his heart for the Providence riders.

Recent Affiliations.

As predicted by Chairman E. M. Estabrook of the membership committee of the Federation of American Motorcyclists, the list of affiliated clubs has begun to increase rapidly with the approach of the riding season. Since the publication of the last list, the following additions have been made:

Harley-Davidson Motorcycle Club, Philadelphia, Penn., No. 240; F. B. Shenh, secretary, 2204 North Broad street, 19 members. Attleboro Motorcycle Club, Attleboro, Mass., 241; C. H. Obrist, 22 Fourth street, 31. Herkimer Motorcycle Club, Herkimer, N. Y., 242; T. K. Kelley, 215 Dewey avenue, 22. Valejo Motorcycle Company, Valejo, Cal., 243; D. R. Rutherford, box 382, 14. Whittier Motorcycle Club, Whittier, Cal., 244; Horace B. Miller, Rivera, Cal., 13. Bay Ridge Motorcycle Club, Brooklyn, N. Y., 245; R. G. Hanna, 859 61st street, 17. Luzon Motorcycle Club, Manila, P. I., 246; Thedore Siddall, box 550, 18. Bradford Motorcycle Club, Bradford, Penn., 247; N. M. Neilly, 75 Main street, 12. Berkeley Motorcycle Club, Berkeley, Cal., 248; E. B. Ellis, 1121 Laurel street, 17. Vincennes Motorcycle Club, Vincennes, Ind., 249; Thomas Bouchie, 903 North Seventh street, 22.

Coming Events.

The following race meets have been arranged by motorcycle clubs throughout the country: April 26, Augusta, Ga.; May 5, Peoria, Ill., and Brooklyn, N. Y., the latter the annual century and double-century events of the Invincible Motorcycle Club; May 12, Newark, N. J., opening meet on the motordrome; May 19, Detroit; May 30, Lancaster, Penn.; Washington, D. C., and Joliet, Ill., the last named being a 100-mile event under the auspices of the Will County Motorcycle Club; July 4, Cortland, N. Y., and Detroit; Sept. 2, Detroit. In addition, mention should be made of the annual tour of the Shortgrass Motorcycle Club in Kansas, Nebraska, Colorado and Wyoming, which starts Aug. 17.

Club Notes Here and There.

The San Jose Motorcycle Club, San Jose, Cal., has inaugurated a scheme of fining its members for overspeeding, in addition to any fine imposed by the city magistrate.

The recently organized Jersey Motorcycle Club, Bloomingdale, N. J., has elected the following officers: President, D. W. Voorhis; vice president, W. H. May; secretary, H. J. Hough; treasurer, H. T. Post; captain, E. C. Gurnee; lieutenant, W. A. Elliott; mechanician, H. W. Fredericks.

The Traymore Motorcycle Club, Philadelphia, has secured handsome quarters at 623 West Girard avenue. The following have been selected as officers: President, A. J. Schickling; vice president, Harry Gerlach; secretary, Henry Warker; treasurer, C. Kieffer; recording secretary, William Germann.

The Lincoln Motorcycle Club, Lincoln, Neb., has elected the following officers: President, E. H. Gumbel; vice president, Albert Keens; secretary, Ray Blakewell; treasurer, W. E. Gumbel; captain, J. R. Mawson.

The Kings County Motorcycle Club has been or-



James H. Shippee, Special Representative of the Pope in Southern California.

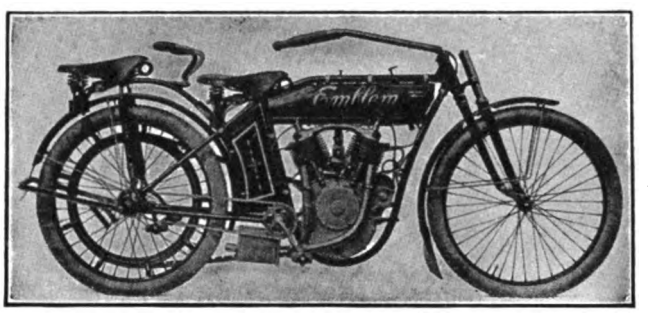
ganized at Hanford, Cal., with the following officers: President, S. Raney; vice president, Elmer Bechma; secretary, M. Homan; treasurer, W. O. Pickrill.

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STRAWS SHOW WHICH WAY THE WIND BLOWS

The fact that we are making today more than twice as many motorcycles as we did a year ago at this time, and running our factory night and day in an effort to supply the demand, is proof that

STURDY EMBLEM MOTORCYCLES GIVE UNIVERSAL SATISFACTION



If we are not represented in your territory write today for special proposition and catalogue, Dept. D.

THE EMBLEM MANUFACTURING COMPANY

(Also Makers of the Famous Emblem Bicycles)

ANGOLA ERIE COUNTY NEW YORK

The Hoquiam Motorcycle Club has been organized in Hoquiam, Wash., with a membership of 22, all of whom are to become members of the F. A. M. C. J. Ritchie is president and W. B. Ogden, secretary-treasurer.

The St. Cloud Motorcycle Club, St. Cloud, Minn., has elected the following officers: President, A. E. Bakeman; vice president, George Thielman; secretary, Eugene Scharenbroich; treasurer, Charles Harrison; captain, Herbert Gray; first lieutenant, Lee Peffer; second lieutenant, Harry Sartell.

Norwich Wants Summer Cottage.

At the recent annual meeting of the Norwich Motorcycle Club, Norwich, Conn., plans were discussed for securing a cottage on the banks of the Thames river, in which the members will be able to spend their nights during the summer and yet have ample opportunity to get back and forth to their work in the city. The following officers were elected: President, C. C. Simpson; vice president, H. F. Burdick; secretary and treasurer, C. V. Pendleton, Jr.; captain, William C. Bode, Jr.; first lieutenant, Richard Fillager; second lieutenant, Peter Desjardins; directors, Maurice Sherman and Ellsworth Williams.

Providence Club Activities.

No date has been set for the formal opening of Motorcyclists' Home, the new headquarters of the Providence Motorcycle Club, Providence, R. I., in the Swenson building, but it will be some time during the early part of May. Invitations will be issued to all the clubs in that section of New England, and it is anticipated that the entire top floor of the building will be required to house the crowd.

At the meeting of the club April 12, arrangements were made for the annual "Herring Run" to Taunton, Mass., which is scheduled to take place either April 28 or the following Sunday. This event is awaited with interest by all the members, as it marks the official opening of the run season with the Providence club.

Several of the boys have been taking part in long distance spins during the past few weeks, among them being a run to Boston and another to Summit, R. I.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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April 14, B. A. Swenson and two other members of the club went over the road to Berlin, Conn., by way of Worcester and Springfield, Mass. On the return trip,



Ray Seymour and His Indian Racing Machine.

Swenson made the 98 miles between Springfield and Providence in three hours, which is remarkably good time, considering the condition of the roads at this season of the year.

Tuileries Track Opening.

Twenty-five hundred people saw the opening race meet on the Tuileries track in Denver early in the month, during which G. R. Boyd on an Indian created a new track record for single-cylinder machines, riding an exhibition five miles in 4:30.2. The summary follows:

Two miles, amateurs—First, Shepherd, Merkel; second, Beck, Merkel; third, Hurlburt, Indian; time, 2:44.

Three miles, professionals, class B—First, Patterson, Merkel; second, Bowen, Merkel; time, 2:29.8.

Three miles, professionals, class B—First, Fleckstein, Indian; second, Swartz, Indian; time, 2:18.

Five miles, professionals, class B—First, Swartz, Indian; second, Cox, Merkel; time, 4:06.

Three miles, professionals, class A—First, Armstrong, Excelsior; second, Swartz, Indian; time, 2:24.

Three miles, professionals, class A—First, Armstrong, Excelsior; second, Fleckstein, Indian; time, 2:19.

Five miles, professionals, class A—First, Armstrong, Excelsior; second, Fleckstein, Indian; third, Swartz, Indian; time, 3:46.4.

Seven miles, open—First, Armstrong, Excelsior; second, Swartz, Indian; third, Patterson, Merkel; time, 5:33.

Benefit Meet for De Rosier.

The riders in Los Angeles responded generously early in the month to the plan for holding a benefit meet for Jacob De Rosier, who was injured so badly recently that he is not expected to ride again. W. E. Hasha on an Indian created a new record for a mile, going the distance in 0:39.8. The results in the other events follow:

Two miles, match—Dead heat; Dekerin, Indian and Allbright, Indian; time, 1:47.6.

Two miles, professionals, class B—First, W. Samuelson, Indian; second, Humiston, Indian; third, Allbright, Indian; time, 1:32.4.

Two miles, professionals, class A—First, Hasha, Indian; second, Ward, Indian; third, Seymour, Indian; time, 1:27.2.

Three miles, professionals, class B—First, W. Samuelson, Indian; second, Allbright, Indian; third, Humiston, Indian; time, 2:20.

Three miles, professionals, class A—First, Hasha, Indian; second, Ward, Indian; third, Seymour, Indian; time, 2:04.8.

Five miles, professionals, class B—First, Allbright, Indian; second, Humiston, Indian; time, 3:41.2.

Four miles, professionals, class A—First, Seymour, Indian; second, W. Samuelson, Indian; third, Ward, Indian; time, 2:51.

Flanders Carries Excess Weight.

An accompanying illustration indicates that the four horsepower Flanders, made by the Flanders Manufacturing Company, Pontiac, Mich., is capable of withstanding an excess weight of some hundreds of pounds. The machine is owned by W. E. Tomlinson, a Texas ranchman, who weighs 263 pounds and is shown in front. His friend tips the scales at 258. This makes 521 pounds in addition to the guns and other hunting equipment. The photograph was taken while the two men were on a recent hunting trip, and they claim to have ridden home with a still bigger load.

Plan Long Distance Tour.

Three Detroit motorcyclists and their wives are



W. E. Tomlinson and Friend Testing Capacity of the Flanders.

planning a transcontinental tour, which they expect will take them two years to complete. The men are Reuben Winslow, John Schnall and A. Wellman. They

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will leave Detroit some time in June and will take the southern route to San Francisco. They expect to spend the winter in California, working at their trades, and return East in 1913.

Streiff on Foreign Tour.

William Streiff, who has only recently completed a 5000-mile motorcycle tour through England, Scotland, Wales, Ireland, France, Germany and Italy on an N. S. U. mount, reports that he made the trip in record time and has compiled a set of figures showing the distance and time from city to city. He used a Jones speedometer, made by the Jones Speedometer Company, New Rochelle, N. Y., in securing his data. This concern has made a specialty of producing reliable motorcycle instruments, which have been in service with riders in this country and abroad for some time.

Somebody Erred in Texas.

Those who were responsible for the recently enacted motoring law in Texas forgot to take the motorcycle into consideration, and as a result, according to Assistant Attorney-General O. C. Funderburk, the two-wheeled mounts are subject to all the requirements of the ordinary automobile. Until this ruling was received several cities throughout the state were permitting motorcycles to be operated without registration. San Antonio demanded that they be registered and that riders take out a license to operate. This brought the whole matter to the attention of the attorney-general's office wih the above result. It would appear that the F. A. M. must proceed at once to secure a correction of the apparent error.

Manufacturers Meet in Buffalo.

Several matters of importance came before the meeting of the Motorcycle Manufacturers' Association in Buffalo, N. Y., April 10. President A. B. Coffman, representing the Consolidated Manufacturing Company, was in the chair and Secretary J. F. Cox, representing the Pope Manufacturing Company, kept the minutes. The other members present and the concerns they represented were: W. G. Schacht, Emblem Manufacturing Company; Edward Buffum, Hendee Manufacturing Company; Arthur Davidson, Harley-Davidson Motor Company; J. F. Merkel, Miami Cycle & Manufacturing Company; A. B. Coburn, Pierce Cycle Company; C. W. Mason, New Era Auto Cycle Company, and W. T. Marsh, American Motor Company.

The motorcycle rim standard adopted by the Automobile Clincher Tire Association in Cleveland was turned down unanimously, and the matter left to the engineers at the various factories for a final decision. These will confer with the tire and rim representatives at Cleveland and agree upon a standard that will be acceptable to all parties concerned.

Resolutions were passed calling upon the mayors of the large cities throughout the country to take steps to secure the abatement of the muffler cut-out. Initial steps were taken toward securing lower freight rates. An application for membership from the Triumph Manufacturing Company, Detroit, was received and referred to the proper committee. The next meeting will be held in Toledo, O., June 5.

Valiant With Merkel Forces.

The many friends of Frank Libbey Valiant throughout the country will be glad to learn of his appointment as assistant advertising manager of the Miami Cycle & Manufacturing Company, Middletown, O., maker of the Merkel. He already has assumed his new duties and it is anticipated his wide acquaintance in the motorcycle industry and among the riders will result in a largely increased interest in the Merkel mount.



Frank L. Valiant, Assistant Advertising Manager for the Merkel.

Valiant is particularly well known because of his connection with the Emblem Manufacturing Company, Angola, N. Y., which concern he represented as a special agent in various sections of the East last year. He also rode Emblem machines in numerous racing and contest events, finishing with splendid credit to himself and his mount in many of them.

Energetic Club Organizers.

Among those who are engaged in securing the necessary riders to warrant the formation of a local club, and to which riders in their vicinity should apply for information, are the following: Kessler & Miller, Rochester, Ind.; A. M. Reynolds, 406 Smith street, Schenectady, N. Y.; A. J. Hall, 3741 West 25th street, Cleveland, O.; J. W. Warnken, 711 46th street, Milwaukee, Wis.; Will Last, 209 River street, Holland, Mich.; H. Pattison, box 506, Pontiac, Mich.; H. O. Stone, Newberry, S. C.; C. L. Cheshire, Lake City, Fla.

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Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

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298 Blackstone Street, Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00
(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

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The following concerns have become incorporated recently to manufacture and deal in automobiles, accessories, etc.:

California Automobile Timetest Company, Los Angeles, Cal.; $100,000; incorporators, F. P. Carr, R. L. Bisby, E. B. Coll, Joseph H. Gosling and E. Kershner.

Great Eagle Motor Devices Company, Lindsborg, Kan.; $130,000; to manufacture and sell motor devices.

Standard Resilient Wheel Company, Inc., New York City; $500,000; incorporators, J. Gaynor, P. B. Verplanck, S. Jochelson.

D. G. Hutcheroft & Sons Company, Cleveland, O.; $10,000; incorporators, D. G. Hutchcroft, Glidden W. Hutchcroft, Thornton Hutchcroft, William Merts, S. H. Meacham.

Norman County Auto Company, Ada, Minn.; $50,000; president, Peter Matson; vice president, D. C. Lightborn; secretary, Louis Hintze; treasurer, C. J. Lofgren.

Dennis Motor Company, Toledo, O.; $25,000; incorporators, H. H. Dennis, C. W. Close, Allen E. Reid, R. S. Woodrow, John G. Meister.

Sutherland Automobile Air Appliance Company, Louisville, Ky.; $10,000; incorporators, M. M. Glavin, John W. Barns, T. R. Cartmell.

Omaha Motor Car Company, Augusta, Me.; $1,000,000; to manufacture and sell motor cars; incorporators, R. S. Buzzell, L. J. Coleman.

Chauffeurs Legal Association, Boston, Mass; $10,000; incorporators, Jay R. Benton, George A. Kearsley, Francis D. Harrigan.

Williams Auto Company, Boston, Mass.; $2500; directors, James F. Hanley, William T. Hanley, Fred W. Ryan.

Auto Tractor Company, Augusta, Me.; $100,000; incorporators, L. J. Coleman, R. S. Buzzell.

Worcester Automobile Parts Company, Worcester, Mass.; $10,000; incorporators, James N. Heald, Cyrus A. Cowan, John A. Doane.

Porto Rico Motor Company, Greenwich, Mass.; $150,000; officers, Loren J. Whiteside, Milton A. Mills.

Lyons Auto Company, Grand Forks, N. D.; $15,000; incorporators, J. W. Lyons, M. J. Lyons, M. M. Lyons.

Twin City Auto Company, Council Bluffs, Ia.; $25,000; incorporators, S. V. Barnhart, J. J. Klein, H. W. Neiman, M. C. Goodwin.

National Tire Company, $50,000; to manufacture automobile tires in New York City; incorporators, H. Davies, T. H. Hopkirk, I. V. Weisbrod.

Eadie Vehicle & Gear Company, Buffalo, N. Y.; $200,000; incorporators, John M. Eadie, George P. Keating, Seward H. Millener, William J. Donovan, Howard G. E. Smith.

Mitchell-Edmondston Garage, Inc., New York City; $10,000; incorporators, Liland A. Mitchell, George W. Edmonston, Joseph P. Bickerton.

Kingsbury-Leahy Company, Albany, N. Y.; $40,000; to deal in automobiles and motorcycles; incorporators, J. S. Kingsbury, S. M. Kingsbury, E. W. Leahy.

Pennsylvania Automobile Company, St. Louis, Mo.; $10,000; incorporators, William A. Fortner, Claude G. Fordran, George P. Burleigh.

Charter Automobile Company, Baltimore, Md.; $75,000; incorporators, C. R. Fouts, W. E. Byrd, G. H. Reinhardt.

Pembroke Manufacturing Company, Rochester, N. Y.; $50,000; to deal in and manaufacture automobile parts and accessories; incorporators, Charles J. Pembroke, Winfield P. Pembroke, Walker J. Fellows.

Etchell Auto Company, Biddeford, Me.; $10,000; incorporators, Arthur L. Roberts, Joseph Etchells, Charles V. Tanner.

Wetherbee Bros. Company, Arlington, Mass.; $20,000; incorporators, Ivers L. Wetherbee, Clarence A. Wetherbee, A. Ingham Bicknell.

Punctureless Tire Company of Massachusetts, Boston, Mass.; $15,000; incorporators, William E. Riddell, J. Hiram Smith, Frank H. Jenkins.

New York & Boston Auto-Bus Company, Chelsea, Mass.; $20,000; to buy, sell, lease and operate motor vehicles; incorporators, Daniel O. Fillmore, Charles E. S. Moir, Lucy M. Fillmore.

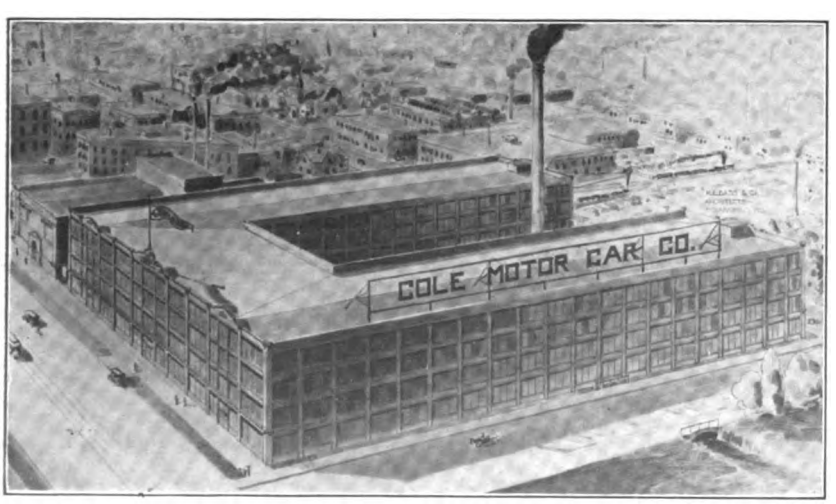
Cut Price Automobile Supply Company, Boston, Mass.; $10,000; incorporators, I. J. Rothenberg, Louis S. Rothenberg, Henry L. Rothenberg.

Victoria Motor Car Company, Victoria, Tex.; $5000; incorporators, Welder Daniel, J. T. Linebaugh, W. S. Crain.

Buffalo Automobile Sales Company, Buffalo, N. Y.; $10,000; incorporators, R. A. Smith, C. A. Poppert, P. G. Buxby, Walter F. Titus, Henry W. Hill.

Capital Garage and Service Company, Washington, D. C.; $125,000; incorporated in Virginia by Lewis T. Cowie, Joseph B. Chapin and Eugene A. Jones.

B. & B. Manufacturing Company, Cleveland, O.; $35,000; to sell accessories and parts; incorporators, W. E. Smith, R. L. Bacher, W. R. Bauman, L. C. Heinberger, I. T. Quick.



As the New Cole Factory in Indianapolis Will Look When Completed—One Wing of This Is Now Finished.

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Guide Motor Lamp Manufacturing Company, Cleveland, O.; $100,000; incorporators, H. J. Monson, W. F. Persons, W. H. Bunce, J. D. Kauffman, W. L. Rose.

Hampton Manufacturing Company, Indianapolis, Ind.; $5000; to manufacture accessories; incorporators, S. B. Nussbaum, Sol Allman, William Hampton.

GARAGE AND DEALER.

Superior Motor & Machine Company, Superior, Wis., has leased the Cary garage building on Tower avenue and will operate it in connection with the other garages of the concern. This move was made necessary by the rapid expansion of the business.

H. G. Raymond, Fort Wayne, Ind., agent for the Imperial and R-C-H, is having a new garage built at 718 Barr street. The building will contain 7680 feet of floor space, and will cost $12,000.

The Oakland Motor Car Company, Pontiac, Mich., maker of Oakland cars, opened a new factory branch in San Francisco, Cal., recently. The new quarters are large, 50 by 150 feet, and the equipment of the branch is exceptionally complete.

Malcolm P. Burbank, 805 Main street, Worcester, Mass., has taken the local agency for Pullman cars, made by the Pullman Motor Car Company, York, Penn.

Dewey & Byrns, conducting the Island garage in Potsdam, N. Y., has just installed an 18-foot elevator, making the garage one of the most complete and up-to-date in the locality.

J. William O'Donnell, Jr., Lynn, Mass., has been appointed agent for the Morgan Motor Company, Worcester, Mass., and will handle Morgan trucks in Lynn. He is but 19 years old, and will be placed in charge of the only truck service station in the vicinity.

The Oklahoma Motor Car Company, Oklahoma City, Okla., has taken the agency for the R-C-H, made by the R-C-H Corporation, Detroit, and is carryilng a full line of cars.

The City Hall Garage, Lowell, Mass., has been bought by J. C. Evans and Carl W. Morteson of North Billerica, Arthur Beharrell, the former proprietor, having gone to the Boston office of the Velie.

The Cook & Stoddard Company, Washington, D. C., will remove into new quarters at 1138 Connecticut avenue, N. W., in the near future. The company handles Cadillac, Pierce-Arrow and Baker electric cars.

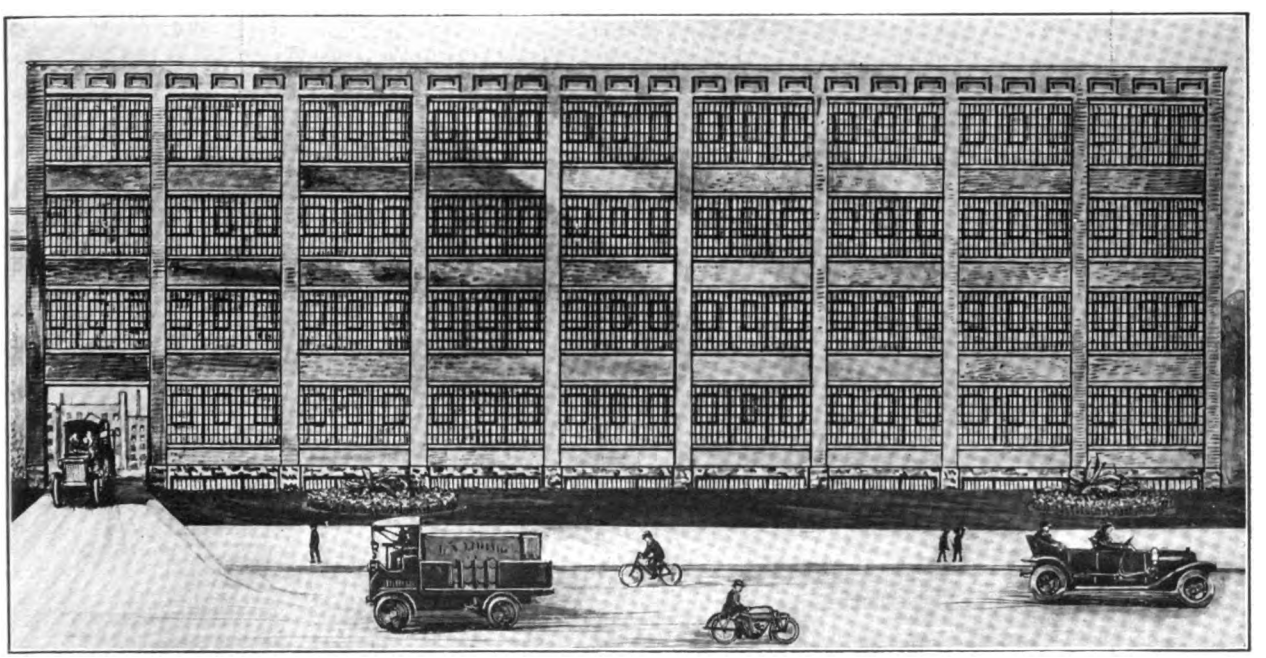
The R-C-H Motor Sales Company, Jackson, Mich., incorporated some time ago by F. C. and G. A. Weber, has opened salesrooms for the R-C-H cars at 304 Cooper street.

Ramsey's Auto Supply House was recently opened in Phoenix, Ariz., by J. R. Ramsey, representing the Western Rubber Supply Company of Los Angeles, Cal. A full line of automobile supplies will be carried, and a specialty will be made of vulcanizing.

Geo. R. Giroux has become manager of the Foraker Motor Truck Company, Chicago, Ill., handling Durable Dayton trucks, made by the Dayton Motor Truck Company, Dayton, O. Mr. Giroux formerly handled the Little Giant, produced by the Chicago Pneumatic Tool Company.

The Studebaker Automobile Company, Milwaukee, Wis., has moved into new quarters in the Stroh building, where a service department will be maintained in addition to show rooms for the E-M-F and Flanders. C. R. Dashiell, formerly local manager, has gone to the Chicago branch, and has been succeeded by L. P. Chittenden, who has been travelling in Wisconsin for the Studebaker organization.

Fred F. Folger, Watertown, N. Y., has purchased the garage of the Warner Automobile Company, and will succeed Mr. Warner, who, however, still retains the agency for Ford cars, made by the Ford Motor Company, Detroit. The garage has been improved and its equipment brought up-to-date.



The New Pope-Hartford Plant in Hartford, Conn., Which Will Double the Output of the Company.

The Selden Motor Car Company is to erect a $50,000 garage in Houston, Tex., on Clay avenue. The building will be three stories in height, thoroughly modern and strictly fire proof.

The Dwyer & Roche Company, Hartford, Conn., has taken the livery stable at 18 John street and is conducting an automobile painting and repair business. The building is centrally located, and contains 15,000 square feet of floor space.

The Vestal Motor Car Company, Pittsburg, Penn., has moved to new quarters at 5852-54 Baum street The new structure is large and will furnish space enough to take care of the company's needs for some time to come. Stevens-Duryea and Velie cars are handled.

A. J. Rogers of the sales department of the Remy Electric Company, Anderson, Ind., has gone to San Francisco to take charge of the branch there at 170 Golden Gate avenue. He is well known in the South and West, and will no doubt repeat his success in that territory.

LeHardy & Lindsay, Rochester, N. Y., agent for the Marmon, made by the Nordyke & Marmon Company, In-

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dianapolis, have contracted for the property at 308-10 East avenue. The building will be altered and a show room and garage built.

R. B. Raynor, Fort Wayne, Ind., has secured the agency for the Cutting car, made by the Clarke-Carter Automobile Company, Jackson, Mich., and will operate under the firm name of the Cutting Sales Company, conducting a garage as well as salesrooms.

George Yon, Syracuse, N. Y., agent for the Abbott-Detroit, made by the Abbott Motor Company, Detroit, recently moved into a new garage at 1057 South Clinton street. The building is 40 by 110 feet, two stories high.

The Trenton Motor Car Company, Trenton, N. J., composed of Hugo Ufert and Oliver O. Moore, recently purchased Dorsett's Electric garage, at 111-113 Chancery street. Extensive alterations have been made, and the new concern carries a full line of parts and accessories.

The New England Auto & Supply Exchange, Bridgeport, Conn., has been organized by George W. Jackman, and a salesroom opened at 608 Main street, where a full line of supplies is carried.

The Pullman Motor Car Company, York, Penn., has opened salesrooms in Pittsburg, on South Highland avenue. The Auditorium building is to be remodeled at a cost of about $40,000 and will be used by the branch, which will be incorporated as the Pullman Auto Company of Pittsburg.

The Neustadt Automobile & Supply Company, St. Louis, Mo., has secured as department managers, Earl J. Hoffman, formerly with the Timken Roller Bearing Company, and Robert W. Maloney, an expert on automobile lighting.

The Goodyear Tire & Rubber Company's branch at Portland, Me., has moved to 646 Congress street. I. W. Penniman of the Boston branch has been appointed local manager.

C. E. Havens has been appointed manager of the service and technical departments of the Abbott Motor Company, Detroit, having left the Hudson Motor Car Company. Mr. Havens has had considerable experience in the factories, having been connected with the Thomas and Oldsmobile plants.

Dittrich Bros., Perth, Ont., has just completed a new garage, which it will operate in addition to its foundry and machine shop.

The Eastern Auto & Machine Company, Baltimore, Md., has awarded the contract for the erection of a garage on the Philadelphia road, on the outskirts of the city. The building will be 180 by 49 feet, of brick.

The Repass Automobile Company, Waterloo, Ia., a branch of the Herring Motor Car Company, Des Moines, has moved to new quarters, 217-19 West Fifth street, where they have ample room to display Ford cars, and to conduct a repair and service department. A total of 50,000 square feet of floor space is occupied by the company.

WITH THE MANUFACTURER.

The Bartholomew Automobile Company, Peoria, Ill., maker of Glide cars, has increased its capital stock to $350,000. The increase amounts to $150,000, the capital stock having been $200,000 previously.

The Krupp Motor Company, Pittsburg, Penn., has purchased 10 acres of ground near Beaver Falls, Penn., and is to start erection at once of buildings which will cost $300,000. The plans for the main building, as recently drawn up, call for a structure two stories high, 80 by 700 feet. Motors, pleasure cars and trucks will be manufactured, and about 200 men will be employed at first.

Hess & Son, Philadelphia, has moved to new and larger quarters at 666 North Broad street, where Tinol, the combined solder and flux, will be carried in stock.

The Simplex Automobile Company has leased for 15 years a plot of ground 100 by 200 feet in Long Island City, N. Y. A one-story building will be erected at a cost of $40,000. Other stories will be added when necessary, the foundations being planned with this in view.

Fred E. Bogart, who has been manager of the Hartford Auto Parts Company, Hartford, Conn., for several years, has retired.

George Weber has been appointed factory manager for the Metzger Motor Car Company, Detroit, and will look after the manufacture of Everitt cars. Mr. Weber is a man of considerable experience in the manufacturing end of the industry, having been with the Locomobile Company of America, Bridgeport, Conn.; the Waltham Manufacturing Company, Waltham, Mass., and the Buick Motor Company, Flint, Mich.

William C. Little has resigned his position with the General Motor Car Company, Philadelphia, and accepted the position of western travelling representative for the Lozier Motor Company, Detroit, representing the Lozier in the Missouri river and Rocky mountain territory.

The Pope Manufacturing Company, Hartford, Conn., maker of Pope-Hartford cars, is to erect a modern four-story building. It is expected that this will be completed and the output of the factory doubled by summer, or early fall at the latest. Specifications have been completed and bids invited, so that June should see the new factory well under way, when the postoffice sub-station will be moved to the Hart & Hegeman building and the space thus available occupied by the Pope superintendent, giving the factory some much needed room. The new building will be 192 by 72 feet, four stories and basement, and will add about 70,000 square feet to the plant. A tower outside the main walls of the addition will contain the elevators, stairways and toilets. The elevators will be two in number, and will each have a capacity of 10 tons, with platforms 25 feet long. The building will be light, large steel sash windows being a feature. An open 20-foot driveway will admit automobiles to the first floor.

The Metzger Motor Car Company, Detroit, has closed a deal with George Holm & Co., Helsingfors, Finland, giving it the agency for the Everitt cars in Finland and the northern part of Russia.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, recently took possession of the first wing of the new factory which is being erected for it in the heart of the manufacturing district, and work is being rushed on the other wing. The one just completed cost $100,000, is four stories high, of reinforced concrete, 100 by 160 feet. It stands in the rear of factory No. 1. The second wing will be a duplicate of the first, and when the factory is completed it will be U shaped, 230 by 315 feet. The construction will be such that two additional stories may be built at any time.

The Jeffrey Dewitt Company, Detroit, is building an addition to its factory which will shortly be completed. It will be two stories high, 100 by 40 feet and the increased space will enable the factory to turn out 36,000 spark plug porcelains a day, making a yearly capacity of 10,800,000. The company has bought the patents and rights to the Visible spark plug, and this will be manufactured and marketed as the J. D. Visible spark plug. It has a port or opening in the porcelain, containing an auxiliary spark gap.

Hal Smith has resigned his position as advertising manager for the Anderson Carriage Company, Detroit, and joined the advertising department of the electric truck division of the General Motors Company.

The Motor Distributing Company, Seattle, Wash., agent for the Lozier Motor Company, Detroit, is planning to spend $80,000 for a new home for the Lozier. A plot of ground has been bought for $50,000, and a $30,000 building is to be erected to house modern salesrooms and a garage and service department.

The Henry Motor Car Company's factory at Muskegon, Mich., was sold recently to E. Levens and George Fachfennaier of Philadelphia. The purchase includes all the cars and material at the factory, and it is reported that a company will be organized to supply the trade with spare parts for the Henry car.

Dyneto Electric Company is to move its plant from Elbridge, N. Y., to Syracuse, and negotiations are under way for obtaining a suitable factory.

The Olson Manufacturing Company has started work on its new factory in Sioux City, Ia., where it will manufacture valve truing and seating machinery. The factory will cost $5000, and will be 32 by 122 feet.

The Abbott Motor Company, Detroit, recently closed Abbott-Detroit agency contracts with the following: Victor Levesque, Montreal, Can.; Norwood Machine Company, Norwood, O.; Western Motor Car Company, Denver, Col.; R. J. Rhodes, Newport News, Va.; Reese Machine & Tool Works, Plymouth, Penn; Zanesville Taxicab Company, Zanesville, O.

The Pittsburg Chalmers Company, Pittsburg, Penn.; has bought a plot of land in Louisa street, where a $20,000 building, containing display, sales and repair rooms, will be erected.

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THE INDUSTRY IN NEW YORK.

According to an advance bulletin on manufactures for the State of New York, based upon the 13th census, and issued by the Department of Commerce and Labor, the automobile industry in that commonwealth arose from 126th place in 1899 to 73rd in 1904 and 23rd in 1909. These figures show that the number of establishments engaged in the manufacture of automobiles, bodies and tops has increased from 15 to 113 in 10 years, and that the capital involved has been increased from $639,000 to $25,102,000. Of course, it must be remembered that these figures are now more than two years old, and many changes undoubtedly would be revealed were it possible to secure a similar report for 1911.

In the accompanying tabulation is presented the statistics for the entire state, and for the cities of Buffalo and New York. Automobiles are manufactured in several other cities, but the amount of business transacted does not appear to have warranted segregation in the report of the census board, and the figures are included in the item "All other industries." The compilation will be of interest to motorists, not only because it shows the growth of the motor car industry in New York, but as an indication of the growing importance of the manufacture of cars throughout the entire country. The tabulation follows:

State of New York.

	1899	1904	1909
No. of establishments	15	35	113
Persons engaged	..	2,101	11,610
Proprietors	..	21	59
Salaried employees	56	231	1,690
Wage earners	288	1,849	9,861
Primary horsepower	..	1,254	9,398
Capital involved	$639,000	$3,347,000	$25,102,000
Salaries paid	57,000	231,000	1,604,000
Wages paid	166,000	1,227,000	7,016,000
Cost of materials	173,000	1,907,000	14,908,000
Value of products	456,000	4,260,000	30,980,000
Value added by manufact'e	283,000	2,353,000	16,072,000

City of Buffalo.

	1899	1904	1909
No. of establishments	3	5	23
Persons engaged	..	679	3,640
Proprietors	..	1	13
Salaried employees	7	53	583
Wage earners	23	625	3,044
Primary horsepower	..	...	4,561
Capital involved	$112,000	$791,000	$9,300,000
Salaries paid	6,000	71,000	283,000
Wages paid	15,000	390,000	2,200,000
Cost of materials	34,000	580,000	4,596,000
Value of products	78,000	1,386,000	9,598,000
Value added by manufact'e	44,000	806,000	5,002,000

City of New York.

	1899	1904	1909
No. of establishments	3	14	56
Persons engaged	..	631	2,326
Proprietors	..	8	31
Salaried employees	..	70	316
Wage earners	7	553	1,979
Primary horsepower	..	...	1,460
Capital involved	$89,000	$1,422,000	$3,713,000
Salaries paid	.....	80,000	492,000
Wages paid	4,000	493,000	1,585,000
Cost of materials	3,000	757,000	2,636,000
Value of products	9,000	1,399,000	6,194,000
Value added by manufact'e	6,000	642,000	3,558,000

AUTOS AT MICHIGAN STATE FAIR.

Special provisions are to be made to accommodate visiting motorists at the Michigan state fair to be held in Detroit in the fall, as well as for exhibits of automobile manufacturers. The building which was specially constructed for motor car shows in 1910 will be used, affording 52,000 square feet for the exhibitors. A special entrance will be made in the park for both pedestrians and machines, making the automobile building easily accessible.

MORRIS GRABOWSKY RESIGNS.

According to a dispatch from Detroit, Morris Grabowsky of the Alden Sampson Company, which is a constituent of the United States Motor Company, has resigned, the resignation taking effect May 1. Mr. Grabowsky had been with the Sampson since the factory was purchased by the selling company, and previously had been identified with the Rapid Motor Vehicle Company, Pontiac, Mich. He has not made known his plans for the future.

MISSOURI'S CENSUS FIGURES.

While Missouri may not be classed as one of the most important automobile producing centres of the country, the report of the census bureau with reference to its findings during the 13th census shows that the number of factories in the state producing automobiles, bodies and parts, increased from three in 1904 to 17 in 1909. The total value of products increased from $63,000 to $1,677,000 during the same period. The statistics for the state and the city of St. Louis follow:

State of Missouri.

	1904	1909
Number of establishments	3	17
Persons engaged	37	449
Proprietors	3	6
Salaried employees	13	75
Wage earners	21	368
Primary horsepower	20	184
Capital involved	$24,000	$800,000
Salaries paid	5,000	85,000
Wages paid	16,000	252,000
Cost of materials	31,000	1,025,000
Value of products	63,000	1,677,000
Value added by manufacture	32,000	652,000

City of St. Louis.

	1904	1909
Number of establishments	3	11
Persons engaged	37	340
Proprietors	3	2
Salaried employees	13	56
Wage earners	21	282
Primary horsepower	..	139
Capital involved	$24,000	$620,000
Salaries paid	5,000	62,000
Wages paid	16,000	197,000
Cost of materials	31,000	727,000
Value of products	63,000	1,302,000
Value added by manufacture	32,000	575,000

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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CHANGES IN CONTEST RULES FOR 1912.

WHILE completed rules governing automobile contests for 1912 have not been prepared for distribution by the contest board of the American Automobile Association, advance information concerning the more important changes is now available. These amendments have been adopted with a view to securing greater safety to both spectators and contestants, and for the purpose of clearing up differences which have arisen from situations developed in the past. They may be summarized as follows:

The definition of "Contest" has been so modified as to indicate clearly what motor car events should be sanctioned by the A. A. A. and now reads: "Contest—Any competition of two or more motor cars, governed by rules, in which entry fees may or may not be charged, or prizes may or may not be offered, or in which speed or durability are determining factors in evolving a winner."

The definition of "Automobile, Motor Car or Car," has been changed to include three-wheeled vehicles.

The minimum weights heretofore prescribed in stock chassis events have been eliminated and stock chassis contests will be governed by piston displacement as in class C events.

No car or chassis competing in events held under price or piston displacement classifications is eligible for any division except that to which its price or piston displacement entitles it.

Sanction fees remain unchanged, except that a fee of $1000 is provided for events of 100 miles or more, held on specially constructed speedways, such as the Indianapolis motor speedway, the Los Angeles motordrome, etc.

To rule 17, which reads: "'Reserved territory—No sanction shall be granted to any promoters to hold a contest in the territory of an affiliated club, until the contest board has conferred with such club," has been added: "Any objections which an affiliated club may file against the promotion of any contest in its territory must be supported by bona fide reasons for such objections."

The following new rule has been incorporated: "Rule 17A—No sanction shall be granted to any club, association or individual for any contest other than one to be promoted and conducted by it. Any misrepresentation or transfer of sanction to a second party for a consideration shall invalidate the sanction and render the club, association or individual liable to disqualification and ineligible for further sanctions.'

Registry cards will no longer be issued to drivers in reliability contests, but such drivers will be required to register with the referee for each reliability run prior to the start on a form specially prepared. No registration fee will be required and such registration applies only to that particular event.

With respect to drivers and mechanicians the new rules provide that mechanicians must be carried in all road races and in all events of 50 miles or more held on beach, speedway or track. No driver or mechanician under 21 years of age will be permitted to participate in sanctioned events, and no person under 21 years of age will be appointed to any official position.

To rule 110 on the "Change of Crew" of a car the following has been added: "Should the mechanician leave his seat for any reason whatsoever at any time during the race, the driver must not continue until the mechanician is again seated in the car. In case of disability or accident to the mechanician which may necessitate his leaving the car, the driver may, after stopping and investigating, proceed alone to the pits and make application to the referee for instructions."

The powers of the official referee have been enlarged somewhat, as will be noted by these two new rules:

"He shall have the right to terminate a race before its scheduled finish, if emergency demands such action, and in such case no award shall be made.

"He shall have the right to temporarily stop or delay a race in case of impending disaster. Upon signal to stop, the cars must line up in front of their pits (or in the paddock) and during the time the race is discontinued they shall be in charge of members of the technical committee and no work of any kind shall be done upon them."

The deposit prescribed to accompany written protests filed with the referee, heretofore $10 in all cases except reliability tours, has been raised to $25 for all events, and it is hoped that this will result in a decrease in the number of frivolous protests.

The use of flags to signal contestants in track and road races has been made uniform and the various signals now are: "Red flag, course is clear; yellow, blocked course, stop; green, you are entering your last lap; white, stop at pit on next lap for consultation; black and white checkered, you are finished; black with white centre, a competitor is trying to overtake you (Road judge's flag for use on narrow stretches of course)."

In stock car or chassis events the use of detachable or demountable wheels which do not involve the change of wheel bearings or that portion of the hub carrying the bearings is not permitted except such wheels are regularly supplied as stock equipment. In non-stock events, such demountable wheels are permitted on the same basis as the use of detachable or demountable rim equipment.

Considerable time and thought have been devoted to the matter of taking proper measures for the protection of spectators and competitors, with the following result:

"Rule 203. Fences—Fences should be of such nature as not to endanger the lives of drivers and

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mechanicians of competing cars. The pole or top rail of fences at the inner and outer edges of the track on curves must be removed, starting at a point where the curve begins and continuing to a point 25 feet beyond where the curve ends, measured in the direction in which races are run; i. e., with the left hand of the driver toward the inner fence.

"Neutral Zones—Neutral zones must be established and maintained during the running of races. These zones should be 40 feet in width on the inner and outer curves opposite where the pole or top rail of the fences is removed, as required by the foregoing rule, and 30 feet in width on the straightways.

"Rule 204. Ditches, Holes or Obstacles—Ditches, holes or obstacles must not be permitted on the track between the inner and outer fences.

"Rule 205. Anti-Dust—Adequate measures must be taken for the prevention of dust on the track. The use of water is not permitted, and dust must be laid by oils, calcium chloride or other similar preparation approved by the contest board.

"Rule 206. Official sanction for track events is issued conditional upon a strict compliance with the above rules, and sanction shall be revoked in case of failure to meet each and every one of these requirements."

Handicap events will be timed hereafter from the start of the "limit" man or first competitor away from the line. The number of starters in a track race is limited to one car for every 400 feet of track. This will permit 13 starters in a race held on a one-mile track, and seven on a half-mile track. Starting positions are to be assigned in the order in which competing cars are presented to the starter, unless otherwise specifically arranged, and there must be four feet between the hubs of contesting cars.

In the matter of touring events, in which other than registered stock cars may be entered, these can be run under class E and the conditions of grades III and IV. In case of tied scores, winners are to be decided by lot. Reliability contests of grades I and II shall be open only to registered stock cars, whereas contests of grades III and IV may be restricted to registered stock cars or open to any car privately owned or otherwise, regardless of registration.

The following addition has been made to rule 425, fourth paragraph: "Where dash adjustment for needle valves or auxiliary air valves on carburetor are furnished as standard equipment by the manufacturer, same may be used without penalty."

DETROIT TO CELEBRATE.

Detroit will hold a grand celebration during the week of July 22, when the 211th anniversary of the founding of the city will be observed. The affair is named the "Cadillaqua," which title is a combination of the name of the man who founded the city, Cadillac, and aqua, the Latin for water. Water sports will be a feature of the week, but there will also be automobile races and aeroplane flights. It is expected that the motoring fraternity of the country, especially of the West, will make Detroit a mecca during the Cadillaqua.

NEW DURYEA ELECTA.

C. E. Duryea, the well known veteran of the automobile trade, appears to be quite well settled in Saginaw, Mich., after his removal from Reading, Penn., and under the firm name of the C. E. Duryea Company, has just produced a new model of his Electa. This is even simpler than its predecessor. A decided novelty of the construction is the chassis frame, which is triangular, instead of rectangular. By this means three point suspension of both the motor and body is attained. The characteristic Duryea motor is used, with the flywheel between the two cylinders and the crankshaft serving as the driving axle. The transmission has been strengthened, and the muffler enlarged.

LIABLE FOR CHECKED CAR.

A decision of interest to motorists was recently given in the second district municipal court of Brooklyn, N. Y., in the suit of Dr. A. S. Brinkerhof for damages to his car while checked at a Coney Island cafe. Clifford Brinkerhof, son of the doctor, checked the car with an attendant outside of Feltman's cafe, Coney Island, from which it was stolen, being found subsequently with all the removable parts missing and considerably damaged by being run into a ditch. Feltman Bros., the cafe proprietors, refused to acknowledge any responsibility in the matter, stating that the checking stand was maintained independently.

Testimony showed, however, that the checking space was in charge of an attendant in the Feltman uniform, and that the numbered ticket which was issued for the car bore Feltman's name. The fact that the checking system was maintained only for the convenience of the patrons of the cafe, without any fee being charged, had no influence on the verdict, which was for the highest sum the court could award, $500.

ENTER THE "BITE."

In the current number of Juice, published by the Pettingell-Andrews Company, Boston, Mass., manufacturer of electrical supplies and fittings, a decidedly new term is introduced. This is the "bite" which is used to signify the electrician's helper, the raw material for future electrical engineers, much in the same manner as reference is made to the printer's devil. The origin of the name is somewhat shrouded in mystery, but is said to have become rather popular among electricians.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

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UNITED STATES TIRES ABROAD.

Although Europe has been producing automobile tires for a number of years, it is said that the rubber tread type of non-skid pneumatic, so prevalent in this country, is practically unknown there except as it has been introduced by American tourists. That there is a demand for these tires abroad is made evident by the interest that European dealers are manifesting in them.

Recently, M. Adler of Amsterdam, Holland, came to America for the purpose of investigating the tire field, and as a result of his visit he has taken the agency for United States tires, including the Nobby treads, made by the United States Tire Company, New York City. He represents one of the largest supply stores in Europe, maintaining branches at Brussels, Paris and Birmingham, England.

In purchasing tires in this country, Mr. Adler absolutely disregarded the question of price. He admitted that American shoes cost more than the European product, but explained that the difference in price can be more than offset by the difference in service. In spite of the fact that Continental highways are noted for being good, it is said that foreign tires have not been giving anywhere near the mileage obtained by motorists in this country, under decidedly less favorable road conditions.

NEW ROAD GUIDE SYSTEM.

A system based on a somewhat novel plan is being advocated by A. L. Bancroft of Concord, Cal., for the numbering of farm houses, roads and routes. The idea is to lay off every road into blocks of one-tenth of a mile each and designate the houses by letters placed to the right or left of the block number according to whether the houses are on the right or left side of the road. The system, if thoroughly carried out and the roads posted with their numbers, would no doubt be of value to the tourist.

THE TRAIL BLAZER.

Among the new house organs is the Trail Blazer, the first number of which recently appeared from the offices of the Findeisen & Kropf Manufacturing Company, Chicago, Ill. It is an interesting little publication, devoted to the interests of the Rayfield carburetor, made by this concern.

THE FIRST MAGNETO.

According to C. F. Splitdorf of New York City, the first magneto appeared in Germany in 1886 and was of the low-tension type. It was used for ignition on stationary engines and was later perfected for use on road vehicles.

CANADIAN OVERLAND TRADE MARK.

G. R. Rastall of Regina, Sask., some time ago incorporated the Overland Automobile Company of Canada, Ltd., and is said to have claimed partnership with President John N. Willys of the Willys-Overland Company, Toledo, O. The name Overland was registered as a trade mark, and preparations were made to build Overland cars in Canada. All this came as a surprise to Willys who had never heard of Rastall except as being one of the Overland's Canadian agents, and he immediately instituted suit for damages. As a result the name of the company has been changed to the Canadian Motors, and the trade mark Overland surrendered to the government.

NATIONALS ON STAGE ROUTES.

C. P. Barnard of Roseburg, Ore., operating the stage line between Roseburg and Myrtle Point, has bought two Nationals and four Buicks for use in carrying mail and passengers. The Nationals will be used for the heavier work, and will carry both passengers and mail, Barnard figuring on loading 1500 pounds of mail and three passengers on each car. The Buicks will be used for passengers exclusively, and special bodies are being built for them. The number of horses which the automobiles will eliminate is as yet a matter of conjecture, but no doubt the present stable of 84 will be considerably reduced. Barnard estimates that the two National cars will eliminate 32 horses at least. The trial of the automobiles is attracting attention among the stage men of the coast, and it will be watched with considerable interest.

OHIO TO BUILD CANADIAN PLANT.

The Ohio Motor Car Company of Cincinnati, O., is to build a plant in Canada at Colborne, Ont., near Toronto, for the production of Ohio gasoline cars. A Canadian company is to be incorporated with a capital of $400,000, and work on the factory is to be started at once. The offices will be located in Toronto, and C. F. Pratt, the president of the parent concern, will take an active part in the management of the new venture.

UNITED STATES TIRE BRANCHES.

The United States Tire Company, New York City, in line with its policy of establishing branches in all parts of the country, has opened branch houses in Jacksonville, Fla.; Richmond, Va., and Des Moines, Ia.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

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Why Not Change Places With Your Customers On This Tire Question?

It might be a good thing for tire dealers to get on the other side of the counter once in a while and look at things from the viewpoint of the customer.

If you were buying tires instead of selling, what tires would you buy?

The ones that offered you the greatest tire value for the money, wouldn't you? And you undoubtedly would let the number of strong points incorporated in the tire determine its value.

When you found a tire that "stood up"—gave you a service return for every penny of your investment—you probably would tell your neighbor that your dealer sold Good tires. And your dealer would get another customer and his business would grow accordingly.

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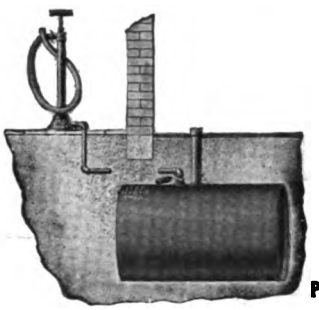
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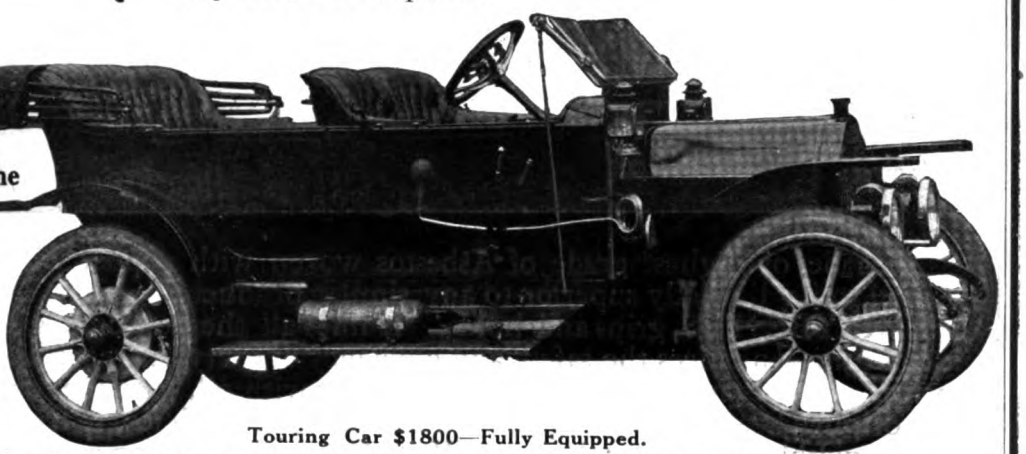
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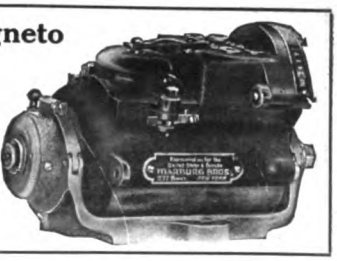
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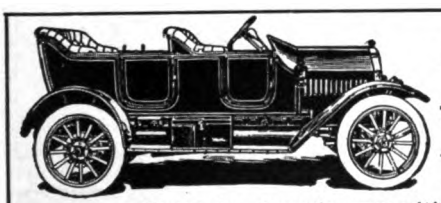
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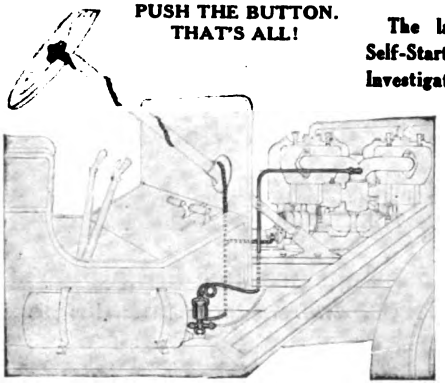
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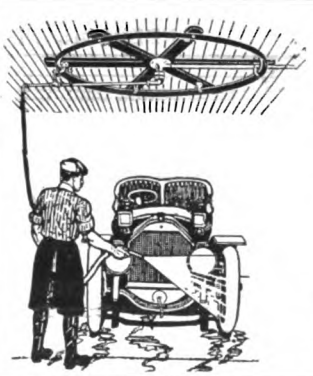
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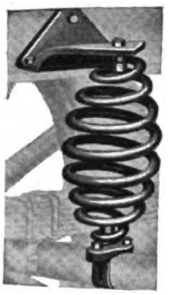
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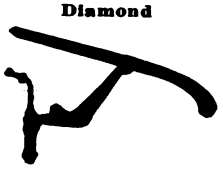
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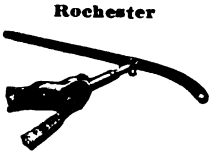


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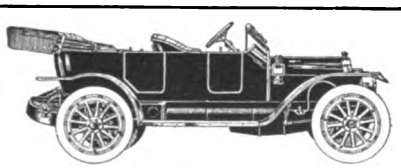


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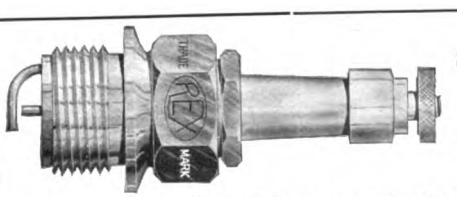
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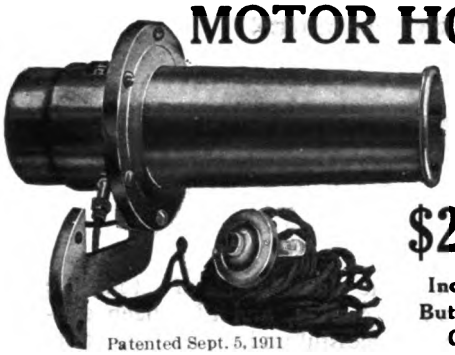
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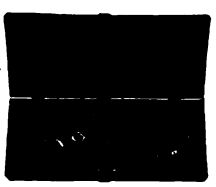
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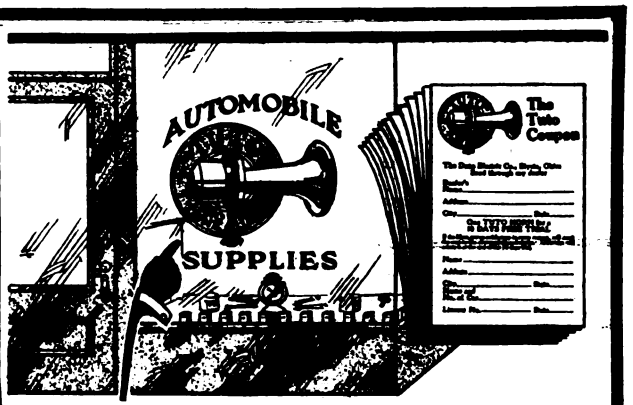
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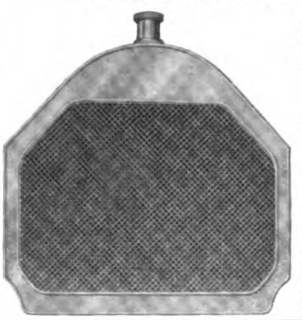
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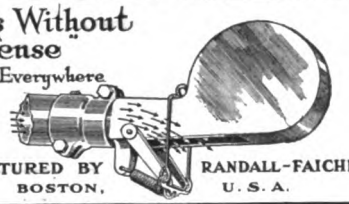
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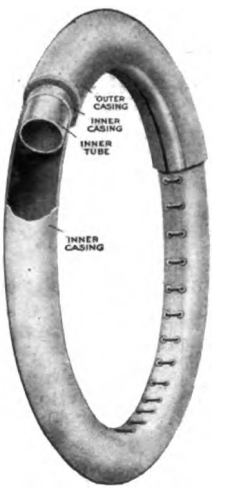
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Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Webb-Veitch Co., 1777 Broadway, New York City (Invex.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland, O. (L B A.)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")
Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Harris Oil Co., Muncie, Ind.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York City (Rex.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPEEDOMETERS AND RECORDING DEVICES

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 807 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Ideal Oil Pump & Tank Co., 146 Summer St., Boston, Mass.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)

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CLASSIFIED BUYERS' GUIDE---Concluded

Branch: 1974 Broadway, New York.

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St. Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1776 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims — Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17 1-2 Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

Western Automobile Supply Co., 3900 Sheridan road, Chicago, Ill. (Auto Inner Casings.)

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator.) See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

New Tyr Manufacturing Co., 771 Lexington Ave., New York City, (New Tyr.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz (Cushion.)
Branches: New York, Chicago, Detroit, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TRUCK BODIES.

Lynch Manufacturing Co.,. Hammond, Ind.
Branches: East Chicago, Ind.; South Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Mfg. Co., 1756 Cranston St., Providence, R. I.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Canton Foundry & Machine Co., Canton, O. (Universal.)

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Garage and Individual.)
Branches: In all principal cities.

WASHING DEVICES FOR GARAGES.

Perfect Mfg. Co., Albany, N. Y.

WINDSHIELDS AND WINDSHIELD CLEANERS.

Conover & Robinson, 244-252 W. 54th St., Motor Hall, New York City (Boreas.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York City (Bowden.)

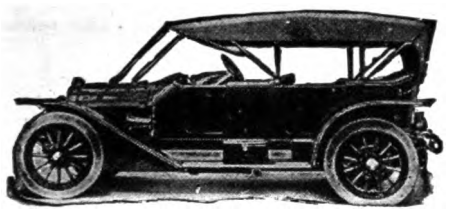
WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.

Cutter, George A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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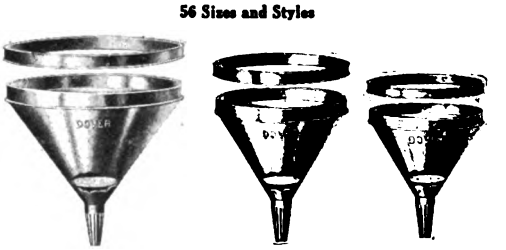
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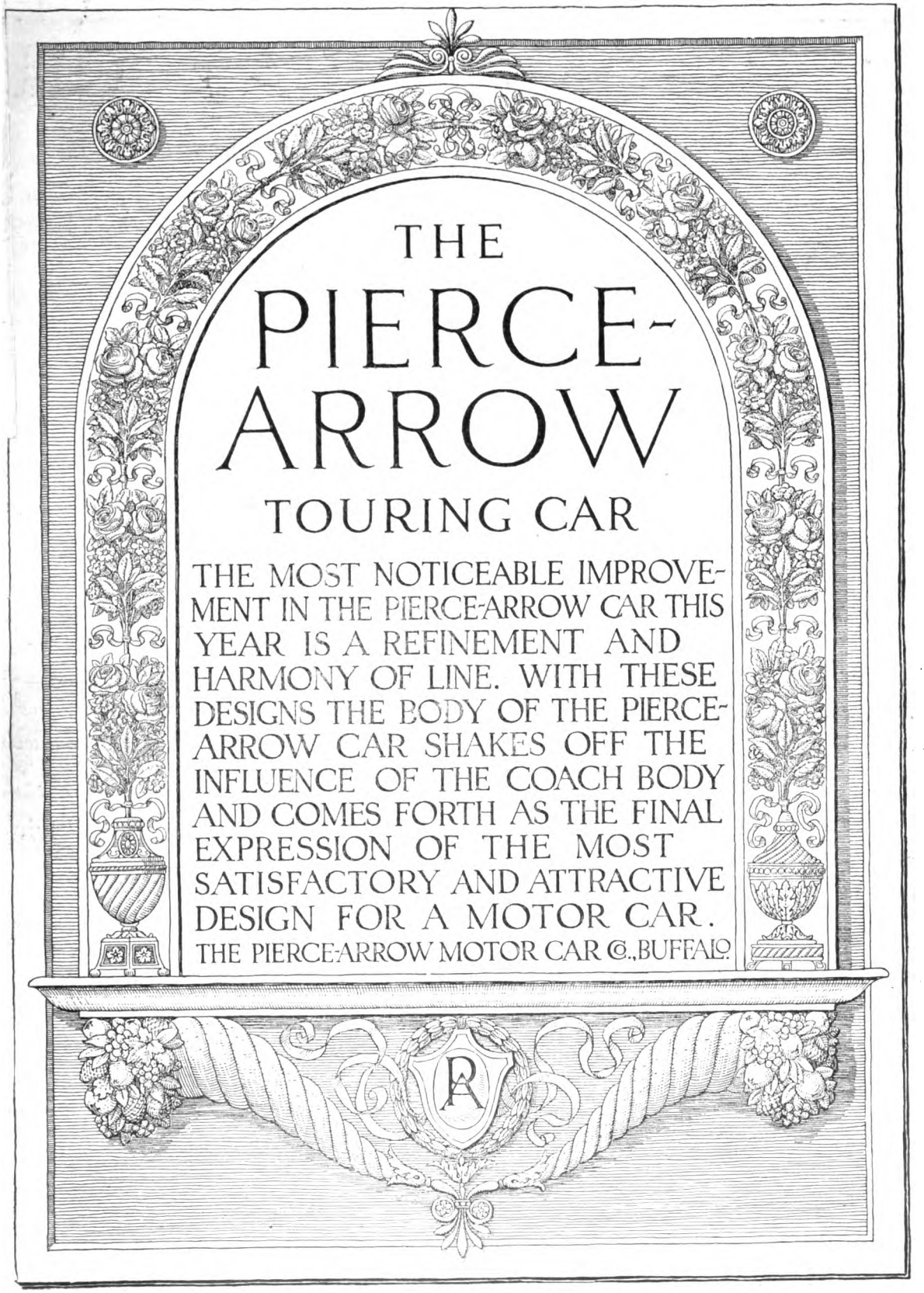
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Accessory & Garage Journal

TIMES BUILDING PAWTUCKET, R. I.

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Santa Monica Road Race—Indianapolis Entries.

VOL. XXXIII. No. 7

AUTOMOBILE JOURNAL

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PAWTUCKET, R. I.

May 10, 1912

BELOW you will see listed the correct grade of oil for 111 makes of automobiles—for both Summer and Winter. Space limits the list of cars. On request we will supply our more complete list with recommendations. Gargoyle Mobiloils are put up in barrels, half-barrels, in 5 and 1 gallon sealed, white cans. All are branded with the Gargoyle, which is our mark of manufacture. The various grades go by the following names:

Gargoyle Mobiloil "A." Gargoyle Mobiloil "B." Gargoyle Mobiloil "D." Gargoyle Mobiloil "E." Gargoyle Mobiloil "Arctic."

They are handled by the higher class garages, auto-supply stores and others who supply lubricants.

A guide to correct Automobile lubrication

Explanation: In the schedule, the letter opposite the car indicates the grade of Gargoyle Mobiloil that should be used. For example, "A" means "Gargoyle Mobiloil A." "Arc" means "Gargoyle Mobiloil Arctic." For all electric vehicles use Gargoyle Mobiloil A. The recommendations cover both pleasure and commercial vehicles unless otherwise noted.

MODEL OF CARS	1908		1909		1910		1911		1912	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Abbott Detroit	....	....	....	....	A	Arc.	A	Arc.	A	Arc.
Alco	....	....	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
American	A	E	A	Arc.	A	Arc.	A	Arc.	A	Arc.
Apperson	E	E	A	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Atlas	A	A	E	E	E	E	E	E	A	A
" Com'l	....	....	E	E	E	E	Arc.	Arc.	A	A
Austin	A	A	A	Arc.	A	Arc.	A	Arc.	A	Arc.
Autocar (2 cyl)	B	A	A	Arc.	A	Arc.	A	Arc.	A	Arc.
" (2 cyl) Com'l	....	A	A	Arc.	A	Arc.	A	Arc.	A	Arc.
" (4 cyl)	A	E	A	E	A	E	A	Arc.	A	Arc.
Benz	....	....	A	A	A	A	A	A	A	A
Bergdoll	....	....	....	....	A	Arc.	A	Arc.	Arc.	Arc.
Brush	A	A	A	E	A	E	A	E	A	E
Buick (2 cyl)	A	A	A	A	A	A	A	A	A	A
" (4 cyl)	A	Arc.	A	Arc.	Arc.	Arc.	A	Arc.	A	Arc.
Cadillac (1 cyl)	A	E	B	A	....	....	....	....	....	....
" (4 cyl)	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Cartercar	A	E	A	A	A	E	A	E	A	E
" Com'l	B	A	A	A	A	E	A	Arc.	A	Arc.
Case	....	....	....	....	....	....	A	A	A	Arc.
Chadwick	A	A	A	A	B	A	A	Arc.	A	Arc.
Chalmers	....	....	Arc.	Arc.	Arc.	Arc.	A	Arc.	Arc.	Arc.
Chase	B	B	B	B	B	B	B	B	B	B
Cole	....	....	....	....	Arc.	Arc.	A	Arc.	Arc.	Arc.
Columbia	A	E	A	E	E	E	A	A	A	A
Columbia Knight	....	....	....	....	....	....	....	....	A	A
Couple Gear	A	A	A	A	A	A	A	A	A	Arc.
Croxton-Keeton	....	....	....	....	A	Arc.	A	Arc.	Arc.	Arc.
Daimler	A	E	A	E	A	E	A	E	A	A
Daimler Knight	....	....	....	....	....	....	A	A	A	A
Darracq	A	E	A	E	A	E	A	E	Arc.	Arc.
De Dion	B	A	B	A	B	E	B	A	B	A
Delahaye	A	A	A	A	A	A	A	A	A	A
Delaunay-Belleville	B	A	B	A	B	B	A	B	B	A
Elmore	A	A	A	A	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
E. M. F.	....	....	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Fiat	A	E	B	A	A	A	B	A	A	A
Flanders	....	....	....	....	E	E	E	E	Arc.	Arc.
Ford	A	E	E	E	A	Arc.	E	E	E	E
Franklin	B	E	B	E	B	Arc.	A	Arc.	A	Arc.
" Com'l	B	E	B	A	B	A	B	A	A	Arc.
Gramm	....	....	....	....	....	....	A	Arc.	A	Arc.
Gramm-Logan	....	....	A	Arc.	A	Arc.	....	....	....	....
Hewitt (2 cyl)	....	....	A	A	A	A	A	Arc.	....	....
Hewitt (4 cyl)	A	A	A	E	A	E	A	Arc.	E	E
Hudson	....	....	....	....	....	....	A	Arc.	A	Arc.
Hupmobile	....	....	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
International	B	A	B	A	B	A	B	B	B	A
Interstate	....	....	A	E	A	E	A	Arc.	A	Arc.
Isotta	A	E	A	A	A	A	A	A	A	A
Itala	....	....	A	A	A	A	A	A	A	A
Jackson (2 cyl)	A	A	A	A	A	A	....	....	....	....
" (4 cyl)	A	E	A	E	A	Arc.	A	Arc.	A	Arc.
Kelly	....	....	....	....	....	....	Arc.	Arc.	Arc.	Arc.
Kissel-Kar	A	E	A	E	A	E	A	Arc.	A	Arc.
" Com'l	....	....	....	....	....	....	Arc.	Arc.	Arc.	Arc.
Kline Kar	....	....	....	....	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Knox	B	E	B	A	B	A	B	A	B	A
Krit	....	....	....	....	A	A	A	A	A	A
Lambert	A	E	A	A	A	Arc.	A	Arc.	A	Arc.
" Com'l	A	A	....	....	....	....	A	E	A	E
Lancia	B	A	B	A	B	A	B	Arc.	B	Arc.
Locomobile	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Lozier	A	A	A	A	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Mack	A	A	A	E	A	E	A	E	E	E
Marion	A	A	A	E	A	E	A	E	A	Arc.
Marmon	B	E	Arc.	Arc.	A	E	A	Arc.	Arc.	Arc.
Matheson	A	E	Arc.	Arc.	Arc.	Arc.	A	A	A	Arc.
Maxwell (2 cyl)	E	E	E	E	E	E	E	E	E	E
" (4 cyl)	....	....	E	E	E	E	Arc.	Arc.	Arc.	Arc.
Mercedes	A	E	A	E	A	E	A	E	A	E
Mercedes Knight	....	....	....	....	....	....	A	A	A	A
Mercer	....	....	....	....	A	Arc.	A	Arc.	A	Arc.
Minerva Knight	....	....	....	....	....	....	A	A	A	A
Mitchell	A	E	A	A	Arc.	Arc.	A	Arc.	A	Arc.
Moon	A	E	A	E	A	E	Arc.	Arc.	Arc.	Arc.
National	A	E	A	Arc.	A	A	A	A	A	A
Oakland	....	....	A	E	A	E	A	Arc.	A	Arc.
Oldsmobile	A	E	A	E	A	E	A	Arc.	A	Arc.
Overland	A	E	A	E	A	E	Arc.	Arc.	Arc.	Arc.
Packard	E	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Panhard	A	E	A	E	A	E	A	E	A	Arc.
Panhard Knight	....	....	....	....	....	....	A	A	A	A
Peerless	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Pennsylvania	A	E	A	E	A	E	A	E	....	....
Pierce Arrow	A	E	A	Arc.	Arc.	Arc.	A	Arc.	A	Arc.
" Com'l	....	....	....	....	....	....	Arc.	Arc.	Arc.	Arc.
Pope Hartford	A	E	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Premier	A	E	A	Arc.	A	Arc.	A	Arc.	A	Arc.
Rambler	A	E	A	A	A	A	A	Arc.	Arc.	Arc.
Rapid	A	A	A	A	A	A	A	Arc.	Arc.	Arc.
Regal	....	....	A	E	A	E	A	Arc.	A	E
Renault	A	E	A	Arc.	A	Arc.	A	Arc.	A	Arc.
Reo	A	E	A	A	A	E	A	Arc.	A	Arc.
Royal Tourist	A	E	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Selden	A	E	A	E	A	E	A	E	Arc.	Arc.
Simplex	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Speedwell	....	....	A	Arc.	Arc.	Arc.	A	Arc.	A	Arc.
Stanley	D	D	D	D	D	D	D	D	D	D
Stearns	A	E	A	A	Arc.	Arc.	A	Arc.	A	Arc.
Stearns Knight	....	....	....	....	....	....	....	....	A	A
Stevens Duryea	A	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
Stoddard Dayton	....	....	E	E	Arc.	Arc.	A	A	A	A
Stoddard Dayton-Knight	....	....	....	....	....	....	....	....	A	A
Thomas	A	E	E	E	E	E	E	E	A	E
Walter	A	E	A	E	A	E	Arc.	Arc.	Arc.	Arc.
Welch	A	E	A	E	A	E	....	....	....	....
Welch Detroit	....	....	....	....	....	....	A	E	....	....
White (Gas)	....	....	....	....	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.
" (Steam)	D	D	D	D	D	D	D	D	D	D
Winton	A	E	E	E	Arc.	Arc.	Arc.	Arc.	Arc.	Arc.



Mobiloil

A grade for each type of motor.

If oil saves power, it follows that one oil saves more power than another.

VACUUM OIL COMPANY, Rochester, U. S. A.

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1912 Annual Catalog No. 22

Our 1912 Catalog, the Largest and Most Complete Catalog of the kind, containing 256 Pages, is Now Ready for Distribution. The Circulation is Limited to ONE HUNDRED THOUSAND Copies. It will be mailed to any one on request.

CUT PRICES

Concerns that offer Large Discounts make it their practice to INFLATE LIST PRICES and then offer Large Discounts, which are somewhat misleading. We have seen a catalog in which a certain spark plug is illustrated, "PRICE $2.50, OUR PRICE $1.00," while THE STANDARD LIST or RETAIL PRICE for the same spark plug as illustrated in Our Catalog and advertised by the manufacturer is $1.00 each. Their CUT PRICE Therefore Is Not Lower Than OUR LIST PRICE.

DON'T BE DECEIVED BY LARGE DISCOUNTS QUOTED FROM INFLATED LIST PRICES . . . .

ORDER FROM OUR NEAREST BRANCH

Boston, Mass., Branch, 202-204 Columbus Avenue
Springfield, Mass., Branch, Bridge and Dwight Streets
Hartford, Conn., Branch, 274 Trumbull Street
Albany, N. Y., Branch, 135 Central Avenue

The Largest Auto Supply House in America

CHAS. E. MILLER

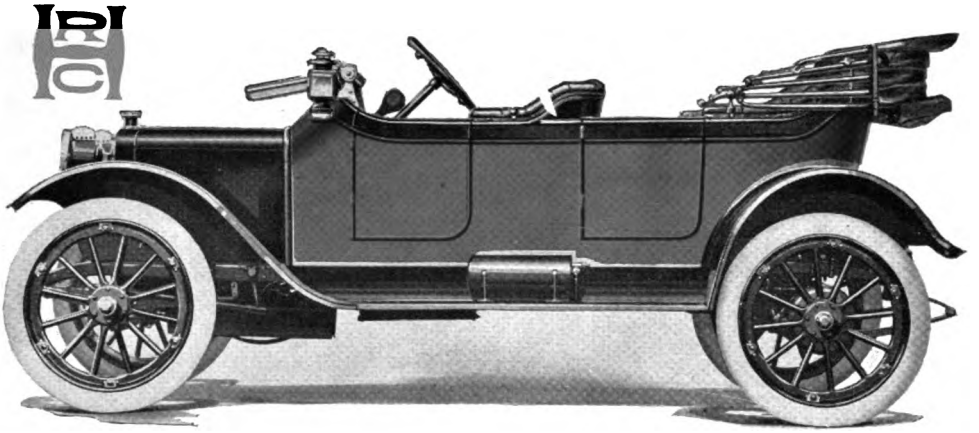
Manufacturer, Jobber, Exporter and Importer

HOME OFFICE: 97-103 READE STREET, NEW YORK CITY

ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

NEW YORK CITY 97-103 Reade St.	BROOKLYN, N. Y. 1421 Bedford Ave.	BOSTON, MASS. 202-204 Columbus Ave.	DETROIT, MICH. 227-229 Jefferson Ave.	ATLANTA, GA. 66 Edgewood Ave.
NEW YORK CITY 924 Eighth Ave.	BUFFALO, N. Y. 824 Main Street	SPRINGFIELD, MASS. Bridge & Dwight Sts.	CLEVELAND, O. 1829 Euclid Ave.	NEW ORLEANS, LA. 601-603 Baronne St.
NEW YORK CITY 2782 Broadway	ALBANY, N. Y. 135 Central Ave.	HARTFORD, CONN. 274 Trumbull St.	PHILADELPHIA, PA. 318 North Broad St.	NEWARK, N. J. 274 Halsey St.

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5-Passenger Touring Car, 110-Inch Wheelbase

R-C-H "Twenty-five"

5-Passenger Touring Car—110 Inch Wheelbase.

Standard Model

$850 F. O. B. DETROIT

Fully equipped with top, windshield, generator, side curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, 3 speeds, enclosed valves, Bosch magneto.

Model E E

$900 F. O. B. DETROIT

Equipped with 32x3 1-2 tires, demountable and quick detachable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit, and the famous Jiffy Curtains, which can be adjusted in an instant and make the car entirely weather proof, long stroke motor, three speeds, enclosed valves.

General R-C-H Specifications

Motor—4 cylinders, cast en bloc—3 1-4 inch bore, 5-inch stroke. Two bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive**—Left side. Irreversible worm gear, 16-inch wheel. **Control**—Center lever operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

Wanted---1000 Dealers

Our selling problem this season has been a peculiar one. Naturally, our original aim was to get as wide a distribution as possible. But the demand for the R-C-H so far exceeded all expectations that our entire output for 1912 was speedily oversold. And this left many sections without R-C-H representation, simply because we could not supply the cars.

We shall manufacture this season in round numbers 10,000 cars. For the season of 1913 our output will be increased to 30,000 cars. Our present dealers tell us that they will take care of 15,000. That leaves 15,000 for sections where the R-C-H is not at present represented. And that in turn offers a golden opportunity to the right dealer in much of the best territory in the country.

Ask yourself these questions: What does your public—the people to whom you must sell—demand in a car? And given two cars possessing all these features, would the average man prefer to pay a lower or higher price?

Of course the answer to the second question is self-evident. So let us consider the first. The average man wants in a car five things—sturdiness, comfort, beauty, power, roadability. We claim that no car at twice its price excels the R-C-H in these essentials.

This advertisement may seem a trifle premature. But we want ample time to consider carefully every application made to us. We want the *best* dealers—men who will stay with the proposition year in and year out; men who will take the same pride that we do in the R-C-H watchwords of good work, good value and good will; men who will put as much care into selling the R-C-H as we do into making it.

So write us today; tell us about yourself.

R-C-H Service Stations

R-C-H service and supply stations in all large centers will be a feature of our 1912-13 policy. Many of them are already in operation—a photograph of one is shown below. Others will be established as rapidly as possible; so that no R-C-H owner anywhere will be far from a base as well equipped to attend to his wants as the factory itself. In California or Maine, Minnesota or Texas the R-C-H owner will be able to obtain repair parts within 24 hours.

R-C-H Corporation 107 Lycaste Street Detroit, Michigan.

Branches

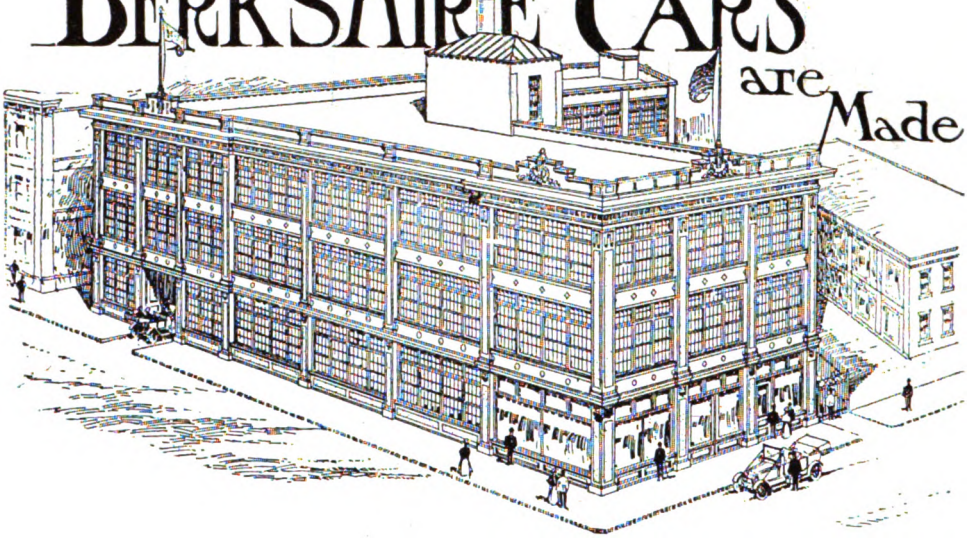
ATLANTA, 548 Peachtree St.
BOSTON, 563 Boylston St.
BUFFALO, 1225 Main St.
CHICAGO, 2021 Michigan Ave.
CLEVELAND, 2122 Euclid Ave.
DENVER, 1520 Broadway
DETROIT, Woodward and Warren Aves.
KANSAS CITY, 3501 Main St.
LOS ANGELES, 1242 South Flower St.
MINNEAPOLIS, 1206 Hennepin Ave.
NEW YORK, 1989 Broadway
PHILADELPHIA, 330 North Broad St.



R-C-H Service Station
Lycaste St. and Jefferson Ave., Detroit, Michigan

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Where BERKSHIRE CARS are Made



The New Plant of the "Berkshire," Cambridge, Mass.

Simple! Speedy!

THE BERKSHIRE

"The Made to Order Car."

4 CYLINDER CARS.

Motors—4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—119 inches.
Springs—Semi-Elliptic front, ¾ rear.
Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
Price—$3,000.

6 CYLINDER CARS.

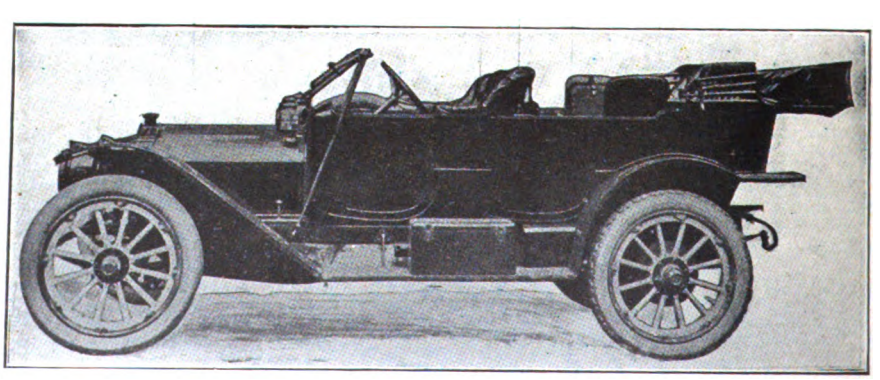
Motor—6 cylinder, 4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective, 4 speeds and reverse.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—134 inches.
Springs—Semi-Elliptic front, ¾ rear.
Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
Price—$4,000.

A Special Speed Model at $2800.

Strong! ☞All models equipped with self-starter. Silent!

BERKSHIRE MOTORS COMPANY

Cambridge, Mass.



1912 Model, 4 Cylinder, 35-40 H. P.

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FISK



TIRES

The FISK HEAVY CAR TYPE Tire is made in every style, *to fit any rim.* All Fisk Tires are identical in construction and quality. FISK PURE PARA TUBES have a lasting quality and superlative element of economy that *cannot* be found in *any compounded tube.*

Send for Description of our Two New Anti-Skid Treads—the Bailey Tread—that has more buttons than any other on the market, and the Fisk Town Car Tread, an effective tread with an attractively substantial appearance that speaks for its non-skidding qualities.

BAILEY TREAD TOWN CAR TREAD

IF YOU ARE READY to select a new Tire Equipment it is worth while to do a bit of first hand investigating.

Read the claims that Tire Manufacturers may put forth for individual makes; then put aside for future reference special records, selected testimonials and broad statements. Find out from personal inquiry among many users what the actual every-day and present-day results are from any given make of tire.

We rest our case on the verdict of our customers—anywhere and everywhere—including thousands whose names we have never heard and will never know.

We do this because our records show that it is safe for us to take this stand.

It is the percentage of tires that the manufacturer never hears of after they leave the factory that determines the real strength or weakness of any product.

FISK SERVICE MEANS *mileage*, *direct representation* in all large cities, *distribution* through the most reliable dealers and an *honest interest* that every tire that leaves the Fisk factory shall give its maximum value to the purchaser.

The Fisk Rubber Company

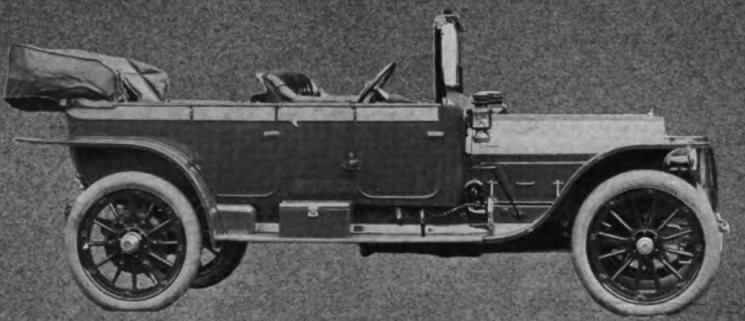
811-813 Boylston Street, Boston.

17 1-2 Dorrance St., Providence. **Factory: Chicopee Falls, Mass.**

Direct Factory Branches in 35 Cities

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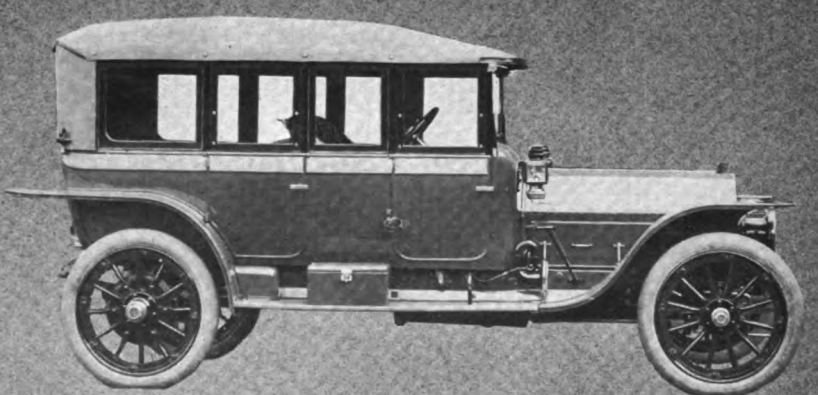
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

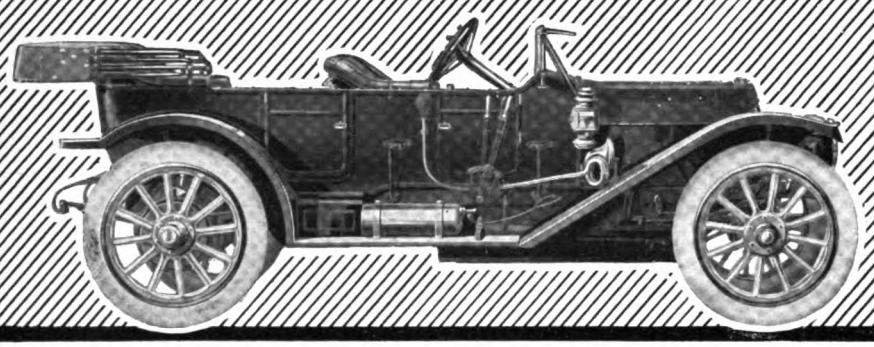
SPRINGFIELD METAL BODY CO.,
SPRINGFIELD-MASS.



SPRINGFIELD, MASSACHUSETTS.

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EVERY INCH A CAR



Service centers dot America

KISSELKAR SERVICE brings every KisselKar owner into close relationship with the manufacturer. Specially constructed and equipped buildings are maintained at principal points as service centers. In cooperation with their regular agencies, they extend to KisselKar owners the complete service that intensifies satisfaction in the KisselKar, minimizes up-keep and depreciation.

"Thirty"	$1500	"Forty"	$1850
"Fifty"	$2350	60 H. P. "Six"	$3000

KisselKar prices, except on the "Thirty" include full equipment—top, windshield, detachable rims, shock absorbers, lamps, tanks, speedometers, etc.—nothing left to be bought separately. "Thirty" has more than regular equipment.

1½ to 2, 3, 4, 5 ton Trucks, Delivery Wagons, etc.

The KisselKar line of commercial vehicles is one of the most comprehensive, carefully designed commercial lines built, furnishing right sizes for cost-saving haulage and delivery under all conditions.

WRITE FOR CATALOG DESCRIBING ENTIRE KISSELKAR LINE

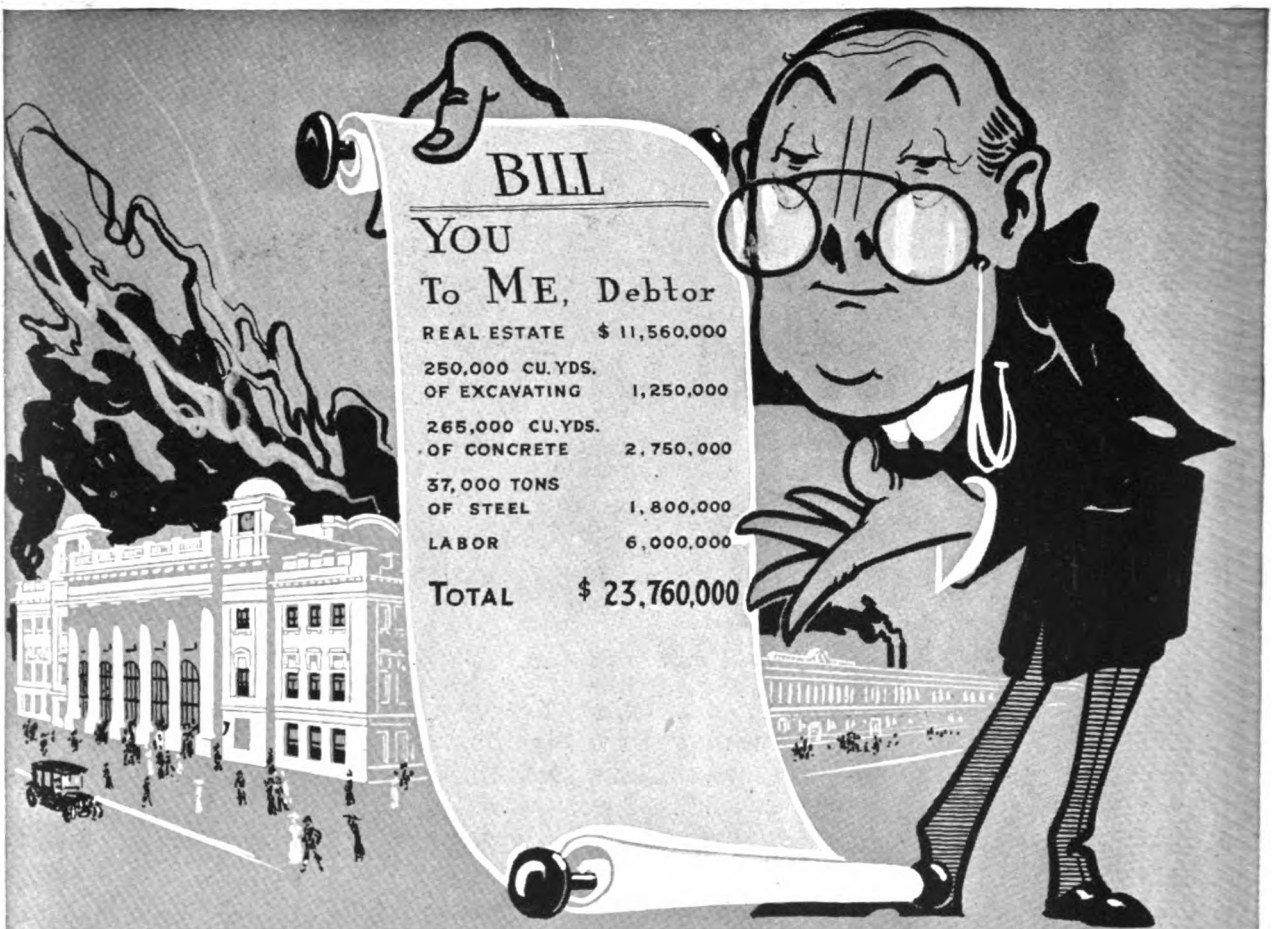
Kissel Motor Car Co., 174 Kissel Avenue, Hartford, Wisconsin

Boston—New York—Chicago—Milwaukee—Kansas City—Los Angeles—Minneapolis

Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburg, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

KISSELKAR

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You Don't Have to Pay It

Your part of the cost of monumental railway terminals is never *felt*—because so very *many* people use the railway. Only roads whose passenger traffic is *tremendous* can *afford* to give you palatial stations. On a smaller volume of business it couldn't be done — without charging you *double* for your railway tickets.

The Stewart volume of business is enormous. Stewart speedometers are on four cars out of five. The Stewart is the best that can be made, and it's sold at a minimum price. *Other* makers can't supply a comparable instrument at double the price.

The Stewart is a perfect speed and distance measure. A beauty in appearance and a marvel in accuracy.

With Stewart Speedometers on four cars out of five, others *have* to charge more just to keep alive.

Magnetic principle — jewel bearings — wearing parts hardened and polished; open dial, large figures, easily read; absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft, drop forged swivel joint, noiseless gears.

"ALWAYS ON THE JOB"



Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

STEWART & CLARK MANUFACTURING CO.
1828-1848 Diversey Boulevard, Chicago, U. S. A.
New England Distributing Office, 174 Columbus Ave., Boston, Mass.
Detroit San Francisco New York Los Angeles Chicago Kansas City Cleveland
Philadelphia Minneapolis Indianapolis London Paris

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We Pay A Premium—

In order to get Premium crude stock which is the basis of HARRIS OILS.

We pursue the most exhaustive inspections and tests during every process of the manufacture of HARRIS OILS.

We disregard the idea of expense in our efforts to sustain the high standard and reputation of HARRIS OILS.

We endeavor to eliminate the soot-deposit forming ingredients from every drop of HARRIS OILS.

We've been making cylinder lubricants for over a quarter of a century---isn't it reasonable to suppose that we know how to make the best?

HARRIS

TRADE MARK REG. U.S. PAT. OFF.

OILS

Will give you increased mileage. They greatly reduce cost for repairs, they are positively the peer of all lubricants.

Ask any motorist who uses HARRIS OILS. Don't take our word for it---but prove our assertion that nothing else compares with HARRIS OILS for cylinder lubrication.



Made in three bodied consistencies.

LIGHT, MEDIUM, HEAVY. Sold in barrels, 1-2 barrels, two 5 gal. cans in wood case, single 5 gal. can cased, and 1 gal. cans. Ask your dealer or garage man.

Ask for HARRIS OILS. If your dealer does not sell them, send 80 cents (1 gal. can) or $3.75 (5 gal. can) and we will send same prepaid.

A. W. HARRIS OIL CO.

326 So. Water St., PROVIDENCE, R. I. 143 No. Wabash Ave., CHICAGO, ILL.

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MR. DEALER

Have you received our Big 1912 Catalogue of all the new and up-to-date Automobile Supplies? A copy of same has been mailed to you. If for any reason you have not received it, advise us and we will be pleased to send another copy prepaid. Our dealers' confidential price list is off of the press and ready now. To insure receiving a copy promptly, drop us a postal with your correct address.

Our service is better than ever. Our stock is all brand new. Our prices are right. *Your* selling prices are protected. We solicit your orders and inquiries.

BI-MOTOR EQUIPMENT CO.

177-179 Portland Street **BOSTON, MASS.**

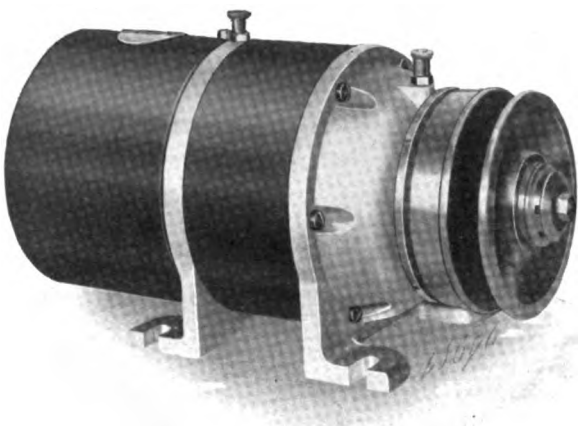
BRANCH STORE, 113 MASSACHUSETTS AVENUE

The Leading Automobile Supply House of New England

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Simplicity in Lighting Systems

THE DYNALUX LIGHTING SYSTEM GIVES AN ABUNDANCE OF LIGHT WITH EXTREME SIMPLICITY



DYNAMO LIGHTING SYSTEMS, even with complications, are far superior to other methods of illumination for motor cars.

The Dynalux Dynamo Lighting System avoids complications and eliminates all chances for trouble in circuits, connections and regulation. It consists of only one working element, the Dynalux Dynamo, with its two wires extending to the lighting storage battery terminals. The battery and electrical wiring of the car can be any standard layout such as is provided when a plain battery system is used. It is the ideal system for the car owner, as it gives an abundance of light without requiring constant attention and supervision.

The Dynalux has been pronounced by leading engineers as the best dynamo system made; size, weight, simplicity and reliability considered.

The Dynalux generator is 8 5-8" long by 5 1-8" in diameter---weighs only 17 3-4 lbs. (less pulley) and delivers from ten to twelve amperes at 6 1-2 volts---sufficient for all lamps, battery ignition, electric horns, etc.---runs on noiseless annular ball bearings---all working parts and circuit connections enclosed and protected from mechanical and electrical injury---furnishes light and charges battery at slow city speeds of car---only two wires extending from Dynalux to battery and these connected to battery without regard to polarity---no chance for injuring battery or dynamo by wrong connections---automatic cut-in located inside of dynamo casing and the absence of outside regulators and meters make the system simple to install and without chance to go wrong---the car is not littered up with miscellaneous trappings---the Dynalux is positively driven at all speeds excepting when the engine is racing---then a simple declutching device in the pulley disconnects the armature so that the latter is not subject to destructive speeds---this gives the Dynalux the advantage of the slow speed type of dynamo with the light weight and compactness of the high speed machines---the Dynalux always retains its original strength and never requires overhauling or re-magnetizing as there are no permanent magnets in its construction---requires no more care than a high grade magneto---will outlast any motor car on which it is installed.

The cost of the Dynalux, complete with 100 ampere hour battery and driving pulley is **$125.00.** Without batteries the cost is **$95.00.**

Specify the DYNALUX on your new car.

THE DEAN ELECTRIC COMPANY

ELYRIA, OHIO.

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Our Profit 8½ Per Cent

No-Rim-Cut Tires
10% Oversize

We want users to know—in an adequate way—what they get in the Goodyear No-Rim-Cut tire.

Perhaps the best way to give you a basis of value is to state our percentage of profit.

So we now announce what per cent of our price goes into what you get.

No-Rim-Cut tires now far outsell any other tire in existence.

So our output is the largest. Our equipment is modern. No concern in America can build good tires for less than we build them here.

With all these advantages our last year's profit averaged almost exactly 8½ per cent.

That was the profit in this risky business, with fluctuating materials, on a tire that's guaranteed.

It is the smallest margin on which a business of this kind can ever be conducted.

So you get in this tire as much for your money as a tire maker ever can give.

When other men claim to give better tires for the money—or equal tires for less money—remember this basic fact.

In No-Rim-Cut tires you get tires which can't rim-cut.

You get tires ten per cent over rated size.

You get the final result of our 13 years spent in perfecting tires.

And you get all this at a profit to us of 8½ per cent.

If you consider that fair—if you think it the limit—insist on these premier tires.

Our 1912 Tire Book—based on 13 years of tire making—is filled with facts you should know. Ask us to mail it to you.

GOODYEAR
AKRON, OHIO
No-Rim-Cut Tires
With or Without Non-Skid Treads

THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio.

Branches and Agencies in 103 Principal Cities

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
Main Canadian Office, Toronto, Ont. **Canadian Factory, Bowmanville, Ont.**

(618)

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You can judge a car by its lighting equipment.

For example:—The GRAY & DAVIS Lighting Dynamo is not a "cheap" system. It is built as substantially as any of the big dynamos that light your home or office.

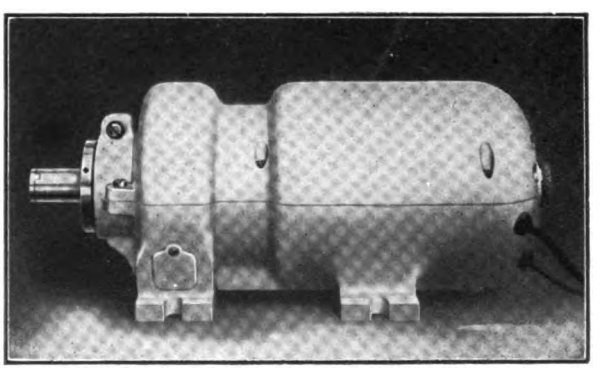
It is not a mere "battery charger." It is beautifully constructed—and costs the car manufacturer more than he has to pay for ordinary systems.

If a car is equipped with GRAY & DAVIS Dynamo and Electric Lamps—with the best—it's a safe bet that the rest of the car contains material and workmanship of the same high quality.

One can buy a GRAY & DAVIS equipped car without investigation. No sales argument is necessary because actual proof of quality is apparent.

Cars equipped with GRAY & DAVIS Dynamo and Lamps are good cars to buy. See that this equipment is on the automobile you intend purchasing.

Our catalog is free. Why not send for it and get posted on high class electrical equipment?



GRAY & DAVIS, Inc., Manufacturers of Automobile Lamps **Boston, Mass.**

55 LANSDOWNE STREET.

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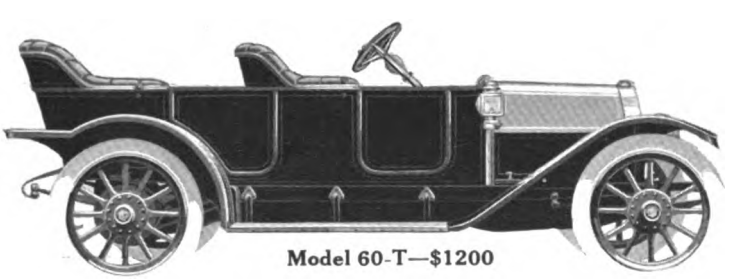
Overland

OUR MODEL 60 is a thirty-five horse-power, 5-passenger touring car. It is priced at $1200. Have you ever seen a car of this type for much less than $1500?

There are more Overland cars being bought today than any other similar car in the world.

This great success must be due to the fact that we are giving more car for less money than any other maker in the business. Compare our cars with anything else on the market and you will quickly realize where you can get the most in an automobile for the least amount of money. Write for a catalogue. Ask for book K45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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More Jewelers Than Blacksmiths Work on the Warner Auto-Meter

For the Warner is a *jeweled* instrument. It is the product of *jewelers* and experienced instrument makers.

It is built with more care than many watches.

For it must *do* more than any watch ever built.

It must possess Waltham *exactness*, Elgin *sensitiveness*, Howard *dependability*, yet be able to endure the persistent cruelty of severe vibration at all times, in all weather, in frigid or torrid temperature. It must possess, above all, Warner *endurance*.

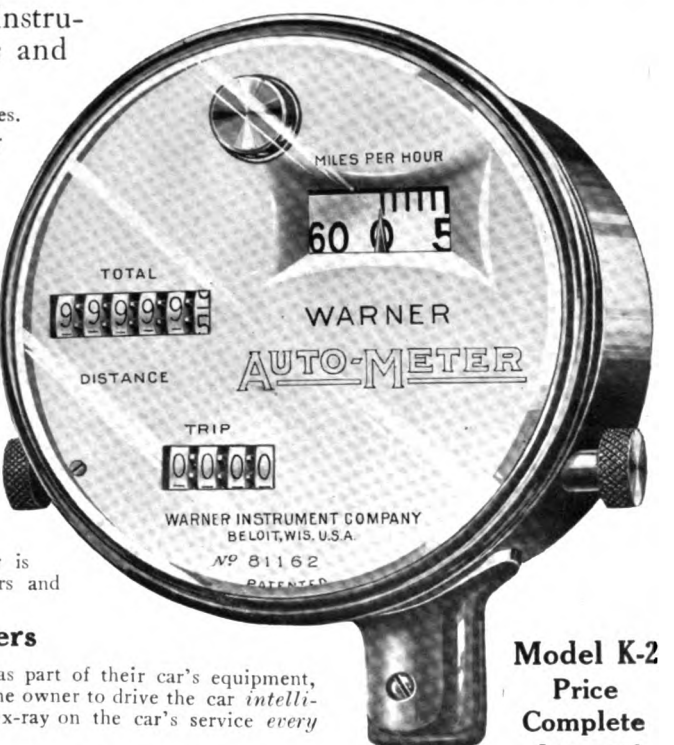
Some watches are sold at retail for four dollars. There is a certain market for these watches.

But there is a *greater* market for *high quality* watches since the advent of the cheaper tickers.

The *high* quality watches win by *contrast*, by *comparison*.

More quality Warners have been sold this year because 1912 is a *quality* year.

By comparison and contrast the Warner is chosen by far-sighted car manufacturers, dealers and owners.



Automobile Manufacturers

are *glad* to *pay* for quality because the Warner, as part of their car's equipment, helps to give the car class and distinction—allows the owner to drive the car *intelligently*—to *know* what the car is *doing*—to put the x-ray on the car's service *every minute*.

Such a manufacturer *must* be far-sighted to do this. He *must* be figuring on the owner's *lasting* satisfaction.

For the Warner is built to *last*. It is about as hard to figure the duration of Warner service as to know the exact life of the high-grade watch. We *do* know that the instruments we made in the very earliest days of manufacture are still giving the same accurate service. Many of these have registered over 100,000 miles and have been used on five and six different cars.

Model K-2
Price Complete
$75

Diameter 4 1-2 inches. Season odometer registers 100,000 miles and repeat. Trip odometer, 1,000 miles and repeat. Indicates all speeds up to 60 miles an hour. Finished in brass, nickel or black enamel with brass or nickel bezel. Hooded electric light connection under the glass concentrates rays of light on speed and distance figures.

Warner Instrument Co.,

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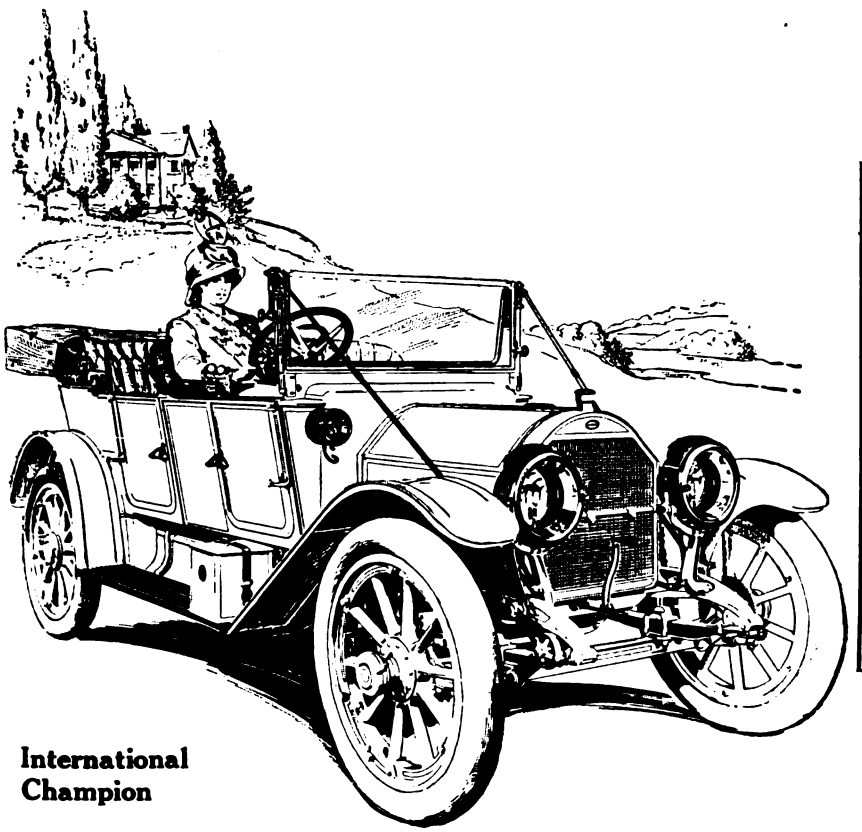
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Worlds Record Broken

Teddy Tetzlaff in 90 Horsepower Fiat Wins Free-For-All at Santa Monica, Cal., Driving 303 Miles in 3:50:57, Averaging

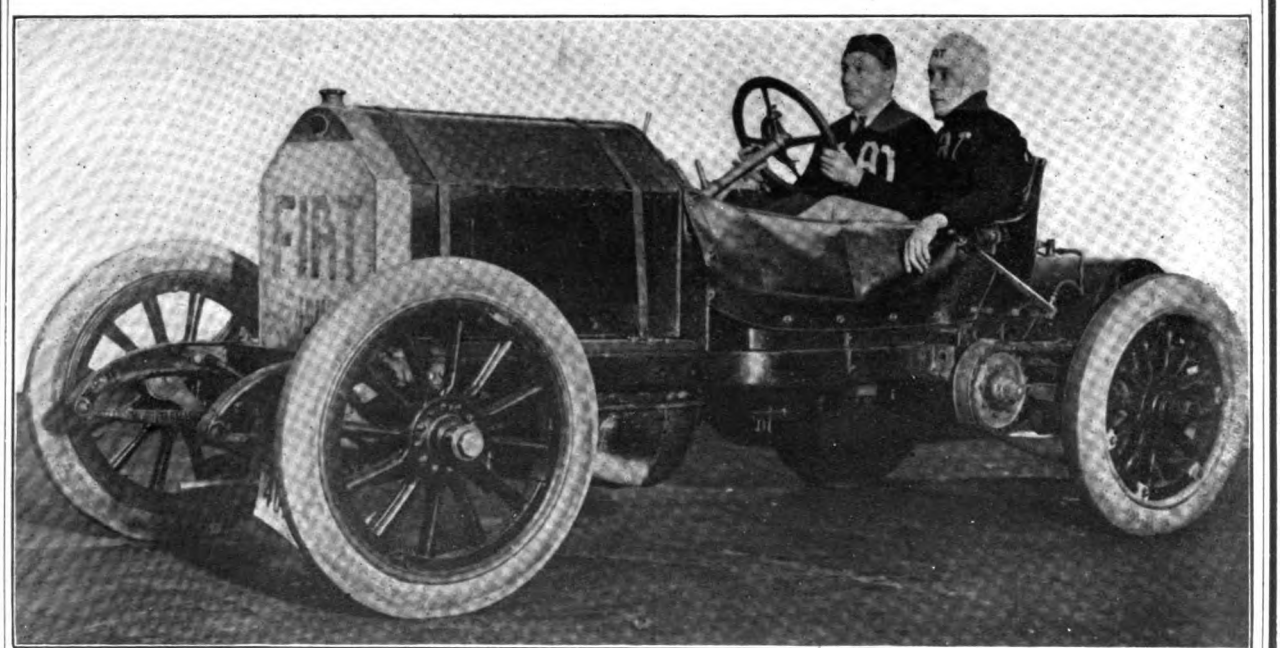
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By R. E. Olds, Designer

4000 Carloads Wanted

Reo the Fifth, as automobile men know, is the greatest success of the season.

Orders have come to us for 4000 carloads. We have orders in at this writing, from six separate cities, for a trainload to go in one shipment to each.

Nearly one thousand dealers in 1000 towns have allied themselves with this car. I have never known a car so popular.

The Climax

This comes as the climax of my career—after 25 years spent in car building.

It comes from men who have faith in me. It comes from thousands of buyers, who think the best I can do is the best they can get.

And I am glad to know that every man will get more than he expects.

Never was a car built so carefully — never was a car so watched.

For Reo the Fifth is not built for a season. It is My Farewell Car, and all my fame in the years to come is at stake on this car's performance.

First Buyers Get An Underprice

I am also glad to know that those who buy now are getting overvalue. There was never a car so underpriced as this.

The price of $1,055 is too low to continue. The slightest advance in materials is bound to force it higher.

But you first buyers deserve this inner price. That is why we give it. The future of the car will be created by you—by the good words you say about it.

But I wish to avoid any expectation that this initial price will be permanent.

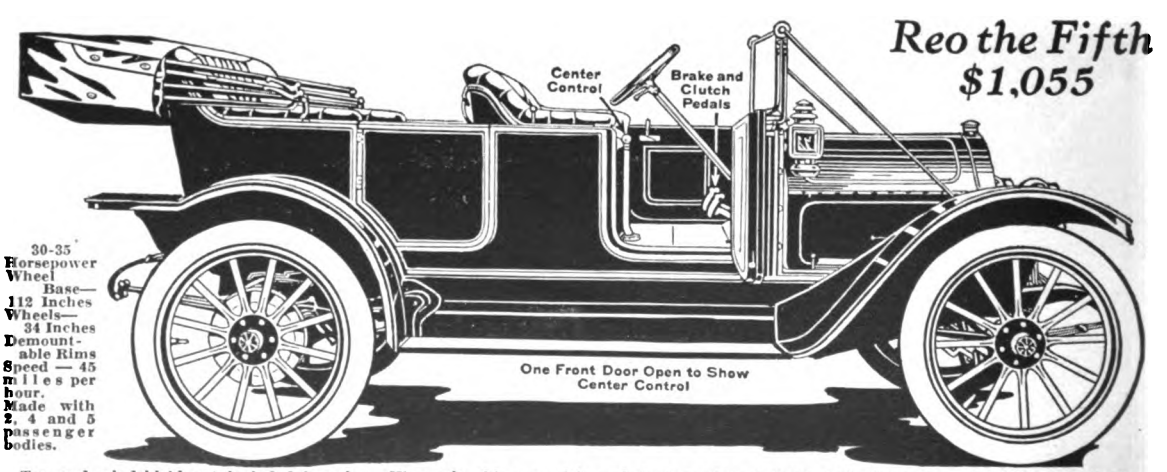
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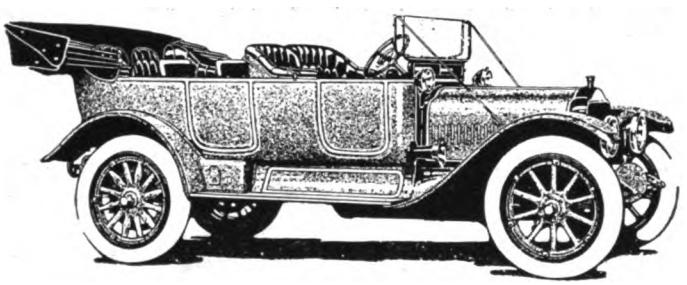
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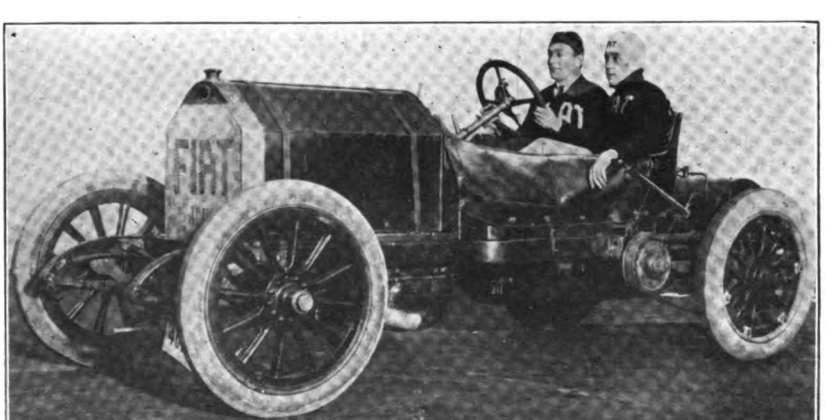
VOL. XXXIII, No. 7 MAY 10, 1912 Price $1.00 the Year

WORLD'S RECORD AT SANTA MONICA.

Tetzlaff in Fiat Surprises Californians, Exceeding Mark Set by Herrick in National by Nearly Four Miles an Hour---De Palma in Mercer Takes Medium Car Event, and Joermann in Maxwell the Light Car Race.

(By James H. Shippee.*)

TEDDY TETZLAFF driving a 90 horsepower Fiat, not only won the free-for-all race over the Santa Monica road course, Santa Monica, Cal., May 4, but created a new world's road race record of 78.5 miles an hour, exceeding the mark of 74.63 set by Harvey Herrick in a National car over the same course, Oct. 14, 1910, by nearly four miles an hour. Inasmuch as the accessories and supplies utilized on the winning car also are of interest, it is proper to note that the following share with Tetzlaff and the Fiat in the honors secured in this victory: Miller tires, Dorian rims, Bosch magneto and plugs, and Oilzum lubricants. The winner's time for the 303 miles was 3:50:57.



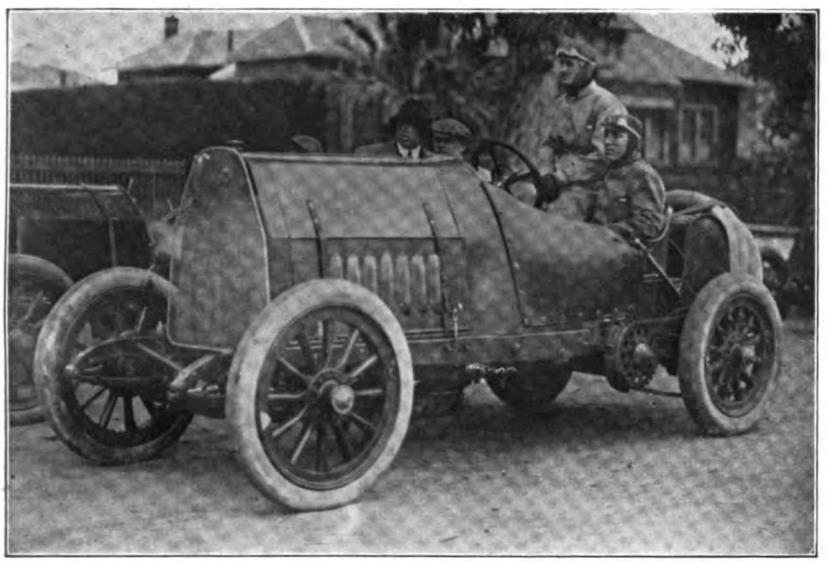
Teddy Tetzlaff in Fiat Car with Which He Created New World's Road Race Record at Santa Monica, Cal.

Caleb Bragg in a second Fiat won second place, his time being 3:54:05, and David L. Bruce-Brown, twice a winner of the Grand Prize, was third in a Benz; time, 3:56:32. Bragg's Fiat was equipped with Michelin tires and rims, Bosch magneto and plugs, and utilized Monogram oil. Bruce-Brown's Benz also was shod with Michelin tires and rims, and the ignition was by two Bosch magnetos connected, current being supplied to two sets of Bosch plugs. Monogram oil was used by him as well.

Three races were run, the free-for-all at 1:30 in the afternoon, and the others at 10:30 in the morning. These were the event for cars of 231-300 cubic inches piston displacement, known as the medium car race, and for machines 161-230 cubic inches, known as the light car race. In the first of these Ralph De Palma, driving a Mercer, fitted with Michelin tires and rims, Bosch magneto and plugs, and Rayfield carburetor, and utilizing Monogram oils, was the win-

*Pacific Coast staff correspondent.

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Caleb Bragg and Second Place Fiat in Santa Monica's Free-for-All Event.

ner in 2:10:43, the distance being 151 miles. Second place went to Joseph Nikrent in a Case, fitted with Michelin tires and rims, Remy magneto, Bosch plugs and Rayfield carburetor, and employing Monogram oil, his time being 2:15:20. His teammate, Louis Disbrow, was in third place, in 2:22:23. This car was equipped in the same manner and used the same brand of oil.

In the light car event, George Joermann in a Maxwell was the winner. His time for the 101 miles was 1:37:57, and his car was equipped with Goodyear tires, Continental demountable rims, Splitdorf magneto, Bosch plugs and Miller carburetor. He also used Monogram oil. Second and third place went to two Flanders, the first being driven by Robert Evans in 1:40:38, and the second by Jack Tower in 1:42:00. These cars were equipped alike with Firestone tires, Dorian rims, Splitdorf magnetos and plugs, and both used Harris oils. Incidentally, the winner, Joermann, had never driven in a contest before.

The winner of the free-for-all secured $3500 in cash and the possession of the Dick Ferris challenge cup. Second place carried with it a prize of $1000, and third, $500. In the medium car event, the winner took $700 in cash and the Jepson challenge trophy; second place, $200, and third, $100. In the light car race the prizes were: First, $700 and the Chanslor & Lyon challenge trophy; second, $200, and third, $100. Besides these awards there were a number of prizes offered by makers of accessories, among which may be mentioned those of the Bosch Magneto Company, which will be distributed as follows: Tetzlaff, $200; Bragg, $100; Bruce-Brown, $50; De Palma, $100; J. Nikrent, $75; Disbrow, $50; Joermann, $100.

The result of the big race was a surprise in every sense of the word. Bruce-Brown was looked upon as a favorite, largely because of the fact that he had won the American Grand Prize twice, once with a Benz car, the same make as that with which he appeared in this race, and again last year in a Fiat. No National cars were entered, and this was something of a disappointment, inasmuch as it was remembered that Harvey Herrick in a machine of this make set a new world's record over this course last fall. Herrick was not in the race either, making an additional disappointment.

Previous to the Santa Monica races of last fall, the world's road record was held by Felice Nazzaro in a Fiat car, at 74.3 miles an hour, this having been made during the Targa Florio race in Italy in 1908. The nearest approach that had been made to it was in the winning of the race over this course in the fall of 1910, when Teddy Tetzlaff drove a Lozier at the rate of 73.22. Charles Merz in a National, during the medium car race of 1911, exceeded Nazzaro's mark for the first time, setting the figure at 74.42, only to lose his hard earned honor later in the day to his teammate, Herrick.

Tetzlaff drove in the 1911 race, being at the wheel of a Fiat, but for some reason he appeared to have lost something of his old generalship and his showing



David L. Bruce-Brown Finished in Third Place with His Benz Machine.

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was not at all in keeping with a one-time record holder. Perhaps it was because of this, that he was not looked upon by the California public as even a possible winner this year. The course was conceded to be much faster than last fall, and a new record was confidently expected, but none would have admitted previous to the race that the mark would be exceeded by nearly four miles an hour.

By winning the free-for-all and securing the new record, Tetzlaff becomes a decided favorite in the forthcoming 500-mile event on the Indianapolis motor speedway, Memorial Day. Incidentally, there is much reason for expressions of a congratulatory nature from the Fiat Automobile Company, which sees the return of the world's record honor it lost after holding it for so long.

It is only proper to say that Tetzlaff gave a decidedly creditable exhibition of consistent driving throughout the race, but he appeared to lose his head temporarily during the last lap and came dangerously near, not only losing the victory so ably earned, but his own life and that of a number of spectators as well. At that portion of the course known as Death Curve considerable ingenuity had to be displayed in order to bring the racing cars about without accident. This was discovered by all of the contestants early in the running. On this last lap, with a lead of more than one round over his nearest competitor, Tetzlaff took this dangerous curve at full speed. The car crashed through the fence, burst a tire, and delayed its progress sufficiently to require nearly double the time it had taken for a number of previous laps.



George Joermann in Maxwell Won the 101-Mile Event for Light Cars.

But three cars of American manufacture were entered in the big event. Two of these were the Stutz, the product of the Ideal Motor Car Company, Indianapolis, Ind. It needs but a glance at the accompanying score to learn how consistently these performed. Round after round the two drivers were hardly more than a car's length apart as they crossed the tape. There was less than a second between them on the sixth and seventh laps, the latter being covered in exactly the same time by each. In the eighth they passed the timing instrument together. Neither of these cars stopped until the 19th lap, when Cooper pulled up at the pit for a new tire. Lewis made his first and only stop for the same purpose during the 23rd round. They were both still going strong at the end of the race, and without a sign of mechanical difficulty.

Lewis was the first to get away, and the first to appear at the grandstand. His teammate was sent away second. Barney Oldfield, making his first appearance in sanctioned racing after an absence of something over two years, was third in a Fiat. Right behind him were Tetzlaff and Bragg, his teammates. Bruce-Brown and his Benz and Dingley in his Simplex were the last two.

Tetzlaff swung into first place during the second lap, and was never headed. Oldfield was second with but three seconds between the two. Lewis in a Stutz was third. Bruce-Brown replaced the Stutz in the third, and Barney Oldfield appeared to be losing ground, Bragg passed Bruce-Brown in the fourth, the latter having experienced delay on one of the back stretches. In fact, the Benz was now in sixth place, with those ahead of him arranged as follows: Tetzlaff, Oldfield, Bragg, Lewis and Cooper. Dingley brought up in the rear.

Tetlaff stopped for the first time in the fifth, but he had a lead of almost two miles and could afford it. Oldfield was still in second place, with Bragg in third. Cooper had changed places with Lewis. Bruce-Brown stopped a moment in the sixth, and Bragg was giving Oldfield a hard struggle for second place. In the seventh, Oldfield drew away from Bragg. In the eighth Bruce-Brown regained his place at third. Tetzlaff was now almost two minutes ahead of Oldfield. Dingley went into his pit on this round.

Bruce-Brown called for new tires in the ninth, but had managed to pass Oldfield in the interim. He retained this lead by a few seconds at the end of the 10th round, but lost to Bragg in the 11th. Tetzlaff had nearly lapped the entire field by this time and was making splendid headway. Much of this was lost in the 12th, however, when he stopped to change a tire. Oldfield drew up for repairs. Bragg was in second place at the end of the round, but with only three seconds to spare.

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UNOFFICIAL SCORE OF CARS COMPETING IN FREE-FOR-ALL

Car and Driver.	Time. Laps—1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Fiat	elapsed.... 7:54	13:53	20:03	26:14	32:27	38:41	44:58	51:13	57:39	63:54	70:11	78:19	84:43	90:56	97:12	103:28	109:38
Tetzlaff	lap..... 7:54	5:59	6:10	6:11	6:13	6:14	6:17	6:15	6:26	6:15	6:17	8:08	6:24	6:13	6:16	6:16	6:10
Fiat	elapsed.... 7:38	14:52	21:13	27:40	34:09	40:44	47:18	57:25	63:52	70:07	76:04	82:22	88:35	97:56	104:16	110:39	117:00
Bragg	lap..... 7:38	7:14	6:21	6:27	6:29	6:35	6:34	10:07	6:27	6:15	5:57	6:18	6:13	9:21	6:20	6:23	6:21
Benz	elapsed.... 8:46	14:46	21:01	29:50	36:10	42:57	49:16	55:39	62:16	69:54	76:08	82:25	88:38	94:58	102:40	108:58	115:23
Bruce-Brown	lap..... 8:45	6:01	6:15	8:49	6:20	6:47	6:19	6:23	6:37	7:38	6:14	6:17	6:16	6:20	7:42	6:18	6:25
Stutz	elapsed.... 7:30	14:38	21:49	29:59	36:21	43:21	50:28	57:35	64:33	71:31	78:42	85:48	92:59	100:11	107:17	114:20	121:36
Lewis	lap..... 7:30	7:08	7:11	7:10	7:22	7:00	7:07	7:07	6:58	6:58	7:11	7:06	7:11	7:12	7:06	7:03	7:16
Stutz	elapsed.... 7:49	14:52	21:56	29:01	36:12	43:20	50:27	57:35	64:36	71:36	78:52	86:03	93:12	100:10	107:08	114:29	121:42
Cooper	lap..... 7:49	7:03	7:04	7:05	7:11	7:08	7:07	7:08	7:01	7:00	7:16	7:11	7:09	6:58	6:58	7:21	7:13
Simplex	elapsed.... 9:50	16:29	23:10	29:59	36:28	43:14	49:50	58:05	64:45	71:15	78:00	87:43	94:34	101:12	107:49	114:20	121:13
Dingley	lap..... 9:50	6:39	6:41	6:49	6:29	6:46	6:32	8:19	6:40	6:30	6:45	9:43	6:51	6:48	6:37	6:40	6:44
Fiat	elapsed.... 7:40	13:56	20:21	26:55	33:35	40:03	46:36	53:09	63:07	69:58	76:29	101:39	130:34	136:47	142:51	148:44	154:45
Oldfield	lap..... 7:40	6:16	6:25	6:34	6:40	6:28	6:33	6:33	9:58	6:51	6:31	25:10	28:55	6:13	6:04	5:53	6:01

Oldfield lost 20 minutes in the 12th lap, only to draw up at the pit again in the 13th with additional trouble. Bruce-Brown passed Bragg in the 14th, and the same positions were maintained until the 32nd. Oldfield was now making a brave attempt to catch the field, and drove the 16th lap in 5:53, the fastest of the race up to that point. On the 17th, Dingley passed the Stutz entrants and arrived in fourth place. Tetzlaff stopped again on the 18th, and as stated before, Cooper made his first call at the pits on the 19th.

The three drivers, Tetzlaff, Bragg and Oldfield, made the 22nd lap in less than six minutes, and the race began to take on the aspect of a real contest. Bragg made the fastest time of the course to that point, rounding the 8:41 miles in 5:44. He came into the stretch with Oldfield, but the latter seemed to realize that the race was not for him, and gave his teammate the turn ahead of him. Tetzlaff made the 24th round in 5:45 and Bragg in 5:50.

Bruce-Brown joined the speeding machine in the 24th, still further lowering the time to 5:36. Meanwhile Dingley had lost his place again, first to Lewis and then to Cooper, and was now sixth. Bragg lost valuable time in the 25th, but managed to tie Bruce-Brown for the lap in the 26th. The score sheet shows that Lewis covered this round in 5:43. Oldfield went out in the 27th. Bruce-Brown also was held up at this point.

Beginning with the 28th lap, it became a steady whirl, with hardly a round that was not made in less than six minutes, by the three leaders. Bruce-Brown had the best of this manoeuvre in the 28th, 29th and 30th, making the fastest time of the race in the last named, 5:27. It looked a little as if Bruce-Brown's chance had come in the 32nd, when Tetzlaff drew up at the pits, but in a few seconds the Benz pilot was beside him. Bragg was not slow to grasp the situation and gained more than two minutes on Bruce-Brown, running into second place. Bragg made still another gain in the 33rd, when his rival was held up once more.

With only three more laps to go, the three leaders, renewed their contest for supremacy. Dingley was out of the running at this point, and the two Stutz cars, although making the rounds in better than six minutes, were hopelessly behind. Tetzlaff made his best time, 5:31, in the 34th, and came within two seconds of repeating the performance in the next to the last lap.

Then he lost his generalship. Rounding Death Curve at a terrific speed he crashed into the fence, just as Bragg, almost two laps behind him, came into sight. With a "whoop" Bragg dashed down the course. A moment later, a second "whoop" announced the approach of Bruce-Brown. While Tetzlaff was extricating himself from the results of his thoughtlessness, Bragg reduced his intervening time by three minutes, and Bruce-Brown came very near doing the same. Fortunately, Tetzlaff's Fiat was not damaged in any way. Two new tires soon placed it in position to renew the fight. The last lap was covered in 10:28, whereas the one just before it was made in 5:33. The race was won because of the inherent good qualities of the car.

DETAILS OF EQUIP

Car and Driver	Bore	Stroke	H.P.	Gear Ratio
Simplex, Bert Dingley.....	5.750	5.75	50	.....
Benz, David Bruce-Brown....	6.100	8.00	120	1.2—1
Fiat, Barney Oldfield.....	6.000	8.00	90	.....
Stutz, Earl Cooper.....	4.750	5.50	50	2.3—1
Fiat, Teddy Tetzlaff.....	6.000	8.00	90	.....
Stutz, Dave Lewis.....	4.750	5.50	50	2.2—1
Fiat, Caleb Bragg.....	6.000	8.00	90	.....
Mercer, Rupert Jeffkins.....	4.375	5.00	30	2.2—1
Buick, Earl Devore.....	3.360	5.00	30	2.2—1
Schacht, H. A. Shain.....	4.312	5.00	35	2.6—1
Mercer, Ralph De Palma.....	4.375	5.00	30	2.5—1
Case, Louis Disbrow.....	4.375	5.00	30	2.2—1
Case, Joe Nikrent.....	4.375	5.00	30	2.2—1
Warren, ——— Miller.....	4.250	4.50	35	3 —1
Reo, H. C. Krouse.....	4.000	4.50	30	3 —1
Buick, Louis Nikrent.....	3.750	3.75	20	3 —1
Ford, A. J. Charles.....	3.750	4.00	20	2.5—1
Flanders, Jack Tower.....	4.000	4.50	20	.....
Maxwell, George Joermann...	4.140	4.25	30	2.8—1
Flanders, Robert Evans.....	4.000	4.50	20	.....
Ford, V. Rosher.....	3.750	4.00	20	2.5—1
Regal, Roscoe Anthony.....	4.125	4.00	30	.....

* Two magnetos connected; † or speed; ‡ double ignit

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EVENT OVER CALIFORNIA ROAD COURSE AT SANTA MONICA

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
117:40	124:00	130:10	138:46	144:32	150:17	156:02	161:39	167:15	172:53	178:28	184:24	190:05	195:41	203:30	209:25	214:56	220:29	3:50:57
8:02	6:20	6:10	8:36	5:46	5:45	5:45	5:37	5:36	5:38	5:45	5:46	5:41	5:36	7:49	5:55	5:31	5:33	10:28
123:19	130:50	137:26	143:36	149:20	155:10	160:47	168:22	174:01	179:59	185:48	191:26	196:58	203:30	208:13	214:38	221:13	227:27	3:54:05
6:19	7:31	6:36	6:10	5:44	5:50	5:37	7:35	5:39	5:58	5:49	5:38	5:32	6:32	5:43	6:25	6:35	6:14	6:18
121:49	128:07	134:38	141:21	147:28	153:38	159:14	164:51	170:30	178:55	184:32	190:03	195:30	201:51	210:43	....	224:02	229:35	3:56:32
6:28	6:18	6:31	6:43	6:07	6:10	5:36	5:47	5:39	8:25	5:37	5:31	5:27	6:21	8:52	....	....	5:33	6:57
128:41	135:53	142:49	149:24	156:04	162:30	170:40	177:20	183:03	190:32	197:08	203:49	210:26	216:55	223:43	229:35	235:16	running	
7:05	7:12	6:56	6:35	6:40	6:35	8:01	6:40	5:43	7:29	6:36	6:41	6:47	6:29	6:48	5:52	5.41		
129:15	139:39	146:20	152:57	159:31	166:04	172:42	179:22	186:04	192:38	199:13	205:49	212:20	218:35	224:52	230:49	236:28	running	
7:33	10:24	6:41	6:37	6:34	6:33	6:38	6:40	7:42	6:34	6:45	6:36	6:31	6:15	6:17	5:57	5:39		
127:54	134:36	140:59	148:15	158:21	164:32	176:25	182:37	188:50	194:58	201:14	208:52	214:49	220:57	226:58	out			
6:41	6:42	6:23	7:16	10:06	8:11	11:53	6:12	6:13	6:08	6:16	7:38	5:57	6:08	6:01				
160:46	176:20	182:46	188:48	194:46	201:17	207:45	214:16	229:05	out									
6:01	15:34	6:26	6:02	5:58	6:31	6:28	6:31	14:49										

In every respect it was the greatest speed contest the industry has known. Not only did Tetzlaff complete the distance at an average speed of 78.5 miles an hour, but if he had maintained his previous average to the end, the new record would have been approximately 80 miles.

But while the greatest interest naturally attaches to the big race, it must not be forgotten that the other events were of equal importance. The so-called medium car winner was Ralph De Palma, who is by

De Palma took the lead in his race on the fourth lap. Disbrow's Case was a strong contender, but the Mercer proved too much even for the higher powered Case in the hands of Joseph Nikrent. The Fords made a splendid showing in the light car event.

One of the features of this combined contest was the racing of the two brothers, Joseph and Louis Nikrent, the former in a Case and the latter in a Buick. They came across the tape almost together at the end of the ninth lap. Shain in the Schacht was driving

MENT ON CARS TAKING PART IN SANTA MONICARACES.

ENTERED FOR FREE-FOR-ALL EVENT, 303 MILES.

Revolutions	Tires	Rims	Magneto	Plugs	Two Sets	Carburetor	Oil
....	Michelin	Michelin	Bosch	Bosch	Yes	Miller	Oilzum
1400	Michelin	Michelin	Bosch*	Bosch	Yes	Benz	Monogram
1800	Firestone	Dorian	Bosch	Bosch	Yes	Fiat	Harris
1900	Goodyear	Dorian	Splitdorf	Pognan	Yes	Miller†	.....
1800	Miller	Dorian	Bosch	Bosch	Yes	Fiat	Oilzum
1900	Goodyear	Dorian	Splitdorf	Pognan	Yes	Miller	.....
1800	Michelin	Michelin	Bosch	Bosch	Yes	Fiat	Monogram

ENTERED FOR MEDIUM CAR CONTEST, 151 MILES.

2250	Michelin	Michelin	Splitdorf	Bosch	Yes	Rayfield	Monogram
....	Michelin	Michelin	Splitdorf?	Anderson?	No	Schebler	Oilzum
2600	Miller	Dorian	Mea	Bosch	No	Schebler	Dixon
2200	Michelin	Michelin	Bosch	Bosch	Yes	Rayfield	Monogram
2800	Michelin	Michelin	Remy‡	Bosch§	Yes	Rayfield	Monogram
2800	Michelin	Michelin	Remy‡	Bosch§	Yes	Rayfield	Monogram
....	Firestone	Booth	Bosch	Red Head	No	Gould	.....

ENTERED FOR LIGHT CAR RACE, 101 MILES.

2800	Goodyear	Baker	Splitdorf	Bosch	Yes	Miller	Harris
....	Goodyear	Dorian	Splitdorf	Anderson?	No	Schebler	Oilzum
2800	Firestone	clincher	Ford	Champion	No	Miller	Imperial
....	Firestone	Dorian	Splitdorf	Splitdorf?	No	Flanders	Harris
2200	Goodyear	Continental	Splitdorf	Bosch	Yes	Miller	Monogram
....	Firestone	Dorian	Splitdorf	Splitdorf?	No	Flanders	Harris
2800	Firestone	clincher	Ford	Champion	No	Miller	Imperial
....	United States	Dorian	.....	Rajah	Yes	Schebler	Harris

ion; § Bosch at top, Anderson side.

no means unknown on the Pacific Coast, but the light car event went to a man who was driving in his first race—George Joermann. The two were run together.

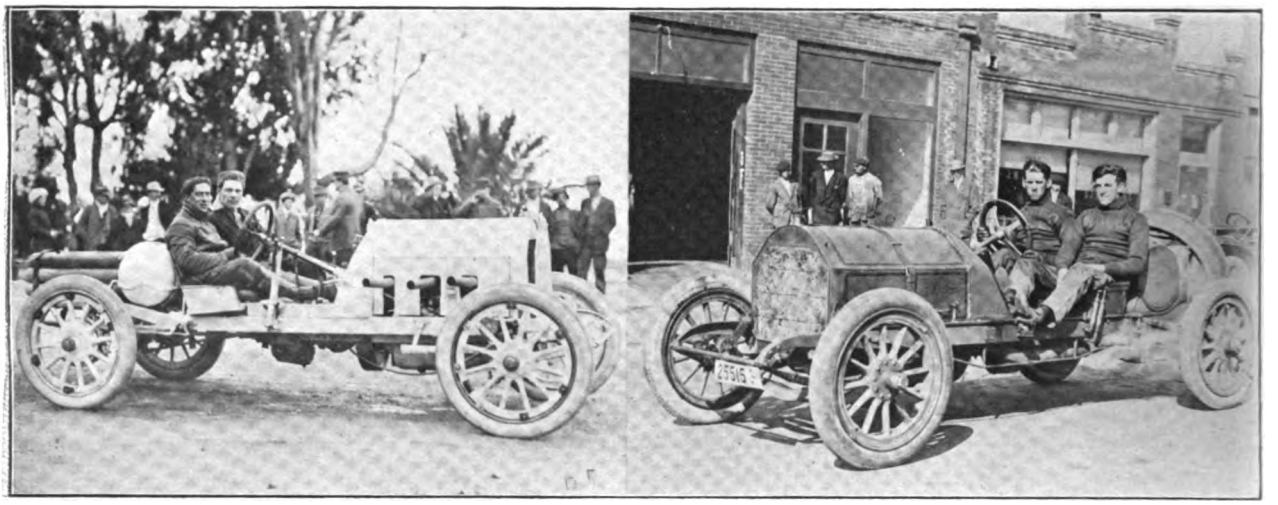
Promptly at 10:30 in the morning Earle Devore was sent away in a Buick, followed by Disbrow in a Case. Joermann was the last man off. Devore rounded the first lap in the lead, with Disbrow close behind him. De Palma in a Mercer was a good third. Jack Tower was the first man home in the little car event, with Evans, his teammate close behind him.

a consistent race and taking the curves like a veteran.

At the end of the 10th lap, De Palma's Mercer was almost a whole lap ahead of all the others in the medium car event. The two Flanders and Nikrent's Buick came down the stretch at this point in the light car event, almost together, and just as they were about to cross the tape, Joermann's Maxwell shot ahead of them like a bullet.

This latter race ended on the 12th lap, Joermann's face wearing a broad grin as he passed the finish flag

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Two Contestants in the Santa Monica Race: At Left, H. A. Shain in a Schacht; at Right, Ruppert Jeffkins in a Mercer.

a winner. Evans in a Flanders was second, only a few hundred yards behind the Maxwell, and his teammate, Tower, was third. Joermann's spurt at the end of the 10th defeated the two Flanders and put the Buick out of the winning class.

The two Case cars showed up strong in the medium car race, holding second and third place throughout. Of course, De Palma's lead was far too great to admit of the Case machines catching him. The Mercer's driver was easily the favorite with the crowd, and a rousing cheer greeted him as he crossed the tape a winner. Joseph Nikrent was second, and Disbrow, third.

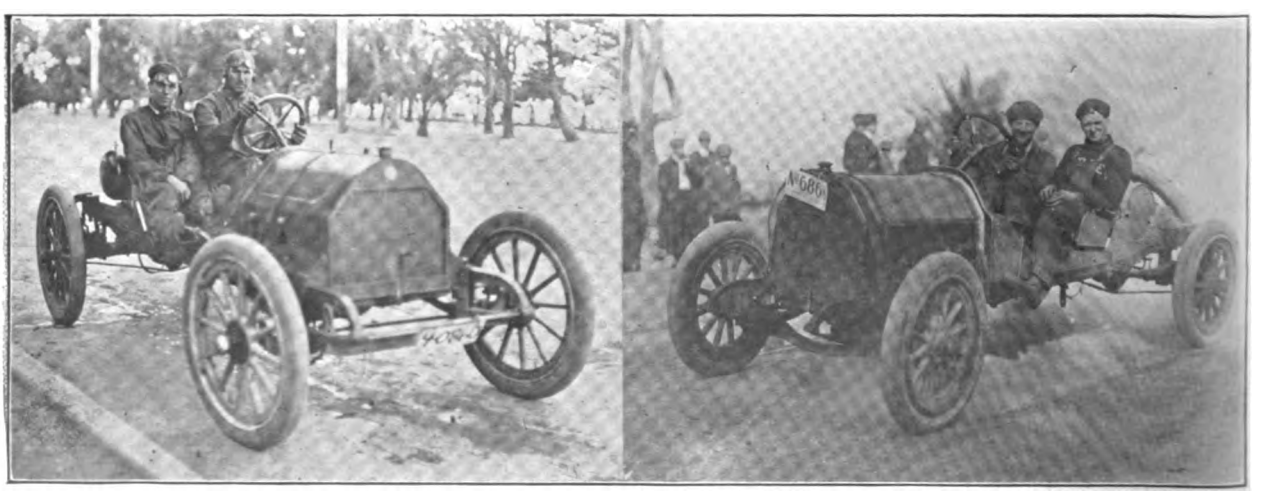
Following the road races, a meet was held on the Los Angeles motordrome, May 5, in which most of the machines which took part in the previous day's events were contestants. Several new speedway records resulted.

Caleb Bragg in a Fiat set a new world's mark for five miles, regardless of class, covering the distance in 3:11.75. The previous record was held by Ralph De Palma. Louis Disbrow in a Simplex took Barney Oldfield's mark for the same distance for cars of 451-600 cubic inches piston displacement, his time being 3:25.1. Joseph Nikrent in a Case lowered Ray Harroun's mark for cars of 231-300 inches, with a time of 3:44.3.

Disbrow in a Case set a new record for 10 miles in the 231-300 class, going the distance in 7:46.4. He also made the fastest mile of the day, driving a special Jay Eye See car in 0:38.

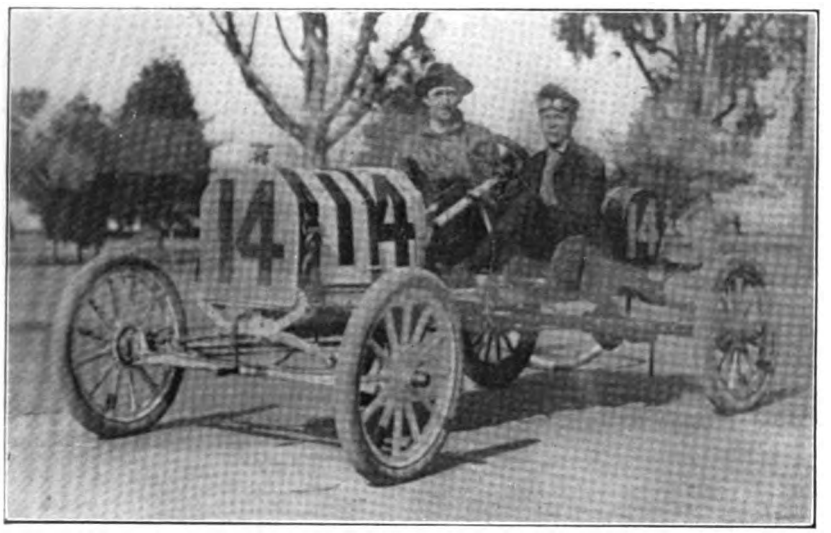
In the race for 25 miles, Ralph De Palma in a Mercer and Joseph Nikrent in a Case, with the same two machines in which they finished first and second in the medium car race the previous day, gave a splendid exhibition of generalship. De Palma won, setting a new record for cars of 231-300 inches, his time for the 25 miles being 18:53.8.

It will not be out of place to make some mention of the good work performed by the officials of the two



Additional Competitors in California Road Events: At Left, H. C. Krouse and Reo; at Right, A. Miller in a Warren.

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A. J. Charles in Ford, a Competitor in the Light Car Division.

meets, particularly that of A. M. Young, the manager. In every respect he appeared to be the right man in the right place, and it was due in no small measure to his energy and diplomacy that the big race was the great success it proved to be. The other officials were: Starter, F. J. Wagner; clerk of the course, P. H. Grier; referee, R. P. Hillman; timers, W. H. Halliwell and C. Halliwell; judges, Jacob Jepson, Walter Chanslor and Ralph Hamlin; technical committee, Capt. H. D. Ryus; official representative of the American Automobile Association, E. J. Custer.

ROCKINGHAM PARK RACES.

New Englanders will not be required to journey to Indianapolis, Ind., Memorial Day, in order to witness one of the most interesting speed contests of the year. Those who have charge of the proposed race meet at Rockingham Park, Salem, N. H., May 30, are now ready to announce a portion of the programme, which indicates that there will be plenty of variety to suit all classes of spectators.

The Berkshire Motors Company, Cambridge, Mass., has decided to withdraw the special racing machine it was constructing for the 500-mile race at Indianapolis, and to enter it at Rockingham park instead. Walter Clapp has charge of the entry, and is trying to arrange with Harry F. Grant, twice a winner of the Vanderbilt cup, to drive the machine. Grant has taken a decidedly active interest in the meet, and it would not be at all surprising if he should change his mind about retiring from the field, just this once.

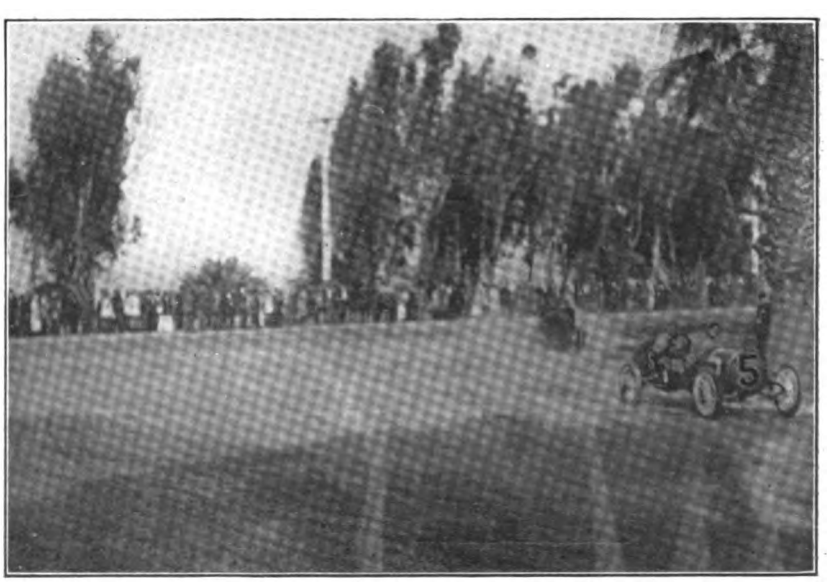
Fred Collins of Dorchester, Mass., who is well known as an amateur driver, has entered his 90 horsepower Chadwick, at the wheel of which he will be seen in the free-for-all amateur event. Leland Hersey of the same city will drive it in the professional races.

R. R. Ross, manager of the Boston branch of the Fiat Automobile company, promises that one of the Fiat cars which took part in the Santa Monica races, recently held on the Pacific Coast, will be entered for the professional events, and that one of the company's well known pilots will be at the wheel.

In addition to the motor car races, an aviation programme will be arranged. Lincoln Beachey, the well known Curtiss aviator, will make exhibition flights, and is trying to secure a match race with Harry Grant or some other equally well known automobile driver.

RECORD BREAKING MILLER TIRES.

In these days of exceptionally fast speed tires play an important part in every long distance event. These shoes used by Teddy Tetzlaff in winning the free-for-all at Santa Monica, Cal., May 4, and thereby establishing a new world's record, were made by the Miller Rubber Co., Akron, O. This is the first time that Miller tires have figured as prominently in important contests.



Ralph De Palma and Winning Mercer in the Medium Event, Rounding Death Curve.

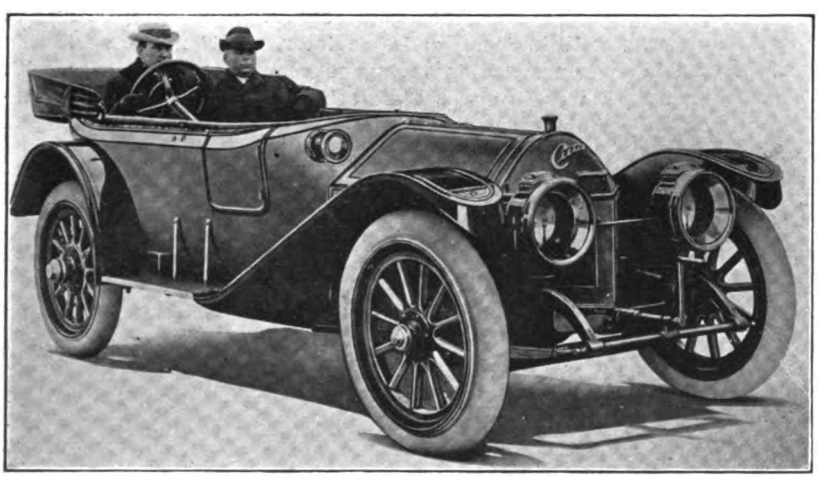
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FOWLER TO MAKE THE VORTEX.

The Fowler Lamp & Brass Company, of Chicago, has taken over the Reichenbach Laboratories Company, maker of the Vortex carburetor and will concentrate the entire business in the Fowler building on East 24th street, Chicago, where the line of the Roberts Brass Manufacturing Company, which was recently purchased, will also be handled.

LECTURES ON KNIGHT MOTOR.

It is more or less well known that the Boston Y. M. C. A. automobile school has taken up a course of instruction with respect to the Knight sliding sleeve motor, the students having complete access to the establishment of J. H. MacAlman, 96 Massachusetts avenue, agent for Columbia and Stearns-Knight cars. Recently, H. F. Farrow, the Knight expert employed with the MacAlman agency, delivered a highly instructive lecture before the school, illustrating his talk with one of the motors, which was completely disassembled for the purpose of bringing out its novel features.



Robert Burman at the Wheel of Latest Cutting Special Model.

WISCONSIN CLUB AFTER SIGNS.

Wisconsin laws require towns to erect and maintain guide posts and sign boards, and not all towns have complied with the regulations. The Milwaukee Automobile Club has started a campaign against such towns, and promises prosecution for town boards which persist in ignoring the law. The Union Automobile Club of Brodhead, Wis., is also taking up the sign question, and will post the road between Janesville and Brodhead at its own expense, so that by next summer Wisconsin should be pretty well posted.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

TO FORM NEW MAXWELL CLUB.

The Maxwell-Briscoe Motor Company, Tarrytown, N. Y., a subsidiary of the United States Motor Company, has decided to form a 50,000-mile Maxwell Motor Club to encourage long distance touring among Maxwell owners. Gold medals are to be given to those who cover the 50,000 miles, and silver medals to those who cover 25,000. It will not be necessary to make these distances in one car, but the mileage of several Maxwell cars owned at different times may be added to make the total.

BURMAN'S CUTTING MODEL.

The accompanying illustration is that of Robert Burman, who holds the world's record for speed in an automobile, at the wheel of a Cutting car, made by the Clarke-Carter Automobile Company, Jackson, Mich. The man beside him is Charles Cutting, after whom the line produced by this concern is named. The car itself is of particular interest, in that it follows the design suggested by Burman.

It is equipped with a very powerful motor, rated at 100 horsepower. The pointed radiator cuts the wind resistance to a minimum. The seat is located far back, about in the position occupied by the rear seat in the ordinary touring car. The steering gear has been constructed long enough to reach this seat, and the whole design presents an unusually attractive appearance. Burman maintains that it will hold better balance at high speeds than with the passengers located in any other manner.

In many ways this car is a duplicate of the racing machine which Burman will drive in the 500-mile race on the Indianapolis motor speedway, May 30. He has been working out this machine for several weeks and expects to be one of the most formidable entries in that event. Incidentally this will be the first appearance of a Cutting in long distance racing.

TITANIUM FOR STEEL.

Titanium promises to be largely used in the steel parts of automobiles, according to B. C. Spitzley of the Abbott Motor Company, Detroit. It is now being used in steel rails with excellent results, the New York Central having found that such rails in service lost in weight but one pound a yard when ordinary steel rails lost three pounds a yard. The titanium rails are tougher and have a higher tensile strength than rails of ordinary steel. The cost of treating steel with titanium is but 75 cents a ton, and the increase in tensile strength amounts to 20 per cent.

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Tarvia

Preserves Roads
Prevents Dust~



Broadway at Dobbs Ferry, N. Y. Roadway treated with Tarvia-B.

Dobbs Ferry's Experience with Tarvia

BROADWAY in New York is one of the longest highways in the world, running from the Battery in New York City far beyond the city limits to the north, following the line of the Hudson for over fifty miles.

It is one of the great historic thoroughfares of the State and is one of the principal automobile highways in the country on account of its picturesque views overlooking the Hudson and the fine estates which border on it.

The maintenance of this road has proven very expensive and for the purpose of reducing the annual costs, Dobbs Ferry used Tarvia on its section of Broadway. The results are described in the following letter:

Dobbs Ferry, N. Y., January 30, 1912.

Gentlemen:

"The Tarvia-B furnished by your Company to the Village of Dobbs Ferry through Michael J. Francis, Contractor, has proven entirely satisfactory. The roadway of Broadway from the Hastings village line to that of Irvington, which was practically a new macadam road, is now one of the finest in the State and Ashford Avenue, which is one mile in length, also a macadam road, is in perfect condition after having been treated with your Tarvia. The automobile traffic is extremely heavy, being approximately one hundred per hour and on Saturdays and Sundays about double that number, and yet the roadway shows no effects of such traffic.

"The Board of Trustees and the people of Dobbs Ferry are unanimous in their praise of Tarvia and after having a large experience in the use of road binders, Tarvia-B has my unqualified endorsement."

Yours very truly,

Hugh P. Tiernan, Village Engineer.

Tarvia is a coal tar product scientifically and carefully prepared for road use, in three grades—Tarvia-X for road and pavement construction, Tarvia-A for surface work (applied hot), Tarvia-B for dust prevention and road preservation (applied cold). Illustrated booklet describing the different treatments free on request to nearest office.

BARRETT MANUFACTURING CO.

New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.

The Paterson Mfg. Co., Ltd.—Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

TRADE B MARK

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SECOND 500-MILE SWEEPSTAKES RACE.

Entries Close for Annual Memorial Day Event on Indianapolis Speedway---Something Concerning the Drivers and What They Have Accomplished in the Past---Twenty-Seven Cars Will Start at 10 in the Morning.

TWENTY-SEVEN cars are entered for the second international 500-mile sweepstakes race on the Indianapolis motor speedway, May 30. Last year there were 40, but this number was considered by all concerned as being too many to be handled with absolute safety to both contestants and spectators. Accordingly, the contest board of the American Automobile Association adopted a rule restricting the number of cars which may start in any race to 30. This explains the reduction in grand total this year, and it is anticipated that the result on the day of the event will be much more satisfactory in every way.



Gilbert Anderson, Stutz 1.



Leonard Zengel, Stutz 2.

It will be remembered that Ray Harroun in a Marmon won the first 500-mile race last Memorial Day, his time being 6:42:08, making an average of 74.59 miles an hour. Ninety thousand people witnessed this victory and were unanimous in the opinion that it was the greatest speed contest in the history of motoring. Of course, much faster speed has been demonstrated since that time, although not in a race covering so many miles. The world's road record is now 78.5 miles an hour, made by Teddy Tetzlaff in a Fiat over the Santa Monica road course, May 4, and inasmuch as many of the cars which took part in that event are scheduled to appear at Indianapolis, Memorial Day, it is expected that this year's average will be not far from 80 miles an hour.

The 27 cars will be sent away promptly at 10 o'clock in the morning, and for nearly seven hours the best known drivers of America will compete for the 12 prizes offered. The purse totals $50,000, divided as follows: First, $20,000; second, $10,000; third, $5000; fourth, $3000; fifth, $2500; sixth, $2000; seventh, $1500; eighth, $1400; ninth, $1300; 10th, $1200; 11th, $1100; 12th, $1000. In addition a number of makers of accessories of national reputation have offered special prizes conditioned upon the use of their equipment.

The complete list of entries, with the drivers, appears herewith. Most of these machines are well known, at least by name, although it is understood that in several instances special construction has been utilized in an effort to present more speed. Undoubtedly additional information concerning these will be available before the race actually takes place. At present, the public is more than ordinarily interested in the drivers.

Gilbert Anderson is best known because of his performance with a Stutz car, made by the Ideal Motor Car Company, Indianapolis, Ind., during the first 500-mile race a year ago. His machine was practically unknown, being the first produced by this concern. In fact, the company's organization had not been completed at that time, and its future depended almost entirely upon the showing made by this car in this race. Anderson appears to have been equal to the occasion. He drove the machine the entire 500 miles without a stop, thereby establishing the Stutz as possessed of remarkable quality. Since that race he has driven Stutz cars in a number of events, always with the same result, insofar as non-stop performances are concerned, and he finished in second place in his class at Fairmount Park, Philadelphia, last October. His first racing experience was in the Crown Point races of June 18-19, 1909, when for 50 miles he lay on the hood of a Marion car, driven by Monson, adjusting a carburetor.



Teddy Tetzlaff, Fiat 3.



Robert Burman, Cutting 15.

Leonard Zengel finished with place in every race

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in which he started in 1911, when he was at the wheel of National cars. He has been a racing driver for a number of years, and perhaps his most important victory previous to his connection with the National Motor Vehicle Company, Indianapolis, Ind., was the winning of the 1910 Fairmount Park race, in a Chadwick. Last year he took the Elgin national trophy, and finished third in the Fairmount Park sweepstakes event. His appearance in this race in a Stutz car will be awaited with considerable interest.

Teddy Tetzlaff holds the world's road race record with the Fiat machine in which he will appear at Indianapolis May 30. This is not exactly a new experience for him, as he came into prominence during the Santa Monica road race of 1910, when he created a new American road race record with a Lozier car. He is a Californian, and has been driving Fiat cars since early in 1911. For some reason, he did not show up at all well in the Santa Monica race of last October, in which he was at the wheel of a Fiat, but he appears to have regained his old driving form in the latest contest over this course.

Ralph De Palma finished in first place 30 times out of 46 starts in 1911, placing him at the head of the list of drivers for the year. He has been driving since 1908, when he appeared in the Briarcliff races. Inasmuch as during that year he entered 16 events and finished in first place 10 times, and followed this in 1909 with 34 firsts out of 47 starts, and in 1910 with 30 firsts out of 48 starts, he established a record for consistent work which will be hard to exceed. He has been seen at the wheel of numerous makes, doing his best work, perhaps with the Mercer and Simplex. It was in a Mercer in which he won in his class at Santa Monica, May 4.

Louis Disbrow began his racing career in a Rainier in the Motor Parkway sweepstakes of 1908, finishing in second place. In 1909, he drove a car of the same make in four 24-hour races at Brighton Beach, L. I., in one of which he secured a record of 19 hours' continuous driving on a mile track. During the same year he won the $10,000 Atlanta trophy. He has driven the Knox in numerous hill climbs, and last year was particularly successful in a special Pope-Hartford racing machine. His recent activity on the Pacific Coast in a Case car places him in an enviable position.

Harvey Herrick is another California boy. In 1910 he won the Los Angeles-Phoenix race in a KiselKar, and last year he was at the wheel of a National, representing the Pacific Coast agent. He won the Levis trophy in the Bakersfield road race July 4, created a new world's record for road racing in the Santa Monica race in October, and won the Los Angeles-Phoenix race for the second time, in 1911. This will be his first race on the Indianapolis speedway.

Spencer E. Wishart is rated as a millionaire who drives his own cars, purely for the sport of driving. For the past four years he has been at the wheel of Mercedes machines, although he has not figured as a prominent winner. In the Fairmount Park race of last October, he was disqualified, because he drove a portion of a lap without a mechanician, after finishing in second place. He finished in third place in the seventh Vanderbilt Cup race in November.

Howard Wilcox won first place in his first race, the five-mile Southern Championship event at New Orleans, Nov. 20, 1909. During 1910 and 1911 he was seen at the wheel of a National, figuring very prominently with cars of this make in numerous hill climbs and other events. With a National, he established a new world's stock car mile record at Jacksonville, Fla., in March, 1911.

Donald Herr, who served as mechanician in the first 500-mile race, is the youngest driver on the

COMPLETE ENTRY LIST FOR INDIANAPOLIS' SECOND 500-MILE RACE.

No.	Car	Driver	Entrant	Cyl.	Bore	Stroke	Cu. In.
1	Stutz	Gilbert Anderson	Ideal Motor Car Company	4	4.750	5.50	389.9
2	Stutz	Leonard Zengel	Ideal Motor Car Company	4	4.750	5.50	389.9
3	Fiat	Teddy Tetzlaff	E. E. Hewlett	4	5.000	7.48	589.0
4	Mercedes	Ralph De Palma	Ralph De Palma	4	5.118	7.08	583.0
5	Case	Louis Disbrow	J. I. Case Threshing Machine Company	6	4.359	5.00	447.8
6	Case	Harvey Herrick	J. I. Case Threshing Machine Company	6	4.359	5.00	447.8
7	Mercedes	Spencer Wishart	Spencer E. Wishart	4	5.118	7.08	583.0
8	National	Howard Wilcox	National Motor Vehicle Company	4	5.000	7.50	589.0
9	National	Donald Herr	National Motor Vehicle Company	4	4.875	6.00	448.0
10	Lexington	Harry Knight	Lexington Motor Car Company	6	4.125	5.25	421.0
12	Simplex	Bert Dingley	Bert Dingley	4	5.750	5.75	593.0
14	White	W. Barndollar	White Indianapolis Company	6	4.250	5.75	489.0
15	Cutting	Robert Burman	Clarke-Carter Automobile Company	4	5.218	7.00	597.8
16	Firestone-Columbus	Lee Frayer	Columbus Buggy Company	4	5.000	5.50	432.0
17	Marquette-Buick	William Liesaw	Will Thomson	4	6.000	5.25	594.0
18	Schacht	William Endicott	Schacht Motor Car Company	4	4.750	5.50	389.9
19	Knox	Ralph Mulford	Ralph Mulford	6	4.800	5.50	597.0
21	Mercer	Hugh Hughes	Mercer Automobile Company	4	4.375	5.00	300.0
22	Lozier	Joseph Horan	Dr. W. H. Chambers	4	5.375	6.00	544.0
23	McFarlan	Melvin Marquette	Speed Motors Company	6	4.250	5.00	425.0
24	Opel	(not named)	Opel Auto Import Company	.	....	...	....
25	Lozier	Joseph Matson	O. Applegate	4	5.375	6.00	544.0
26	(Special)	(not named)	(withheld)	.	....	...	....
27	Continental	John Jenkins	N. Martindale	4	4.250	4.50	286.3
28	Stutz	Charles Merz	Ideal Motor Car Company	.	....	...	....
29	National	(not named)	National Motor Vehicle Company	4	4.875	6.00	448.0
31	Mason	(not named)	Mason Motor Company	4	3.937	5.00	240.0

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Hugh Hughes, Mercer 21.



Bert Dingley, Simplex 12.

National team, from point of experience, but has succeeded in winning several events since becoming identified therewith. His chief claim to popularity was the winning of the Illinois trophy in the Elgin stock car races of 1911. He also finished in third place in his class at Fairmount Park in October.

Harry Knight began driving when he was but 13 years old, piloting a Queen car over the road from Indianapolis to Washington, and making a call upon President Roosevelt at the White House upon the successful conclusion of the trip. In 1910 he drove Westcott cars in a number of events, and last year he drove both Westcott and Cole cars. It was with a Westcott that he took the Hoster-Columbus trophy in Columbus, O., Sept. 13. This will be his first appearance in a Lexington, as well as the Lexington's first long distance race.

Bert Dingley drove in the first Vanderbilt Cup race in 1904, and the following year took part in the Gordon-Bennett race in France. Since that time he has been a consistent winner, although most of his victories have been on the Pacific Coast. Last year he began by winning the free-for-all at Alameda, Cal., Feb. 22, and followed this by finishing second in the race for the St. Francis trophy, second for the Levis trophy at Bakersfield and second for the Shettler cup at Santa Monica. In 1911 he drove a Pope-Hartford.



Donald Herr, National 9.



W. Barndollar, White 14.

W. Barndollar has been a racing driver since 1906, but has intentionally kept from the public, it is stated, because of his desire to keep his professionalism from his family. Because he is practically unknown and because the White car, made by the White Company, Cleveland, O., has not been seen in racing events during recent years, this addition to list of entrants is of decided interest.

Robert Burman is best known because of his world's speed record, having driven the "Blitzen" Benz a mile in 0:25.4 at Daytona, Fla., April 23, 1911. This was at a speed of 141.73 miles an hour. He tested the first Buick car produced by the Buick Motor Company, Flint, Mich., and was at the wheel of cars of that make in various contests until 1911. In 1910 he drove the Marquette-Buick, but the disqualification of these machines robbed him of many victories. His appearance in this event with a Cutting, made by the Clarke-Carter Automobile Company, Jackson, Mich., will be his first with cars of that make.



Charles Merz, Stutz 28.



Howard Wilcox, National 8.

Lee Frayer is one of the oldest men in the industry. After a short experience with motorcycles and air-cooled motors, he began the production of the Frayer-Miller type of the latter, and helped to organize what was known as the Oscar Lear Automobile Company in the fall of 1904. His first race was the six-day contest at Long Branch in August, 1905, during which he was at the wheel most of the time, covering 3302 miles and making a continuous run of 1877 miles. His connection with the Columbus Buggy Company, Columbus, O., dates from July, 1909, when he took charge of the engineering department as chief engineer. He has driven in a number of events, and was at the wheel of a Firestone-Columbus in last year's 500-mile race. It is understood that the same car will be utilized in this event.

William Liesaw is not particularly well known as a racing driver, although he has been quite success-

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ful in many of the minor events of the country, and understands Buick cars thoroughly.

William Endicott has had a number of farewell appearances. Just before the 500-mile race of 1910, he announced his return to racing solely because there were no Cole cars entered, and he did not like to see the race go by without his favorite machine being represented. This year he will be at the wheel of a Schacht and for the first time, having driven Cole cars exclusively heretofore. Incidentally, he was the first driver employed by the Cole Motor Car Company.

Ralph Mulford drove Lozier cars for four years, previous to 1912. With Harry Mitchell he won the 24-hour race at the Point Breeze track, Philadelphia, in 1907. The following year he helped create a new world's record for 24 hours at Brighton Beach, and three weeks later finished in second place in another event of the same character, exceeding his former time. He finished third in Briarcliff race the same year. In 1909 he created still another 24-hour record. In 1910 he took the Elgin national trophy and finished in



Lee Frayer, Firestone 16.



Harvey Herrick, Case 6.

better than fifth place in every event entered. Last year he won the Vanderbilt cup, and finished second in the Fairmount Park sweepstakes. This is the first time he has been seen in a long distance event in any other car than a Lozier. The Knox, made by the Knox Automobile Company, Springfield, Mass., is owned by Mulford.

Hugh Hughes has had a long racing experience, although not prominent among the list of winners until last year. He drove a De Dietrich in the Gordon-Bennett race in France in 1904, and when he first came to America from England, where he was born, he was at the wheel of an Allen-Kingston in several 24-hour events as well as numerous hill climbs. Later he went with Walter Christie, handling the latter's front drive machine on many circular tracks. In 1910 he did good work with a Fal-Car. Last year he organized the Mercer racing team. His chief victories were the Kane County trophy at Elgin, Aug. 25, the class 3C event at Fairmount Park in October, and the fourth Savannah Challenge trophy in November.



Ralph Mulford, Knox 19.



John Jenkins, Continental 27.

Joseph Horan is well known as a driver of Lozier cars, particularly at important race meets in the South. He acted as mechanician for Mulford for three years, and in the same capacity for Seymour and Cobe in long distance events. This is his first race as driver on the Indianapolis speedway.

Melvin Marquette is something of an unknown. At least, his name does not appear in the list of drivers who have been at all prominent during the past few years.

Joseph Matson is better known nowadays as a driver in reliability events, although previous to 1910 he was frequently seen at the wheel of Chalmers cars, securing the Masapequa trophy in 1909 with a car of that make. He also created a number of world's records with these machines.

John Jenkins was at one time a pugilist and has two crippled hands. He drove his first race in America on the Indianapolis speedway. Formerly, he had driven a Fiat on the Continent. It was during the 24-hour race on the Los Angeles motordrome, April 9, 1911, that he came into prominence, and throughout the remainder of the year was seen at the wheel of Cole cars. He drove in last year's 500-mile race, and took the Hamilton trophy at Cincinnati, O., Sept. 9,



Ralph De Palma, Mercedes 4.



William Endicott, Schacht 18.

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finishing second for the Cincinnati trophy the same day. The Continental is a new car.

Charles Merz made his first appearance in a race when a boy in short trousers at Indianapolis, during



Louis Disbrow, Case 5.



Joseph Horan, Lozier 22.

which he crashed through a fence, and narrowly escaped death in the resulting wreck. Less than two weeks later, Nov. 16-17, 1905, he was back at wheel of a National with Fred Clemens in a 24-hour race in that city, creating a 1000-mile record which stood for some years. In fact, the National created new records from 630 miles to 24 hours. Merz always has driven National cars, heretofore. Last year he won the St. Francis trophy on the Pacific Coast, finished second in a number of long distance events, and ended the year with a new world's road record during the race for the Shettler cup at Santa Monica, Oct. 14.

FIGHTING INDIANAPOLIS TAX.

Four members of the Hoosier Motor Club have brought suit against the city of Indianapolis to prevent it from enforcing the automobile license ordinance which was enacted recently. The new license amounts to from $5 to $15 a year, according to the size of the car, while the former fee was $3. It is charged that the ordinance is unconstitutional in that it was passed for revenue, and that it is class legislation, creating an unequal and non-uniform taxation on a special class of personal property. Several automobilists who have been arrested and fined for failing to comply with the ordinance have announced their intention of taking an appeal, so that the matter will be well threshed out.

FREE OVERALLS FOR WORKMEN.

The R-C-H Corporation, Detroit, maker of the R-C-H car, has started an innovation in factory management by furnishing its workmen with their working clothes. Each employee receives two suits of overalls and these are kept clean and in repair by the company.

GEORGE SUMNER, INC.

A little over a year ago George Sumner, Inc., of New York City, took over the agency for the Rayfield carburetor, made by the Findeisen & Kropf Manufacturing Company, Chicago. At that time this product was very little known in the East. However, since this agency was established the merits of the device have consistently been brought to the attention of the public until the increase in the output in this section has been some 700 per cent.

With the object of still further enlarging the business, as well as to enable the public to have the advantage of personal service, the concern recently opened a branch at 755 Boylston street, Boston. This office will be in charge of J. K. Dalton, an able carburetor expert, who is prepared to give the same liberal service as always has been given by the New York house.

While this concern is a dealer and manufacturer of automobile specialties, it never has carried more than three lines at any one time, believing it the part of wisdom to bring all of the experience and knowledge of its members to bear upon the particular articles that it is exploiting. Under this arrangement the consumer is held to obtain better attention and more satisfactory treatment.

BRUSH RUNABOUTS FOR LINEMEN.

Linemen of the New England Telephone & Telegraph Company will use Brush runabouts, 50 having been ordered from the United States Motor Company, New York City. Some of the men have been using machines of the same make during the past year with great success, but the recent order was placed only



Spencer Wishart, Mercedes 7.



Harry Knight, Lexington 10.

after investigation of all the runabouts on the market. The company is an enthusiastic believer in the motor car, and uses 20 large Sampson trucks, also a product of the United States Motor Company.

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BLUE RIBBON METAL POLISH.

Nothing detracts so much from the appearance of a car as to have the brass and metal trimmings tarnished, but many motorists find it tiresome to keep these looking bright and attractive. Those who have had much experience with the Blue Ribbon cream metal polish, made by the International Metal Polish Company, Indianapolis, Ind., insist that there is little reason for such lack of attention if supplied with a suitable product.

The Blue Ribbon polish is a thick oil cream, or emulsion, put up in half-pint, pint, quart, half-gallon and gallon cans for the owner or private garageman, and in five and 10-gallon packages for public garages, fire departments and other large users. It is guaranteed to remove the tarnish and not the metal, and therefore is entirely free from injurious ingredients. The maker claims it does not settle, requires no shaking before using and leaves no sediment in crevices. It is equally adaptable for household use.

PITTSFIELD SPARK COIL AFFAIRS.

The capital stock of the Pittsfield Spark Coil Company, Dalton, Mass., has been increased from $100,000 to $250,000, the increase being for the purpose of installing new machinery and generally enlarging the business. Coils, timers and other electrical accessories are made. Officers have been elected as follows: President, W. P. Wood; treasurer, L. B. Hopkins.

FREAK CAUSE FOR ARREST.

A New York policeman recently arrested the driver of a demonstrating truck, preferring the charge that he was operating on a manufacturer's license a truck that "did not bear sufficient evidence of hard work." The driver was held for three days before he got a hearing, and complaint has been made to the police commissioner by the New York Automobile Dealers' Association, protesting against the unwarranted arrest.

FLANDERS A TRADE MARK.

The Studebaker Corporation, Detroit, has been granted a trade mark on the name Flanders, the application which was made last December having been acted upon favorably recently. For some time there was a rumor that another concern was hoping to reap some of the benefit of the name, which may or may not have led to its being trade marked.

TRAVELLING EXHIBIT.

J. S. Conwell, manager of the United Motor Los Angeles Company, the southern California agent for the United States Motor Company, New York City, recently tried out a travelling exhibit of Maxwell and Columbia cars and Sampson trucks with considerable success. The cavalcade went on a two weeks' tour through the smaller California towns and cities, where it excited much interest.

WINS DESERVED PROMOTION.

The Rhode Island branch of the Olds Motor Works, which was established the first of the year, is in charge of Ernest L. Smith, who was transferred from Boston to Providence at the time the branch was opened. Mr. Smith was for years a commercial salesman and when he decided to become identified with the automobile industry he made a connection with the sales department of the Olds Motor Works and was stationed at Boston. Mr. Smith's home has been at Pawtucket, R. I., for years and he is widely and favorably known.



Ernest L. Smith, Manager Rhode Island Oldsmobile Branch.

When the company decided that a branch was necessary in Rhode Island in order to give its patrons the consistent attention and service they were justified in expecting, Mr. Smith was named as the manager. This was followed by the opening of admirably located salesrooms at 77 Exchange street and the establishment of a service station in Broad street. The policy of the company is to give to Oldsmobile owners factory attention and to deal with them direct instead of through an agent. The Rhode Island branch has the equipment and the facilities to deal with any condition that may arise, and Mr. Smith says that the satisfaction this insures will be realized.

RHODE ISLAND GOOD ROADS MONEY.

The state of Rhode Island is to spend $850,000 for road improvement and maintenance work, the Legislature having appropriated the sum of $250,000 for this purpose. In addition a bond issue of $600,000, approved by the voters last fall, is available for good roads work.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

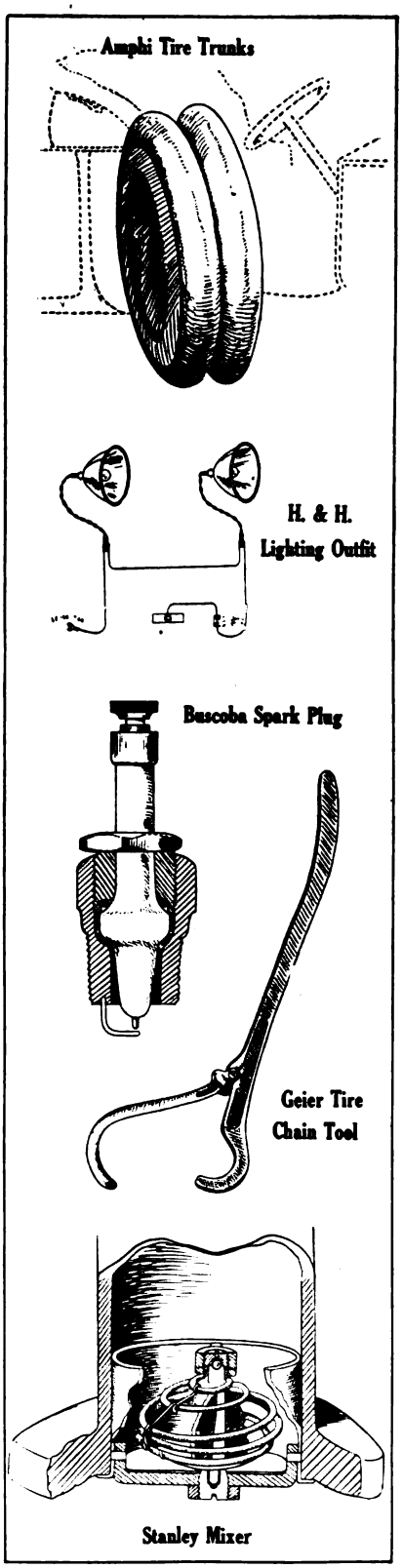
Amphi Tire Trunks, made by the Coward Auto Supply Company, Motor Mart, Boston, are adapted to take the place of a door, so that installing them at the side, on the running board, does not mean the obstruction of one of the doors as is usually the case. The trunks are supplied with a swivel mounting and can be fitted at either the side or the rear. They are water and dust proof, do not rattle, and are suitable for any kind of tire or demountable rim.

★

The H. & H. Lighting Outfit, made by the E. A. Hammer Company, Cleveland, O., has been specially designed for use with Ford cars, so that the owner of one of these machines can have electric headlights, at slight expense. Current is taken from the magneto, the wiring being from magneto to lamp and from lamp to ground, the two lamps being wired in series. The outfit consists of a pair of parabolic reflectors, two tungsten bulbs, switch and wires with terminals and clamps. The reflectors are of the parabolic type, projecting the maximum amount of light from the lamps, and the sliding socket enables the latter to be placed in the proper focus of the parabola. The bulbs are fitted with the Edi-Swan or bayonet lock base, which does not jar loose or break, preventing the lamp from becoming disconnected or injuring the reflector. The filament of the lamps is tungsten, tough enough to withstand the strain of automobile work and giving a brilliant light which will show the road ahead for 600 feet at 25 miles an hour.

★

The Buscoba Spark Plug is made by the Bush-Scott Company, Detroit, and may be had in conical and petticoat types in .5-inch standard, S. A. E. standard, or metric sizes. The shells are full length and handsomely finished. When the plug is taken apart for cleaning the copper asbestos gasket is retained by means of a recess in the bushings, which are hardened to prevent bruising, adding to the life and service of the plug. The porcelains are accurately formed of a special heat resisting material and are interchangeable, with the caps well crimped in place and filled with cement to exclude oil and water. The sparking points are made of a special alloy which approaches platinum in its resistance to heat and the electric spark. The binding post and nut are so formed as take a great variety of cable terminals. The packing of the plug consists of asbestos filled copper gaskets of standard type.



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The Geier Tire Chain Tool is sold by the Post & Lester Company, Hartford, Conn., and is used for tightening anti-skid chains. Those who have had trouble in applying these members on a wet day will appreciate this device, which makes it easy to bring together the ends of a chain for hooking. The tool is in two parts, both hooked to engage the tire chain. Depressing the handle brings the hooks on it and the movable arm together and in line, enabling the chain to be fastened.

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The Stanley Mixer is being placed upon the market by C. W. Jacob & Allison, New York City, and is a device to be located in the intake pipe above the carburetor. The construction is such that the incoming mixture rotates the coil and is itself set whirling, resulting in the gasoline and air being perfectly mixed before it enters the motor. All globules of gasoline are broken up and vaporized by passing through the mixer, resulting in increased power and fuel economy as well. The rotating member is made of stiff wire formed into a coil, within which is a pair of tilted propeller blades which whirl the device. The coil, or agitator as the maker calls it, is mounted on ball bearings and is very easily turned,

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offering little or no resistance to the passage of the gases.

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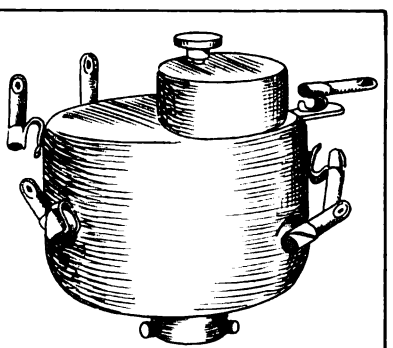
The Monitor Distributor is made by the Motor Specialties Company, Waltham, Mass., and is designed for use with a single unit coil, furnishing sparks to any number of cylinders. The distributor in combination with a six-volt battery, may be used instead of a high-tension magneto for ignition purposes at about one-tenth of the cost of installation. It is especially recommended for use on motors which run at high speeds. A feature of the construction is the shaft, which is of solid steel and runs through a very long phosphor steel bearing of perfect finish. This construction eliminates the fault of rocking or wabbling and secures a true and smooth running machine of long life. All the primary parts are at the top of the instrument where they are accessible by removing the cover. The contact is of a slightly wiping character, enough to keep the surfaces clean, and by means of a screw the duration of contact may be adjusted to suit the motor or coil. The body of the instrument is strong and impervious to water and oil.

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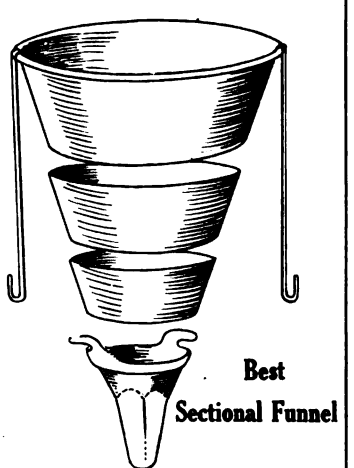
The Best Sectional Funnel is built upon the collapsible plan, being in four sections which when nested fit in a circular box 7.75 by 2.5 inches, enabling the funnel to be carried in the tool box without waste of space. It is made by R. L. Best, Bismarck, N. D., of 26 gauge steel, nickel plated, and is inexpensive. The two arms seen hanging from the rim of the funnel engage with hooks on the spout when the funnel is in use, making it rigid. The arms fold underneath when the sections are nested.

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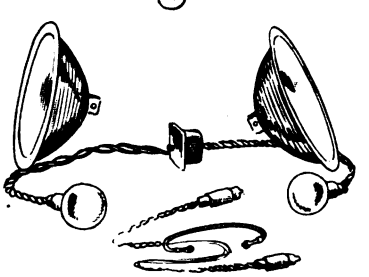
The L. C. R. Lighting System is made by the L. C. R. Storage Battery Company, Dayton, O., and is designed especially for Ford cars. It consists of a set of parabolic reflectors to fit in the ordinary gas lamps, with wiring to connect the lamps with the magneto. The installation is an exceedingly simple one and does not need the services of an expert electrician. It adds little to the weight of the car, as no storage battery is carried, current being taken from the magneto alone without danger of weakening the ignition, it is claimed. A switch installed on the dash or wherever convenient, controls the lamps. The reflectors are parabolic, silver plated, with a flange which will fit beneath the wire ring that holds the glass in the lamp, so that it is easy to install them. The globes are of Mazda make with Edi-Swan base. The outfit comes complete with all connections, terminals and wire, ready to be installed.



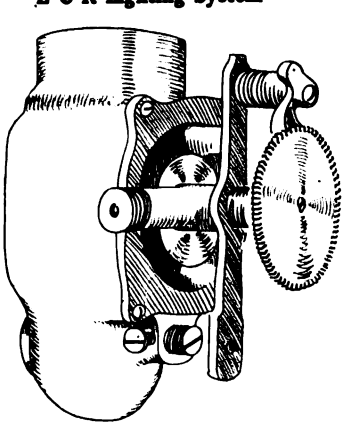
Monitor Distributor



Best Sectional Funnel



L-C-R Lighting System



Atkins Carburetor

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The Atkins Carburetor is made by the Atkins Manufacturing Company, Coldwater, Mich., and differs from other carburetors in that the float chamber may be located anywhere along the gasoline line as it does not stop the flow of fuel through the nozzle when the motor stops, but merely regulates the hydrostatic pressure on the nozzle. The float is thus not an integral part of the carburetor and is not shown in the illustration, which portrays only the carburetor proper, which may be placed in any position without affecting its operation. The instrument is very compact and is simple in action. The gasoline flows from the float chamber so placed as to furnish a gravity feed to the carburetor, and the throttle regulates this flow by increasing or diminishing the space around the nozzle. The throttle is connected to the lever seen between the toothed wheel and the body of the carburetor. Moving this lever moves the toothed wheel and the valve. The only adjustments are in the connection between the lever and the wheel, and the auxiliary air valve.

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The Automatic Steam Vulcanizer is being placed on the market by the Simplicity Supply Company, Cleveland, O., and has been designed with the idea of produc-

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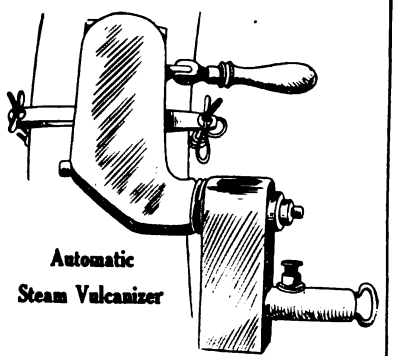
ing an apparatus as nearly automatic as possible, requiring no attention in vulcanizing. The device has no gauge or thermometer. To use it is only necessary to light the lamp, no watching or other attention being required. It will do all kinds of work, either on the wheel or off, from vulcanizing cuts and tears in the casing to patches on tubes. The outfit is small and compact, taking up little room in the tool box. The cover of the box forms a vulcanizing board which may be clamped to the running board of a car, or wherever convenient.

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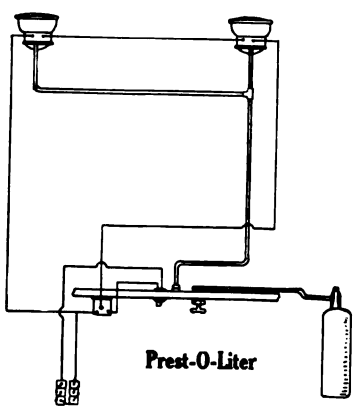
The Prest-O-Liter, made by the Prest-O-Lite Company, Indianapolis, Ind., makes possible the lighting, control and extinguishing of the acetylene running lights of an automobile from the driver's seat. It is made in three styles, for two headlights, two headlights and tail light and for two headlights, tail light and two side lights. The system consists of an automatic reduction valve attached to the gas tank, piping to the dash, controller valve for the dash, insulated burners with spark gap, spark coil and wiring. It is independent of ignition system, using separate battery and spark coil. The regulator valve, attached to the gas tank, keeps the pressure in the pipe line to the dash down to less than two ounces, so that there is no danger of an explosion as might be the case if the gas were under heavy pressure. To operate, it is only necessary to open the controller on the dash and push the button. This permits acetylene to reach the burners and produces a spark, igniting the gas. The handle of the controller is detachable, and the latter governs the gas so that any desired set of lamps may be lighted.

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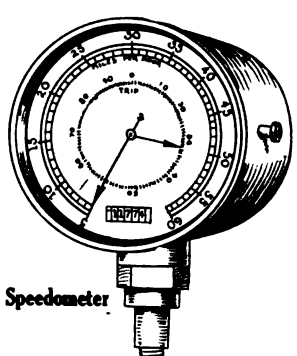
The Reliance Speedometer is made by the Reliance Speedometer Company, Boston, in a number of styles. It is of the centrifugal type, with an evenly balanced ball governor which makes the indication of speed steady. It is provided with speed and trip hands and a season odometer. The trip hand may be set to any desired reading by means of a screw. The construction of the instrument is substantial, with ball bearings at every point. Noise is prevented by the use of hard composition ring gears having cut teeth and running with a fibre pinion. Accuracy is secured by the fact that each instrument and dial is calibrated individually. The trip hand moves continuously. The finish may be had in brass, nickel, black, brass and black, or nickel and black. A feature of the Reliance installation is the swivel drive and ball bearing shaft. The drive is ball bearing, swivels, and is provided with spiral gears, insuring quietness and smoothness, and eliminating chances of breakage. The flexible shaft, provided with ball bearings, serves to give a steady drive, eliminating sudden jumps in the indication and also guarding against shaft breakage. A swivel is provided at each end of the shaft.



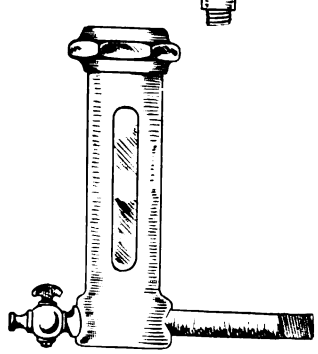
Automatic Steam Vulcanizer



Prest-O-Liter



Reliance Speedometer



H. & H. Oil Gauge

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The H. & H. Oil Gauge has been designed specially for use on Ford cars by the E. A. Hammer Company, Cleveland, O. It is attached to the bottom of the crankcase, and shows the amount of oil therein at all times. No drilling of the case is necessary to install the gauge stem first being inserted in place of the petcock with which the case is provided, and the petcock being located in the gauge itself. The gauge has been improved over the previous model produced by the company in that means have been provided for draining without removing it. It is turned from a solid brass bar, making it very substantial, while leaks are guarded against by leather washers. An improved air vent makes it positive in action, and the glass which is .125 inch thick and .75 inch in diameter, is easy to read and practically unbreakable.

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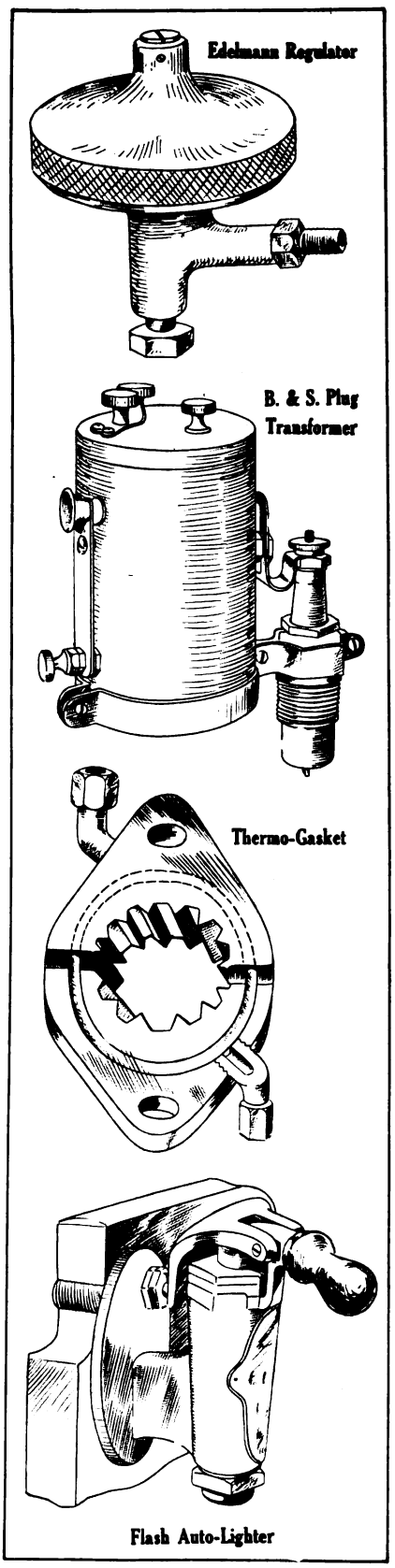
The Edelmann Regulator is manufactured by E. Edelmann & Co., Chicago, Ill., and is designed to be attached to pressure gas tanks, enabling the user to regulate the pressure of the gas delivered from the tank. It can be adjusted to deliver at pressures of from as low as two ounces, which is about the proper figure for supplying two .75-foot burners, to a pound or more, as desired. The regulator is made with a metal diaphragm which has long life. Adjustment is easily made by turning the screw in the cover.

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The B. & S. Plug Transformer is made by the Briggs & Stratton Company, Milwaukee, Wis., and is a complete vibrating spark coil mounted on the spark plug without any secondary wiring to leak. It fits any spark plug and gives a hot spark with low battery consumption. The cost of a switch and coil is saved and the device is said to give better results than a box coil, the vibrator being very rapid and causing a shower of hot sparks at the plug point. Installation is easy, there being only one primary wire necessary, thus preventing mistakes in wiring. The vibrator may be adjusted readily, and at the same time the whole instrument is water, heat and oil proof. It may be covered with a protection hood if desired. Four types are furnished, two for mounting on the plug as illustrated, and two for mounting on the cylinder where convenient. The latter require a short piece of secondary wire from the coil to the plug.

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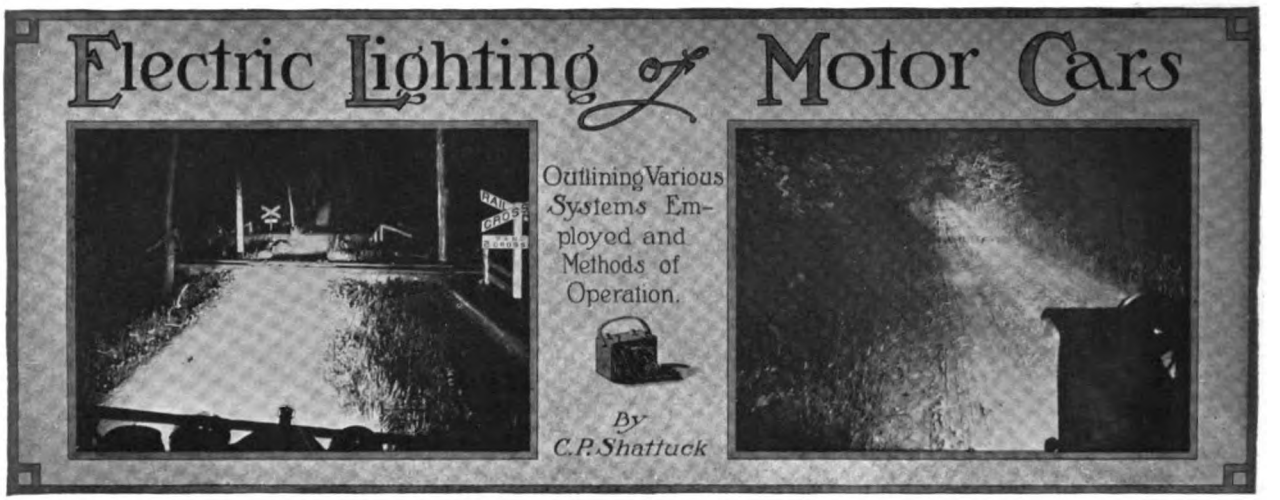
The Thermo-Gasket is a combined heating and mixing device made by F. W. Battershall & Co., Albany, N. Y. Less than .5 inch thick, it is designed to be bolted between the carburetor and the intake manifold of the motor, taking the place of a hot water jacket on the carburetor and of a mixer. The construction is easily seen in the illustration. Surrounding the opening through which the mixture passes is an annular passage through which flows a continual stream of hot gas, led from the exhaust manifold of the engine through copper tubing. By this means the device is heated and the carburetor and intake manifold as well, the mixture as a result being made homogeneous, with all particles of gasoline thoroughly vaporized by the heat. An additional feature of the device which assists in mixing is in the diagonal fins which not only radiate the heat into the mixture, but impart a whirling motion to it.



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The Flash Auto-Lighter is a system for automatically lighting or extinguishing acetylene headlights from the driver's seat, made by the Motor Specialties Company, Motor Mart, Boston. It comprises three parts, the controller, which is illustrated, an induction coil, and a pair of special burners. The controller combines a gas valve and an electric switch, the two being operated by the one lever. It is so timed that sparks are produced at the burners before the opening of the gas valve. The turn of the lever starts the sparking at the burners and admits the gas to the piping. The coil is of the ordinary single unit type, of high grade, finished in mahogany and brass and thoroughly guaranteed. In order that the lighter may be entirely independent of the engine circuit, the coil is provided with four terminals for the primary and secondary wires. The burners are made to fit any standard lamp and are provided with sparking points rigidly clamped in position over the gas vents. The points will not interfere with the light given by the burners, and will not be jarred apart by the vibration of the car. The lamps are lighted instantaneously, by a single turn of the handle to the left, and may be extinguished as easily, by a turn of the handle to the right. The lighter enables the lamps to be controlled as easily as the motor, so that they may be extinguished when stopping or driving on city streets, with resulting economy. With the outfit are furnished gas pipes, union fittings, wires, terminals, etc.

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Part VII.—The Dynalux Dynamo System.

A DYNAMO designed especially for automobiles, having in mind the peculiar conditions and requirements under which a mechanical generator must operate successfully in this work, is the Dynalux, brought out by the Dean Electric Company, Elyria, O., well known maker of electrical apparatus. It is the result of exhaustive experiments that were conducted to perfect a device capable of developing a steady and constant production of electrical energy not affected by the variable speeds of the car. In designing the system the engineers have considered its utilization by those unfamiliar with electrical devices, their installation and operation, and claim for the Dynalux system a simple generator having but one working unit outside of the battery and lamps, dispensing with volt and ampere meters, magnetic regulators, complicated wiring, etc.

Its simplicity will appeal to motorists as the principle involved is similar to the straight storage battery system. Current to the lamps is furnished by one of these members charged by the dynamo which is connected to the battery by two wires without regard to their polarity. That is, to say: Either wire may be connected to the negative or positive terminal of the current container as the dynamo will always operate in the right direction. The leads to the lamps, signalling horn, etc., are by a separate set of wires connected to the battery, this arrangement eliminating the possibility of introducing high resistance connections in the circuit through wires jarring loose, and thereby causing high and destructive generator voltage to be impressed upon the lamp filaments. As the Dynalux dynamo maintains the battery in a fully charged condition and is a six-volt member, it is obvious that if lamps of similar voltage be utilized these cannot be burned out through excess voltage as above explained.

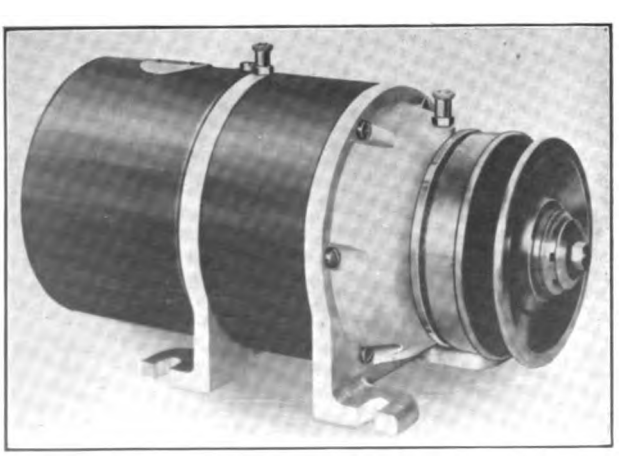


Fig. 44—The Dynalux Dynamo Equipped with a Declutching Device Preventing Excessive Speeds and Controlling Current Generated by Automatic Cut-In Device.

The dynamo is compact, occupying but little room, and its casing contains the automatic switch for connecting the circuit to the battery when the proper charging current is generated, as well as breaking the circuit when the speed of the generator falls below that required. The variable speed of the automobile is provided for by a declutching mechanism, also contained in the housing of the dynamo, and the devices and components of the generator require no attention whatsoever except oiling at stated intervals.

Lamp Loads.

The dynamo provides an ample output of current capable of supplying electrical energy for the largest automobile, and is designed to carry a lamp load as follows:

Two 21 candlepower headlights.
Two 4 candlepower side lights.
One 4 candlepower tail light.
One 2 candlepower dash light.
One 6 candlepower dome light.
One battery ignition system.
One horn.
One inspection lamp.

Additional lamps, such as pillar, running board, etc., may be operated without danger of overloading, as all of these lights are not drawing current from the battery at the same time. The latter will, how-

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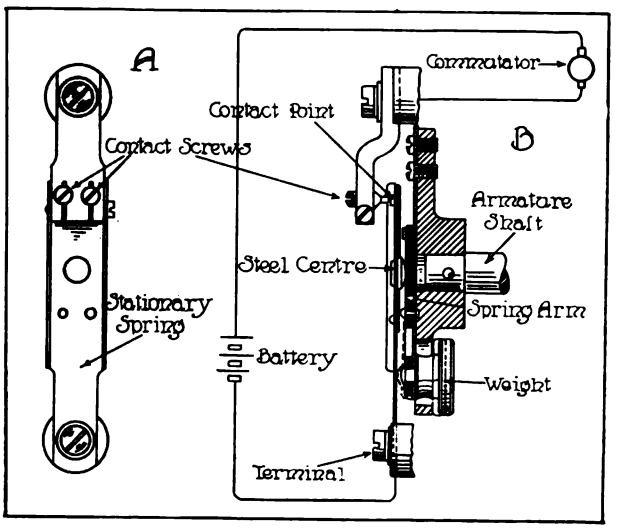


Fig. 45—Automatic Cut-In Device: A, Flat Steel Spring Carrying Contact Member; B, Outlining Principle of Operation by Centrifugal Force, and Relation to Armature Shaft.

ever, permit of the use of these members for a considerable period without overtaxing it as with a 120 ampere-hour battery employed with the Dynalux system, many hours' service is obtained even if the dynamo be inoperative. Lamps of larger candlepower may be utilized if desired, and the many hours of lighting that can be obtained from the battery alone may be computed easily.

For example: With the side and tail lamps, aggregating approximately 12 candlepower or 12 watts, these would consume about two amperes, and the battery would supply current for 60 hours. Even with a group of five lamps, including the headlights, the members could be burned about 15 hours continuously, or two nights. Another feature emphasized by the company is that the current supplied by the battery is steady and that flickering or variation in brilliancy is eliminated.

The Dynalux dynamo, which is presented at Fig. 44, is of the two-pole type, having a plain drum wound armature with a large commutator and ample sized brushes. The field is made up of fine laminations and the field windings are of the differential-compound type. It generates a direct current which is essential for charging batteries, is self-regulating, may be driven from the crank or camshaft of the automobile engine by gears, chain or belt, and its armature revolves at a fairly high rate of speed, the ratio being about three to one. If the armature were rotated at this speed when the motor of the car was operating at its maximum efficiency it is obvious that it would tend to destroy the commutator, and produce undue friction as well as noise in the bearings. To regulate or prevent the armature from attaining high ratios a declutching device is incorporated in a pulley which member actuates or imparts energy to the armature shaft. These members are outlined at Fig. 48, A and B, respectively.

Dynalux Declutching Device.

The former is a very simple arrangement and the result of much experimentation and is so constructed that continuous service does not affect its function. It consists of a star shaped flat spring member provided with four arms. It will be noted in the illustration that the ends of two of the springs are provided with heavy weights and that the remaining extremities are similarly fitted but with lighter members. The ends are bent at an angle so as to force the frictional surface of the clutch like member against the disc. The latter is keyed to the armature shaft and revolves with it. Referring to Fig. 48 B it will be noted readily that the clutch device and housing are a part of the pulley and rotate with the latter.

The tension of the star shaped spring member is so arranged or adjusted that the pulley will drive the armature shaft without any slipping until the latter attains a certain number of rotations; for example, 3000 revolutions a minute. When this speed is reached the heavier weights on the ends of the spring device force their respective spring arms into a straight line releasing the clutch member or breaking its contact with the disc on the armature shaft. The latter continues to revolve, however, because of the other two spring arms.

Slipping of Clutch.

There is a tendency for the clutch to slip at this critical speed and this is increased proportionately

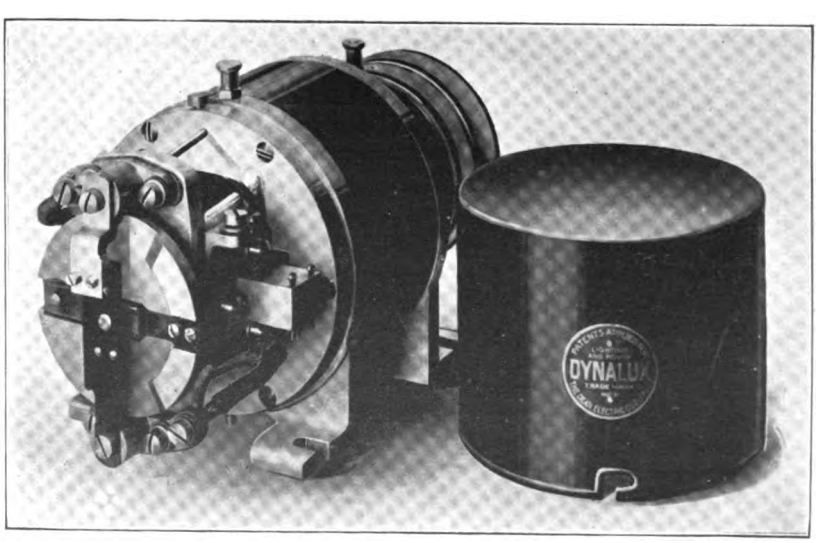


Fig. 46—Dynalux Dynamo with End Cover Removed to Show Accessibility of Commutator and Brushes, Also Brush Cords by Changing Which the Dynamo May Be Driven in Either Direction.

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with that of the pulley until the centrifugal force is sufficient to cause the spring arms carrying the lighter weights to straighten out, when the pulley will revolve freely upon the armature shaft. Any further increase of the speed of the automobile simply rotates the free pulley, and it is obvious with such an arrangement that the armature and its ball bearings are protected from the destructive effect of excessively high speeds, which would be possible were the dynamo positively driven at ratios in excess of those of the crankshaft of the automobile engine.

The function of the different weighted arms on the spring members of the declutching pulley is to bring about an easy disengagement of this member with the disc actuating the armature shaft and gradually accelerate the speed of the latter when that of the pulley decreases, the arms moving into contact and bringing about the desired result. The operation of

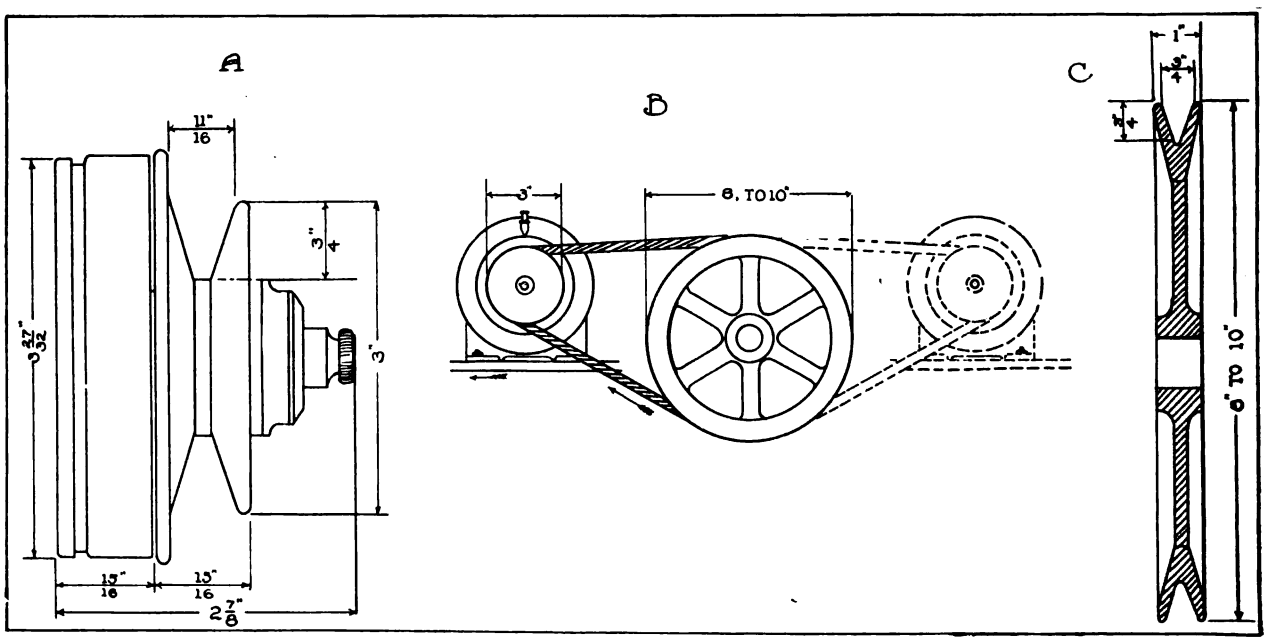


Fig. 47—Driving Mechanism of Dynamo: A, Depicting Driven Pulley and Its Relation to the Declutching Device; B, Method of Installation and Driving with Laminated Belt; C, V Shaped Pulley.

the declutching device is similar to that of the clutch of the motor car, with the exception that the Dynalux performs its work automatically without subjecting its components to stresses. The maker points out that this device is not subject to continual wear as with a constant speed armature with governing devices directly attached to the shaft and that the only friction is at critical speeds when engagement or disengagement takes place. The Dynalux generator is designed so that should the declutching device fail to operate the machine will withstand higher speeds, equally as well as other types not equipped with limiting devices.

Automatic Cut-In Device.

With any type of mechanical generator of electricity utilized to charge a storage battery or supply current direct to the lamps, it is essential that the voltage or strength of the current be controlled and not allowed to flow until a predetermined point has been reached, one in keeping with the battery. It also is necessary that the circuit be broken when the voltage of the battery is in excess of that of the current being generated by the dynamo, to prevent the former from discharging through the latter.

The automatic cut-in device utilized in the Dynalux system for connecting the generator with the storage battery is depicted at Fig. 45 A. It comprises a flat steel spring arm one end of which is attached to a disc which is keyed to the armature shaft as shown at B. The free end of the spring is provided with a weight which is so proportioned that it has a tendency to swing to the left when the centrifugal force reaches a point where it is sufficiently powerful to overcome its tension. The motion is imparted to the stationary part of the spring through the hardened steel centre. The former is provided with a pair of contact members on its free end, which closes the circuit against a pair of contact screws when the armature shaft attains a certain speed. When contact is made the current generated flows through its proper channels to the storage battery. The construction and adjustment of the cut-in device is such that when the dynamo develops a voltage of approximately 6.5 volts, the contact is made and the battery is in circuit.

It is stated by the maker that as the battery is approximately of this voltage, there will be no destructive arcing at these points when connection is made or broken. The governing mechanism is adjusted accurately at the factory, and after being tested its parts are locked securely. It is also claimed that the device will operate continuously without any at-

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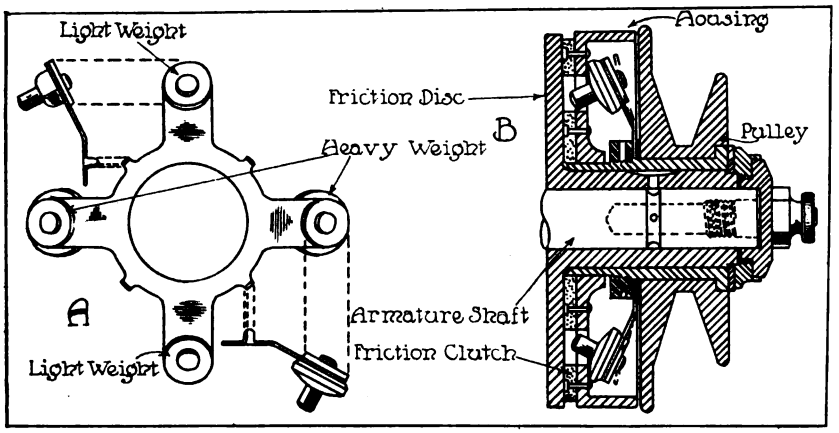


Fig. 48—Declutching Device Regulating Speed of Armature: A, Star Shaped Spring Carrying Light and Heavy Weights and in Contact with Friction Disc; B, Showing How Driven Pulley Is Engaged and Released.

tention whatsoever, being automatic in its action.

Current is collected from the commutator on the armature shaft by means of liberal sized brushes and these may be removed easily for inspection by taking out cotter pins on the outside of the brush holder, when the brush and spring may be completely withdrawn. These members and the cut-in device are located in the casing and are accessible by removing the cylindrical end cover which with the components is depicted at Fig. 46.

Method of Driving.

As previously outlined the Dynalux dynamo may be driven by gear, chain or belt, and in installing, it should be so mounted that there is no relative motion between the driving member and the supporting bracket, such as would be possible if the dynamo were mounted on the main frame of the automobile and the driving member on the motor proper. When belt drive is utilized adjustment must be provided as well as means incorporated for locking the same securely after setting. Spring tension is not suitable for taking up any slack in the belt in the type of drive recommended by the maker, which is a V shaped member of laminated chrome leather.

Its design is such, the maker maintains, that it will not jump off the pulleys in service, is not susceptible to water, oil or grit, and will withstand a temperature up to 160 degrees, Fahrenheit. Its laminations are riveted together so that the links may be removed to compensate for any slack and thereby keep the dynamo within the limit of about .75 inch adjustment. Fig. 47 B shows the details of the drive including the driving pulley as well as the driven member on the dynamo. The relative location of the declutching device and its relation to the driven pulley is outlined at A, and the diagram also gives the dimensions of these components.

Compactness of Dynamo.

In designing the Dynalux dynamo the company has taken into consideration the fact that the construction of many power plants of the motor car does not lend itself readily to the installation of a large sized machine. Therefore, it has sought to produce a simple and reliable dynamo which can be applied easily to existing models or fitted to new machines without altering or rearranging their mechanism. The dynamo and its outside dimensions are given in the diagram at Fig. 49 and it is stated that the weight of the instrument is slightly less than 18 pounds without pulleys. Its compactness will be noted, being 5.5 inches in diameter and about 10.5 long. All working parts are fully enclosed and protected against dirt, dust or water, and the material and workmanship throughout are of the highest quality.

High grade annular ball bearings are employed, of liberal size, these insuring long life and quiet operation. When mounted under the hood it is stated that it is practically noiseless. Each dynamo is assembled and tested carefully and it is claimed by the maker that its construction is such that the components cannot jar loose or its operation become affected by the vibration of the power plant or shocks produced when the vehicle is traversing rough roads.

Wiring and Installation.

One of the features of the wiring is its simplicity. It will be noted that but two wires lead from the dynamo to the battery, and as has been previously pointed out, these may be connected to either terminal of the latter. Provision is made for the operation of the armature shaft of the dynamo in either direction; that is, clockwise or anti-clockwise. This is depicted at Fig. 50 which shows the location of the two

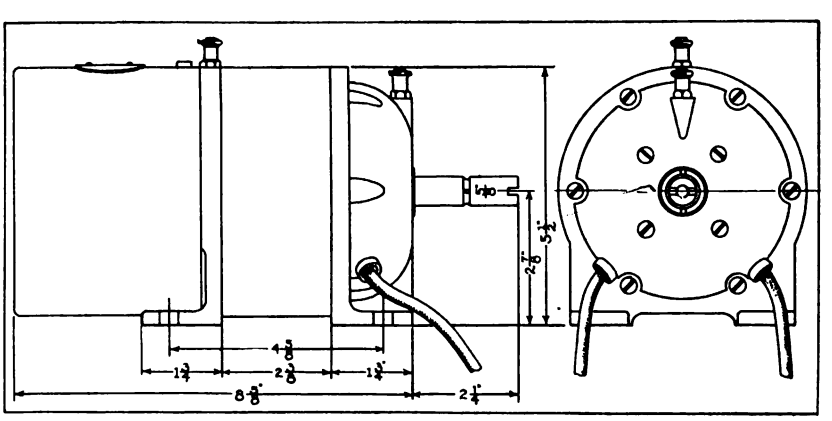


Fig. 49—Depicting External Dimensions of Dynamo Which Is Compact and Constructed of High Grade Material.

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wires or brush connection members. These are colored green and black to facilitate identification. If the dynamo is to be operated in a clockwise direction, looking at the pulley end, the leads are connected as shown at A. If to be driven in an opposite direction the brush cords are attached as illustrated at B. This arrangement permits of installing the dynamo on either side of the motor and taking the drive from the crank or camshaft as desired.

The wiring diagram makes provision for a group of five lamps including two head, two side and a tail light, and by the utilization of a junction box it is possible to operate dash, inspection and dome lights as well as an electric signalling horn. It will be noted that the leads from the dynamo are connected directly to the terminals of the storage battery and not to the junction box or intermediate points in the lighting circuits. The latter are directly connected with the terminals of the battery, and the company points out that by this simple method of wiring danger of

sible short circuits, but can be attached neatly and securely to the chassis by metal saddles or straps.

Care and Maintenance.

The maker of the Dynalux claims that it is a very simple matter to remove the storage battery if a defect should occur in it, as it is not necessary to connect the wires in any predetermined direction, and the new battery will be charged properly with the leads from the dynamo attached either way. As a usual thing the automobilist is warned in advance of a reduction in the battery's capacity, affording ample opportunity to have the member overhauled and replaced. The commercial lighting battery is so substantially constructed that it will withstand the jar and vibration of motor cars for long periods without the necessity of removing it, except for overhauling, and at such times the car is not in service. By keeping the plates covered with distilled water, and observing the general rules of the maker, it is pointed out that storage batteries will give efficient service.

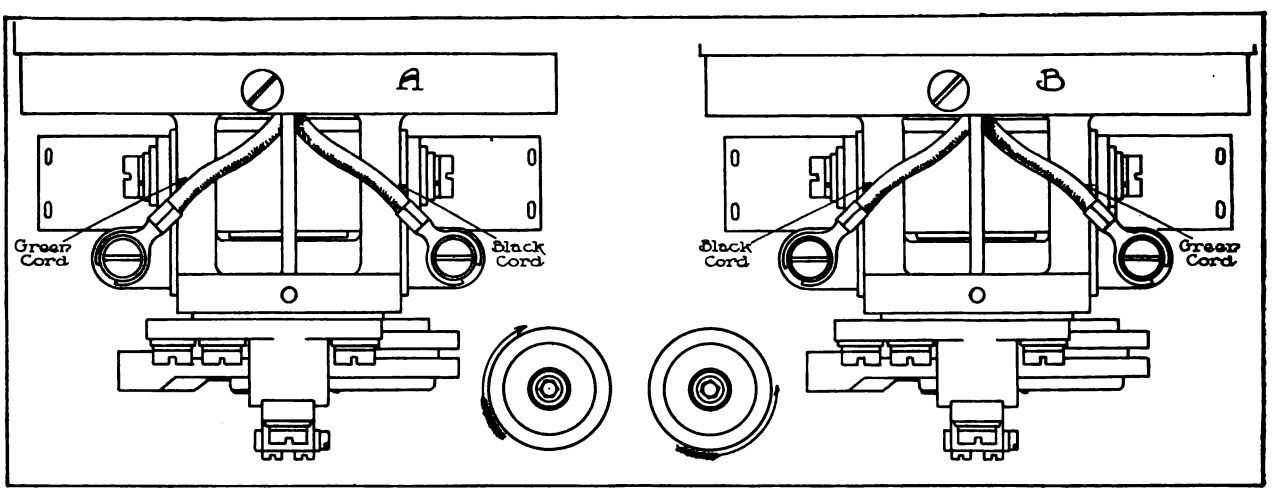


Fig. 50—Outlining Pulley End of Dynamo with Colored Brush Connecting Cords and Their Location When Armature Is Driven Clockwise as at A, and Anti-Clockwise as at B.

overloading the lamps is avoided. The lighting and other circuits of any standard approved design, such as are installed for the straight storage battery system, may be employed, this permitting the purchaser to wire his machine to best suit his requirements and to utilize any type of switch for controlling the lamps.

Battery.

The battery recommended for use with the Dynalux is one especially designed for lighting purposes, a 100 or 120 ampere-hour member, the latter being favored because of its greater reserve capacity for maintaining the lights for long periods when the car is not being operated. It should be of six volts and as with other electric lighting equipments the utilization of an ignition battery is not advisable, but the battery for furnishing current to the lamps may be used for ignition purposes. In connecting the dynamo to the battery the maker suggests the use of circular loom or similar material to convey the leads as the tubular conduit not only protects the wires and prevents pos-

If the automobile is to be run for any length of time without the battery in service, it is advisable to remove one of the dynamo brushes, so as to relieve the charging circuits from electrical potential, thereby avoiding possible damage from accidental short circuiting of the wiring of the car. The brush may be removed easily by taking off the cover of the dynamo and slipping out the retaining pins and brush.

The only possible adjustments are those of the contact points and commutator. If at any time the surface of the latter should become rough it can be polished quickly by holding a fine sandpaper, not coarser than 00, on the revolving member by means of a small, flat piece of wood. This is standard electrical practise. Emery paper should not be utilized as the grit will imbed itself in the copper of the commutator, acting as an abrasive and will rapidly destroy the brushes. Regarding the contact points it is only necessary to see that these members do not touch each other when the machine is not in operation

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or when the armature is revolving at a speed slower than that required to charge the battery. However, these members are adjusted properly at the factory, and barring accidents on an overhaul of the dynamo, will not require attention. The Dean Electric Company guarantees the Dynalux against electrical and mechanical defects and claims that the instrument is so substantially constructed that it will outlast any car to which it is fitted.

(To Be Continued.)

IMPROVED HIGHWAYS FOR IOWA.

Iowa is planning to take an even more active part in the good roads movement in the future than in the past, and the boosters are co-operating with Illinois organizations. A meeting of delegations from various Iowa cities is to be held in June, at which representatives of points along Illinois roads which lead to Iowa will be present, and it is expected that the results will be seen in better highways between the two states. The Iowa Transcontinental Automobile Route Association is quite active, and expects to hold a meeting in Cedar Rapids in the near future.

WINS VERDICT FOR POOR ROAD.

A case of considerable interest to automobilists was decided recently in South Norwalk, Conn. H. G. Andrews of New York City sued the Connecticut town for damages to his machine caused by a poor road. It seems that in 1910, while driving over a road in South Norwalk, he suddenly ran into a rocky spot, and before he could slow down the machine it had been badly damaged and he and his wife, who was ill, were considerably shaken up. It was shown that he was driving with the proper care, and that the road was in such poor condition as to be dangerous even when great caution was observed by those familiar with it. A verdict was given for $350, the town being held responsible for the road and consequently for the damages of the automobile.

BRAZING AND SOLDERING.

The Norman W. Henley Publishing Company, New York City, has just issued a new booklet, "Brazing and Soldering," by James F. Hobart. This is a handy little book that will be of much value to both the amateur and the professional repair man. All methods of brazing are thoroughly covered, with the use of the apparatus, and details of special fittings which render the operation easier. The construction of a home made brazing furnace is described, and formulae for making brazing alloys of varying hardness are given. In that part of the book devoted to soldering all the methods and tricks of operation are described, detailed instructions being given. A part that should prove especially valuable is the section devoted to special methods for various jobs, such as on electrical wires, tin plate, galvanized iron and zinc, lead, aluminum, etc. The composition of solders is thoroughly covered, a large number of formulae for various work being given. Fluxes for different metals are also covered. The book contains many practical hints or kinks which make work easier or quicker. The company has also just issued a book by Thomas W. Poppe on House Wiring, covering all the particulars of wiring a house for electric lighting.

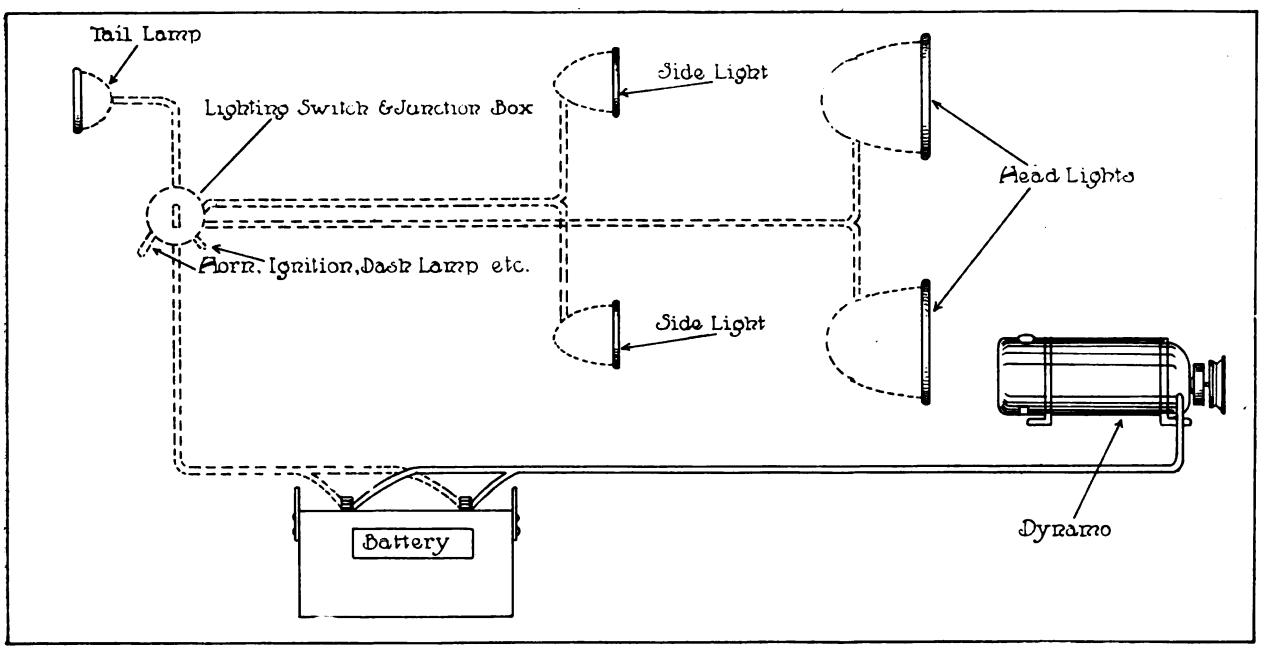


Fig. 51—Wiring Diagram Making for Simplicity as Leads from Dynamo May Be Attached to Either Terminal of Battery, the Latter Supplying Current to the Lamps.

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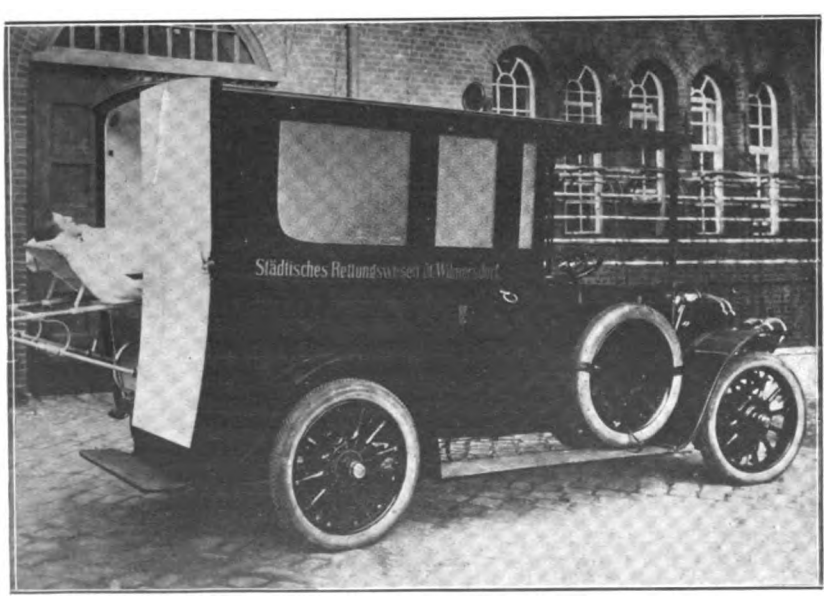
Opportunity is afforded in the accompanying illustrations to compare the construction of ambulances produced in Europe with those made by the leading manufacturers in America for export. The picture on this page presents the latest type installed with the fire department in Berlin, Germany, and it may be stated that this is the first installation of this character in the German capital. The other views depict machines recently shipped by the Pope Manufacturing Company, Hartford, Conn., and the Knox Automobile Company, Springfield, Mass.

It will be noted that the German chassis follows standard lines and is equipped with pneumatic tires of liberal dimensions, thus affording easy riding qualities. Of course, in this respect there may be little difference between the machines produced in America and abroad. The principal distinction between this vehicle and those of American manufacture lies in the body work and its appointments.

The German car is entered both from the side and rear. The illustration shows the method of removing the patient. Two cots are provided, one above the other, and space is left at the side for the surgeon and attendants. The rear door does not expose the entire interior, but only such portion as will admit of easy handling of the patient from the outside. The surgeon must utilize the side entrance.

With the Pope-Hartford ambulance, which is in service in Rio de Janeiro, Brazil, the roof and inside walls are finished in mahogany, with doors on either side and double doors at the rear. These latter have double locks, operated either inside or out, and each door has a plate glass window, beside those in the side walls. Ample room for the surgeon and attendants is provided and the arrangement of windows is such as to afford the fullest possible admission of light and air.

The Knox, which was designed especially for export, has two compartments behind the driver's seat, the forward end having a door at either side, also a folding seat for the use of the surgeon. This compartment serves as a side entrance to the rear end, and opens directly into the latter without an intervening door. Directly behind the partition at one side are two cots, one above the other, each supported on springs and each of the folding type adjustable to any angle. Below the lower cot is a large locker for the convenient storage of medicines, etc. Two folding seats are provided for the surgeon and attendants, and between them on the opposite side from the cots, is arranged a neat folding hot and cold water outfit, with sink and drainage to the outside of the car. The interior is finish in pure white enamel, and is lighted by electricity.



First Fire Department Ambulance Recently Installed in Berlin, Germany.

★

The Geneva section of the Swiss Automobile Club is organizing a hill climb for May 12, over the course leading from Gilly to Bur-

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Pope-Hartford Ambulance in Service with the Brazilian Government at Rio de Janeiro.

tigny, the hill being a little over two miles long with an average grade of about 14 per cent. There will be events for three classes of motorcycles, rated according to their cylinder capacity, five for cars driven by amateurs and five for professional chauffeurs.

★

Prince Raschid Ben Ajad of Turkey was a recent visitor at the headquarters of the Hungarian Automobile Club, Buda Pesth, for the purpose of arranging for an international automobile tour from Buda Pesth to Constantinople and return, the object being to interest people along the route in the countries traversed in the advantages accruing from the use of motor vehicles. The club is now laying plans for the event, for which the Turkish government has promised to award satisfactory prizes. The tentative route leads from Buda Pesth to Klausenburg, Bucharest, Tirnowo, Constantinople, Jalowa, Adrianople, Sophia, Nisch, Belgrade, and back to Buda Pesth. A stop of two days is planned at Jalowa, a favorite seaside resort for Europeans, where the tourists are to be the guests of the Turkish promoters. No date has been set as yet.

★

The seventh annual Targa Florio road race over the Tour de Sicily course, Palermo, Messina, Catane, Syracuse, Terranova, Girgenti, Marsala, Trapeni and Palermo, Italy, will be held May 26. The distance is 700 miles, and as the cars are to be driven constantly, two drivers are permitted. The contest is open to all types of cars, the only stipulation being that they shall have two seats, side by side. The winners of past events are: Cagno, Itala, 1906; Nazarro, Fiat, 1907; Trucco, Isotta, 1908; Cuippa, S. P. A., 1909; Cariolato, France, 1910; Ceirano, S. C. A. T., 1911.

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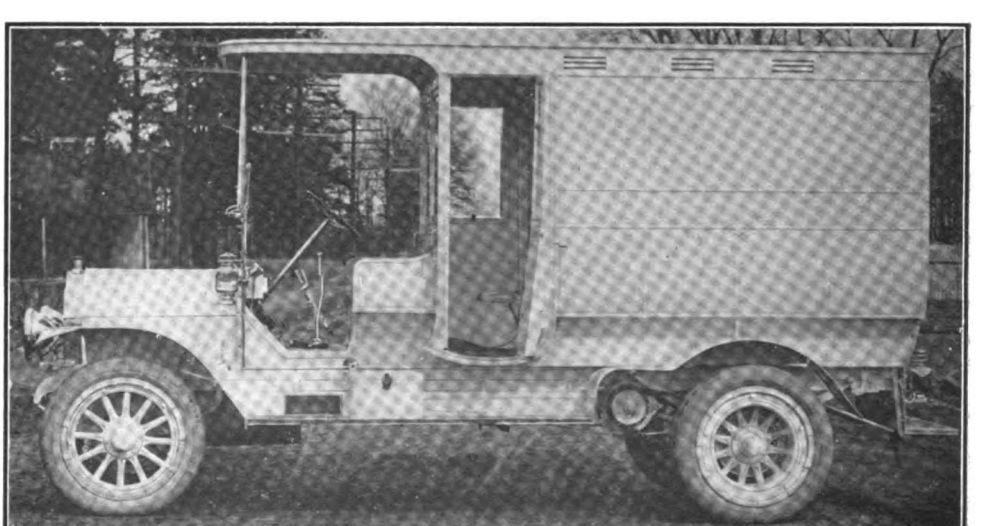
The opening meet on the Brooklands track, Weybridge, England, last month, was the first held under the new classifications of the Royal Automobile Club. G. C. Pullin in his air-cooled Cameron car, made in America, was successful a second time, it being remembered that he won with this machine in the last meet of the 1911 season. The summary of results follows:

Easter private handicap, 5.75 miles—First, N. Hardy, Vauxhall; second, McL. N. Straight, S. C. A. R.; third, E. Horniman, Benz; speed 54 miles an hour.

Third 100 mph handicap, 5.75 miles—First, A. Cumming, Mercedes; second, Gordon Watney, Mercedes; third, G. L. E. Geach, Mercedes; speed. 71.5.

Second 70 mph handicap, 8.5 miles—First, G. C. Pullin, Cameron; second, Percy Lambert, Vauxhall; third, G. W. Hands, Calthorpe; speed, 61.75.

Mercedes, handicap, 8.5 miles—First, W. Dewis, Mercedes; second, A. Cumming, Mercedes; third, Gordon Watney, Mercedes; speed, 80.25.



Latest Type of Ambulance Produced by Knox Automobile Company for Export Trade.

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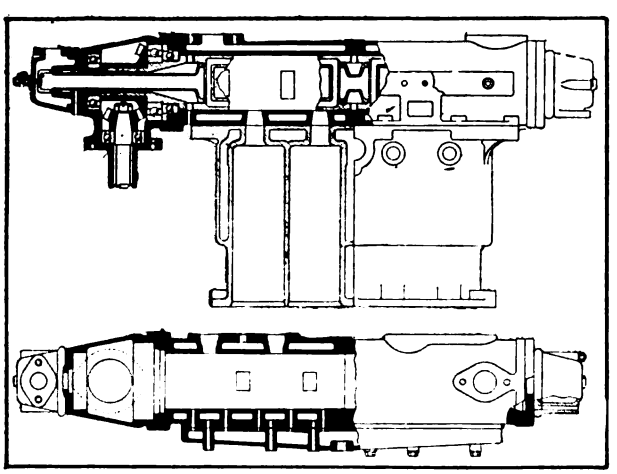
Third long handicap, 8.5 miles—First, H. A. Arkwright, Benz; second, G. L. E. Geach, Mercedes; third, F. R. Samson, Mercedes; speed, 90.

Third short handicap, three miles—First, G. W. Hands, Calthorpe; second, G. C. Pullin, Cameron and McL. N. Straight, S. C. A. R., tied; speed, not given.

Easter spring races, two miles—First, H. A. Arkwright, Benz; second, Gordon Watney, Mercedes; third, Percy Lambert, Austin; speed, not given.

★

Application for space in the exhibition of road construction and maintenance machinery and appliances to be held in the Royal Horticultural Society's hall, Vincent square, Westminster, S. W., London, England, during the progress of the third international road congress in that city in 1913, should be made to W. Rees Jeffreys, honorable general secretary, the Road Board, Queen Anne's Chambers, Westminster, S. W. It is anticipated that many manufacturers will desire to take advantage of this opportunity of bringing their products to the attention of engineers, surveyors and individuals engaged in the public administration of highway improvement, care and maintenance, who will be in attendance upon this congress, either as delegates or as visitors.



Sketch Presenting Sectional Elevation and Plan of Castiglione-Bolton Engine.

★

Afghanistan is shortly to join the ranks of the good roads countries, the Amir, who owns a large number of cars, having ordered the construction of some 10,000 miles of improved highways. It is understood that this new system will cover practically the entire country and involve considerable mountain work. At present there are hardly 10 miles of road in Afghanistan suitable for automobile travel, and it is not at all surprising that the Amir should have decided upon this undertaking.

★

Capt. Charles D. Hope, R. F. A., of England, has decided to utilize a trailer in making short tours in his Arrol-Johnston car during the coming summer. The trailer may not present an attractive appearance but Capt. Hope expects it will prove useful. It consists of a shallow box or tray mounted on two full elliptic springs which in turn are carried on a plain axle fitted with solid rubber tire wheels. The coupling is composed of two stout iron draw bars attached to the forward part of the tray and welded together at their converging point into a dowel pin which drops into an eyelet on the rear framework of the car.

★

Another interesting rotary valve engine has made its appearance in England, the invention of E. J. Castiglione and a man named Bolton of Carlisle. The principal features are brought out in the accompanying illustrations, one of which presents progressive cross sections of one-half of the valve, this portion serving two cylinders only, the extension performing the same functions for the other two. The sketch outlines a part sectional elevation and plan of the motor.

Briefly, the idea of the design is to have a single rotary distributor serving all four cylinders in the usual manner, but a single rectangular port is provided at the top of each cylinder head, and valve pockets are done away with entirely. Thus there are four cylinders, provided with the usual ignition gear, with more or less hemispherical combustion chambers, and each with a single orifice through which the fresh gas must be taken and the exhaust expelled.

The purpose of the distributor, therefore, is to connect each cylinder with the intake and exhaust manifolds at the proper time in the cycle of operations, and this is accomplished by the rotary valve with internal passages. In the accompanying illustration, 8 and 9 show that there are three chambers within the valve itself, the outermost containing cooling water. A and B are ports which serve the same cylinder, registering in turn with the single port in the cylinder head. The holes C C both communicate with an exhaust opening in the casing, so that when B is registering with the rectangular hole in the cylinder head, C in the lower half is registering with the exhaust outlet. When the valve turns around so that A registers with the cylinder port the mixture enters through D, passes through the little chamber and into the cylinder. E is the inlet port for the second cylinder.

The view at 7 is that of the complete valve for the two cylinders. The same thing is true of the view at 1, except in this case the distributor has been cut into sections, which will be explained as follows: The section at 2 presents the exhaust ports and corresponds to C in 8 and 9. It will be seen that there is no dividing web on this section, the central opening being the end of the exhaust passage, which runs along the valve. Two ports are shown at 3, one communicating with the exhaust passage and the other with the inlet, these corresponding to A and B in 8 and 9. The view at 4 is a section between the ports and merely shows the passages. The two inlet open-

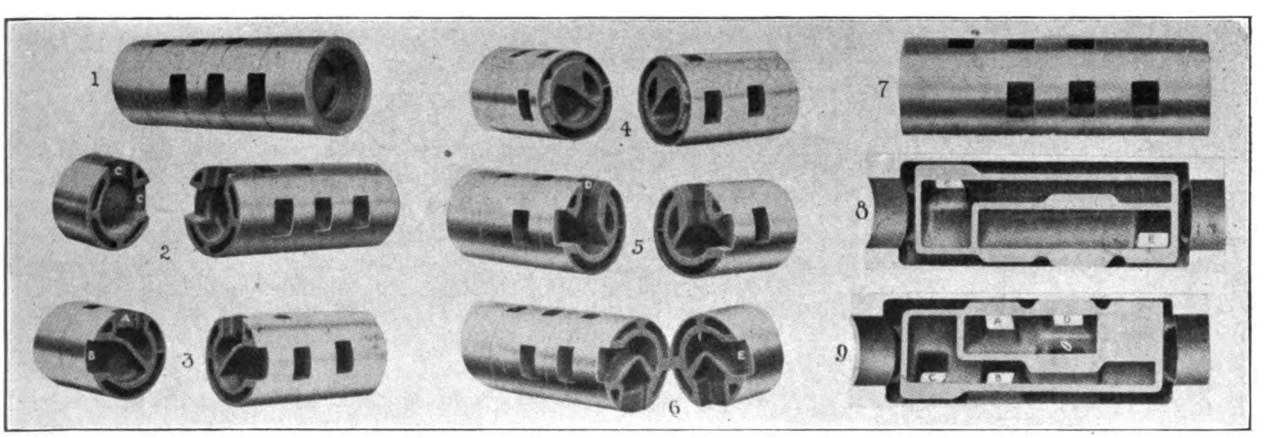
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ings are to be seen at 5, one of these corresponding to D. The view at 6 shows the two openings for the last cylinder, corresponding to E.

The sketch not only presents the general arrangement indicating the method of rotating the valve by bevel gears, but shows the manner in which water is introduced. Attached to each end of the valve is a brass funnel shaped pipe, which runs through a gland into a pump supplied jacket. Lubrication is by means of small holes in the valve casing.

★

For the first time in the history of automobile racing, Knight engined cars will be pitted against numerous others employing the poppet type of motor in the French Grand Prix next month. Naturally the result will be awaited with considerable interest. The entrants include Daimler, Panhard and Mercedes cars, each equipped with the invention of Charles Y. Knight of Chicago. It may be added that the first trophy won by a Knight engined car was that taken by a Minerva in the recent reliability tour from Christchurch, New Zealand. Laurin & Klement of Austria has been added to list of Knight licensees, bringing the total for the Continent and Great Britain to seven.



Sectional Views of the Distributor Valve in Castiglione-Bolton Rotary Valve Motor Recently Brought Out in Great Britain.

★

The Benz and Daimler firms in Germany have been disputing the honor of producing the first gasoline automobile. The trouble was started March 4, when the Daimler works at Untertuerkheim closed down to celebrate the 25th anniversary of the gasoline car, a Daimler, of course. The Benz people protested that the anniversary was two years late, and that the first gasoline machine was not a Daimler, anyway, but a Benz. According to this concern, the first automobile left the Benz factory in 1885, and is now in a museum in Munich, with copies of its patents, issued in 1886 and 1887. This antedates the first Daimler by two years, Gottlieb Daimler having driven his first car March 4, 1887, although two years before that he had driven a tricycle by means of a gasoline motor.

SCIENTIFIC AUTOMOBILE LUBRICATION.

An interesting and important contribution to the subject of correct automobile lubrication is to be found in a booklet recently published by the Vacuum Oil Company, Rochester, N. Y., maker of Gargoyle Mobiloils. Following the policy of this concern in adapting the lubricant to the condition under which it operates, this maker has spent considerable time in studying all of the cars constructed in America, as well as the foreign machines sold here, special attention having been paid to the matter of fitting piston rings, feed systems and other mechanical factors which enter into the matter of selecting the type of oil best suited to the needs of the particular motor.

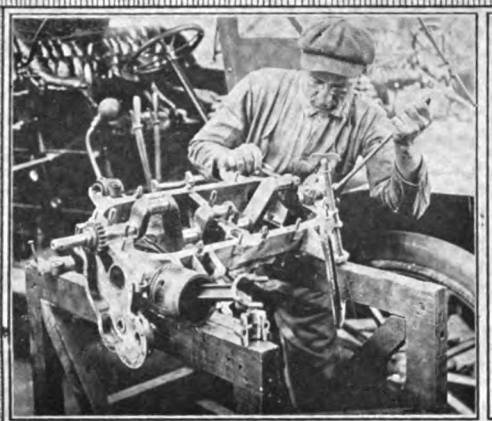
This investigation showed the necessity for several grades of oil to provide the most efficient lubrication for the varying types of cars. In order to furnish this information in concise form, a complete chart of recommendations has been prepared, setting forth the exact grade of Mobiloil which will best meet the needs of any given machine. This covers all makes and models from 1908 to date, and the information has authoritative backing, coming as it does, from the concern which supplies lubricants not only to automobilists, but to three-fourths of the battleships and ocean liners afloat. A copy of the booklet and chart may be obtained by addressing the New York office of the company at 29 Broadway.

CARNEGIE SCHOOL ADDS AUTO COURSE.

The Carnegie Technical Schools at Pittsburg, Penn., have added a course in automobile engineering to the curriculum. The new department will be under the dean of the School of Applied Design, and will be conducted in Machinery hall, a large building now under process of construction.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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MECHANICAL NOTES FOR OWNERS

Methods of Simplifying the Care and Maintenance of the Car, Discussion of Pertinent Facts and Notes on Operation.

EFFECT OF AIR UPON MIXTURE.

Of the important components of the power plant the carburetor is, perhaps, more often blamed for irregular operation of the motor than any other, particularly at low speeds. The average motorist desires that his car shall operate smoothly when the motor is throttled down to a few miles an hour as when in heavy traffic on the high or direct drive, as well as have plenty of power when driving at high speeds on the country roads. In changing gears the speed of the motor is an important factor, and with some cars

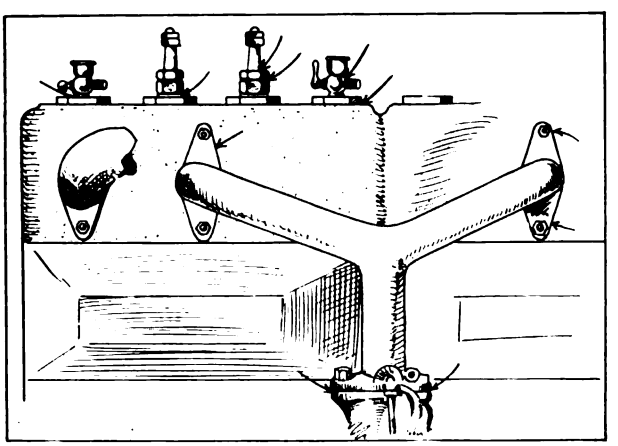


Fig. 1—Outlining How Auxiliary Air May Be Present, and Possible Causes of Lost Compression.

it is difficult to shift from first to second or come from high into the second or low without a clashing of the pinions, if the motor cannot be throttled so as to overcome the inertia of the flywheel.

It may be that the carburetor is so adjusted that the motor will throttle nicely, but upon higher speeds there is too rich a mixture, causing heating and faulty operation. And if the vaporizer be adjusted to the higher speeds the motor may skip at low, in which case misfiring disappears when the throttle is opened and the speed of the car is increased. Under such conditions the motorist is prone to condemn the carburetor.

When a car is new and the carburetor adjusted properly the motor will throttle nicely and respond to acceleration. In time and so gradually that it is hardly perceptible, wear takes place where the valve stem comes in contact with its guide and bushing, allowing auxiliary air to enter, and the mixture is weakened thereby particularly at low speeds. The amount of mixture drawn into the cylinder depends in addition to its size, upon the suction of the piston. If the latter and its rings fit properly and no leaks exist, the cylinder will receive a full charge of vapor.

When the mixture is being drawn in the exhaust valve is closed and the vapor passes from the carburetor through the intake pipe into the cylinder when the intake valve is open as depicted at Fig. 2, which also shows auxiliary air passing between the valve stem and guide, a condition due to excessive wear. Under these circumstances the mixture is diluted and it is obvious that unless the carburetor be adjusted to supply additional fuel the operation of the motor will be affected. The mixture will be too rich at high speeds although if the carburetor be provided with double jets it may be set to compensate for an ordinary amount of auxiliary air.

If the bushings are removable new ones should be fitted and the valve stems trued up. If the latter are worn badly it will be advisable to fit new stems and bushings. Where the guides are integral with the cylinder these will have to be rebored and new valve stems turned out to fit. At Fig. 3 is shown a method of repairing a leaky member. It will be noted that auxiliary air passes between the valve stem and guide, the arrows and dotted lines showing air being drawn in and the space caused by wear.

A method of preventing the admission of air and one that has the advantage of being adjustable, is presented at B. The guide member is threaded to take a cap or stuffing box which is fitted with a well lubricated packing compressed into the recess of the guide, and when this is expanded it closes the aperture. One

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will be required for each cylinder and if the exhaust leaks badly it can be similarly treated. The latter, however, does not affect the mixture as the valve is on

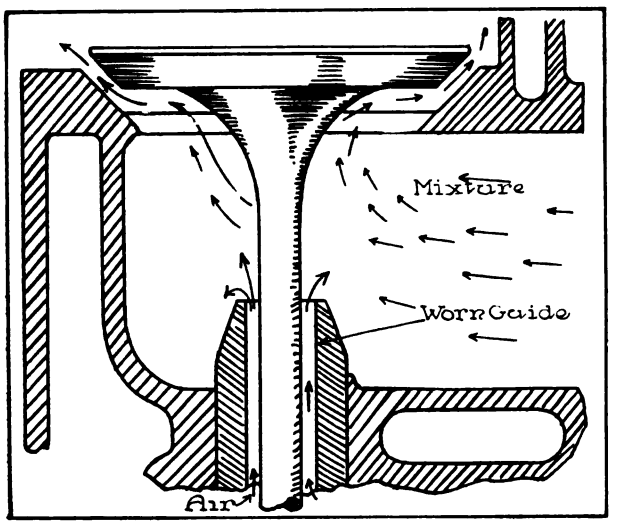


Fig. 2—Worn Valve Guides and Stems Allow Auxiliary Air to Weaken Mixture Causing Erratic Operation of Motor at Low Speeds.

its seat when a charge is being drawn into the cylinder.

Other components may allow auxiliary air to reach the mixture such as the connections between the carburetor and the intake manifold as illustrated at Fig. 1. In removing the vaporizer for cleaning or repairs, and if an asbestos gasket has been utilized and fastened with shellac, the material is apt to become damaged in the operation. If the carburetor be replaced without making a new gasket and is not snug, air will find its way as shown by the arrow in the drawing. The point at which the intake manifold is attached to the cylinders is another place where auxiliary air may enter if the connections are not tight.

While dealing with the effect of auxiliary air upon the mixture the loss of compression because of improperly adjusted spark plugs, valve caps, etc., should be considered. In cleaning a badly sooted plug some motorists make it a practise to dismantle it and in the reassembling fail to get the member gas tight. Valve caps may leak although apparently screwed down tightly. The priming cups threaded into the valve cups may disclose a leak when tested. If several of these members leak the compression of the motor is affected as well as power impaired.

These parts may be tested by filling with oil the crevices indicated in the drawing when the motor is running. If any leaks exist they will be noted by the lubricant bubbling. The loose members should be set up and again tested until tight. Shellac should not be employed to make tight joints as the parts are liable to freeze and make removal difficult. Graphite or some material not affected by the heat is best and may be employed on gaskets which will permit the latter to be taken off without injury.

HANDY HOME MADE GAUGE.

There are a number of tools about the garage which may be converted into useful members after they have become broken. Old files are made into bearing scrapers, or cotter pin extractors, etc. Very few owners save broken hacksaw blades, especially if the pieces be small, but even these may be converted into a handy tool. At Fig. 4 is outlined how a motorist utilizes a small piece of an old hacksaw blade. The piece was about 1.5 inches, and upon measuring its thickness it was discovered to be exactly .03125 inch.

This was the right gap for the spark plug and was employed when setting the points as shown at C. The motorist also noted when adjusting the lift of the valves that the space between the tappet and valve stem was .03125 inch so the tool served for adjusting these members without utilizing the marks upon the flywheel. As his car was equipped with a magneto, it was essential that a rule be employed in setting the gap of the magneto plugs. This was solved by grinding one section of the blade to .015625 inch, as indicated at B. The rough ends were smoothed up on an emery wheel and the teeth removed. The device could be drilled so that it might be attached to the key ring. It is further suggested that two or more of these members could be fastened together which arrangement would provide a measuring gauge ranging from .03125 up to .125 inch.

FITTING DEMOUNTABLE RIMS.

The practicability of demountable rims appeals to many motorists who are changing over their wheels, a process which may require the building up of the felloe or some slight alterations. In removing and

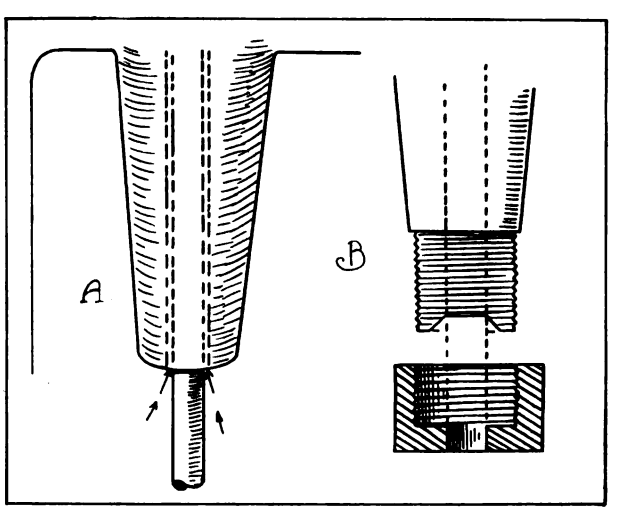


Fig. 3—How Valve Guide Integral with Cylinder May Be Fitted with Adjustable Stuffing Box Device.

fitting the new members the new wood is primed; that is, given a coat of filler material by the blacksmith or wheelwright. The color is usually pink which does

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not harmonize with the finish of the automobile.

It is not necessary to send the wheels to a paint shop as the work may be performed by the operator. The priming coat is first covered by a coat of lead which, when dry, is smoothed up with curled hair, after which the color varnish is applied and finally one or more coats of finishing varnish. These materials may be procured at any carriage paint shop to which the car should be driven so that the head painter will be able to match the colors. Before applying the finishing varnish the rubbing coat should be treated with curled hair. Sufficient time should elapse between each coat to insure that the material has become hard.

FITTING NEW BRAKE LININGS.

In time brake linings wear until they will not grip properly even when adjusted to their limit for expansion. It then becomes necessary to replace the

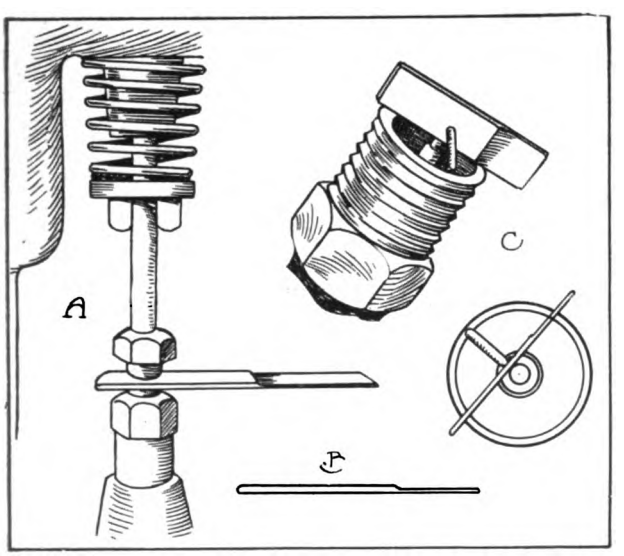


Fig. 4—Combination Measuring Tool, Constructed from a Piece of Old Hacksaw Blade and Depicting Some of the Uses to Which It May Be Put.

worn material with new, and while this may appear to be a simple operation it is one requiring attention to small details usually overlooked by the novice. When the wheel drums are constructed for internal expanding and contracting brakes, the thickness of the friction material utilized for the expanding members should be ascertained before purchasing.

If this information cannot be secured the space will have to be measured and before this is attempted the brake pull rod should be disconnected so that the expanding cam is in normal position. It should be remembered that the brake has been adjusted to obtain the maximum leverage of the cam and that a readjustment will be necessary with new linings. In measuring for new lining allowance should be made for clearance between the material and the brake drum when the friction bands are in a normal position.

The lining varies in width from one inch by quarters to 2.5, and is also made three and four inches. The thickness is .125, .15625, .1875 and .25 inch, the intermediate sizes being most generally used. To remove the old lining the brake band should be gripped in the vise and the peined over rivet heads cut off with a cold chisel, taking care to hold the latter so that the rivet will be cut off close to the brake band yet not cutting the latter. The rivets may then be driven out with a punch although they usually will come away with the lining.

In fitting the new lining it should not be wider than the band and should be lined up on the band before drilling the material for the rivets. Soft copper rivets, about the thickness of the lining and band should be used. These are inexpensive and a few cents will purchase enough for several sets of brakes. The lining should be countersunk deeply so that when the material wears the heads of the rivets will not be exposed, as these members will not produce friction enough to hold the wheels. The rivets should be driven in hard and peined over on the underside of the band. By gripping a punch in the vise and resting the head of the rivet upon the punch, the copper may be peined easily without the rivet slipping back and the lining will be drawn snugly upon the band at the same time.

In replacing the bands the springs should be examined and if these have lost their elasticity should be replaced with new members. In adjusting the brake pull rods they should be set so that the brakes grip firmly and hold the car but not so that they bind and heat the drums. The latter should be examined after a short run to note if undue friction be taking place. The contracting type of brakes does not require other attention than to see that they do not bind. The external type is easily taken care of and adjusted without trouble.

TREATING CORRODED TERMINALS.

The general use of magnetos is apt to make the present day automobilist careless regarding the storage battery when this member is utilized for starting purposes. Some types of storage batteries are more liable to sulphuration than others, this depending upon their construction and method of placing in the car. An instance of failure to start upon the battery, although it had been charged but the day before, was noted by the writer recently.

The owner had been cranking for some time and had the floor board out and hood raised searching for a short circuit or loose connection. The leads appeared to be intact and the battery when tested with a voltmeter showed six volts. The leads to the battery were also snug and the outside of the terminals were fairly clean. Upon removing these members they were found to be corroded, preventing the current from flowing because of the non-insulating accumulation. When scraped, cleaned and replaced, the

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motor started on the switch. Storage battery terminals should be examined from time to time, cleaned and covered with vaseline or some acid resisting material.

DANGER OF GARAGE GASES.

Owners who have objected to the cold and barn-like atmosphere of their garages and wanted to close doors and windows should take heed of the case of James Bavaird in Eau Claire, Wis. He was found suffocated in a barn which he used as a garage, the atmosphere being full of carbon monoxide and dioxide.

It appears he had gone into the barn to repair a tire and had left the engine running, probably for warmth. Working close to the floor, the gases, which are heavier than air and had accumulated there, asphyxiated him, with two cows and 50 chickens. The gases finally became so thick and the oxygen so reduced that the motor stopped.

All garages should be well ventilated, and provision should be made to take air from the floor as well as the ceiling. Many a man who feels sleepy while working under a car and lays it to the fact that he is lying on his back, is under the influence of the gases from the motor.

CAUSE OF MYSTERIOUS KNOCK.

An owner was annoyed by a mysterious tapping sound in the motor and although he made a diligent search, failed to discover the cause. Taking the machine to an expert the latter was puzzled for a short time until he noted that one of the plugs was of a different type than the others. In questioning the owner it developed that he had tried the plug upon the advice of a friend who recommended the use of a long barreled member so that the spark would take place well down in the cylinder. The plug was removed and it was found that the valve just touched when at the top of its lift. A new plug was fitted and the tapping noise eliminated.

CARING FOR CHAMOIS.

A piece of chamois such as is used for polishing bodies, is somewhat like a razor strap in having to be worked in before it reaches its efficiency. A new skin is full of an oily substance, and will leave a fine fuzz on the body. For this reason it should be used first on the running gear, with which one is not so particular as with the body.

RENOVATING FELT WASHERS.

Felt washers are utilized in numerous places about the car to prevent lubricant from leaking out. In time the material becomes hard, especially if in contact with a moving part. Rear axles are usually fitted with felt washers to prevent the oil or grease from working out from the differential housing to the road wheels and when the packing becomes worn the lubricant not only spatters over the wheel and tire but affects the operation of the brake. The best method is to fit new washers but if the old ones be not worn badly, they may be renovated by soaking in gasoline to restore their elasticity. In fitting new members they should not be too snug as the part is likely to become worn.

NO ADVANTAGE IN PEROXIDE.

Some time ago a British chemist stated that two ounces of peroxide of hydrogen to every pint of water used in the acetylene generator would increase the illuminating power of the gas by 50 per cent., due to the oxygen from the peroxide aiding combustion. This theory has now been exploded, another chemist, V. B. Lewes, gas examiner for the city of London, having conducted a series of tests, burning acetylene under various conditions, in different burners, with varying pressures, and with and without oxygen, the illumination being measured in each case. Besides stating that the oxygen does not increase the illuminating power of the acetylene, Prof. Lewes called attention to the fact that the mixture is exceedingly explosive.

SELECTS SAMPSON VEHICLE.

The Chase Rolling Mill Company, Waterbury, Conn., said to be one of the largest brass manufacturing concerns in the world, has been experimenting with industrial transports for a number of years. In fact, it is believed that this company was the first user of motor trucks in that city. Its plant is located on top of a long hill, reached over vitrified pavement from the centre of the city, and the problem of haulage is one which has given G. L. Summey, chief engineer, considerable study. After spending some $7000 and three years in time he has decided upon a Sampson, made by the Alden Sampson Manufacturing Company, Detroit.

HENRY MOTOR CAR COMPANY SOLD.

The Henry Motor Car Company of Muskegon, Mich., has been sold and the manufacture of Henry cars will be discontinued. The cars on hand in the factory were purchased for $9000 by Sachsemmaer & Levine of Philadelphia, while the repair parts and good will were purchased by the Muskegon Automobile Company, so that Henry owners will be able to get spare parts, additional security being given in the fact that A. R. Palmer, formerly with the Henry company, is now connected with the Muskegon Automobile Company and will look after the interests of Henry owners.

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IMPROVED ROAD SITUATION.

The report of the office of public roads, Department of Agriculture, which was presented in condensed form in the last issue of The Automobile Journal, proves of decided interest to the motorist. It shows that in 1904 there were 153,608 miles of improved ways out of a total mileage of 2,151,379, while in 1909 the figures were 190,489 and 2,199,645, respectively. The gain in good roads for the five years was approximately 40,000 miles, or at the rate of 8000 a year.

Obviously, the statistics for the latter year are by no means suitable as a basis upon which to compute the present situation, since it is probable that the increase represented in the last two years is more than sufficient to offset the gain covered by the report. Certainly, this should follow when it is remembered that automobile owners have been contributing liberally, in the form of special registration fees, for this particular object.

Let it be assumed for the sake of argument that the gain in 1910 and 1911 was only proportionate to that of the preceding five years, and there are today some 210,000 miles of improved ways in this country, out of a total mileage approximating 2,200,000. This means a percentage of about 9.5. As it is known that many states have been expending largely increased appropriations for this purpose, it is not unlikely that the percentage is nearer 15, giving about 230,000 miles. Very possibly, this latter figure is far below the actual total.

In this connection it is of interest to note that the American Automobile Association is in receipt of reports which indicate that work of a good roads nature will be done this year on something over 1,000,000 miles of highways throughout the country. Obviously, this is not all to be of a so-called permanent character, but it indicates that practically 50 per cent. of the total mileage is to receive treatment, and largely because of the activities of motorists.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

NEW METHOD OF TAXATION.

Chicago appears to have caught the motorists off their guard, in that a new ordinance was passed March 4, going into effect May 1, under which a wheel tax is imposed on automobiles as follows: For cars of 35 horsepower and under, $10 a year; over 35, $20; electrics, $10; motor trucks, under one ton capacity, $15; over one ton, $30. No hearing on the proposed ordinance was given, and the first intimation the motorists had of the matter was an announcement a week before the new fees went into effect.

The city had a wheel tax based on seating capacity, under which vehicles capable of carrying more than two persons were compelled to pay $20 a year, and others $12. The new ordinance was passed under authority gained by a statute enacted by the legislature last July. Apparently, the motorists neglected to watch the legislators while at work, or else they worked as quietly as the city officials.

Other cities have wheel taxes, but so far as is known Chicago is the first to differentiate between automobiles and other vehicles. This appears to be an entirely new method of securing revenue from the motor car owners. The situation in that city would indicate that organized motorists must be even more diligent than ever in watching proposed legislation.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

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DISCUSSING THE SHOW PROBLEM.

Those who have watched the attempts of certain cities to secure the support of the National Association of Automobile Manufacturers in the holding of so-called national shows in the fall, cannot help but be impressed with the fact that promoters have been dealers in almost every instance. The makers appear to be inclined toward the opinion that they have quite enough to occupy their time and attention in making preparation for the two exhibits in New York and Chicago. It would appear, therefore, that if there are to be any large displays earlier in the season they must be conducted by local dealers, relying upon such financial support as they are able to get from the producers of the cars which they represent.

There is little doubt that the so-called minor show circuit, which has reached large proportions during the past two years, has had a decidedly stimulating effect upon business in many of the centres throughout the country, and it is probable that more of these will be held earlier in the season another year. Just what effect this will have on the main exhibits, those staged by the manufacturers themselves, is somewhat problematical. It would appear that the whole show situation was undergoing a decided change. Meanwhile, France and some of the other foreign countries, which had abandoned the national show idea, are planning to revive the proposition again this year. The industry seems to demand these annual displays and their elimination is not to be undertaken without careful consideration.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

TRANSCONTINENTAL TOURING.

The American Automobile Association, which, it will be admitted, ought to be in a position to determine with some degree of accuracy what is expected in the way of touring, estimates that something like $1,000,000 will be expended by motorists in crossing the continent. Of course, this is but a small percentage of the business that will accrue to American enterprises through touring during the year.

It is significant that many of the western states are beginning to realize the importance of encouraging automobile visitors. Many of these dollars have been expended on the Continent of Europe in the past, largely because the American people have not seen fit to encourage touring at home. Until within the past year, New England and the East were alone in their attempts to interest the motor tourist.

But with all this increased activity with respect to good roads and advertising for tourists, comes the suggestion that there is even more need for uniform motoring laws. Boards of trade and other commercial organizations interested in securing tourist trade, should look into this situation and become prepared to assist organized motorists in procuring the necessary action when the legislatures begin their work next winter.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

MISSISSIPPI AND MASSACHUSETTS.

Although motoring has been a frequent subject of legislation since the practicability of the self-propelled vehicle was established, some of the laws that are being passed today offer plenty of indication that legislators are decidedly unfamiliar with what is needed in this respect. Mississippi has never had an automobile law, but will have one beginning June 1, in which "the owner of any automobile, locomobile, oldsmobile or other four-wheeled vehicle propelled by gas, steam or electricity" must pay registration fees varying from $5 for cars of 25 horsepower and under to $25 for those of over 50 horsepower.

Of course, the wording of the statute betrays a surprising lack of information concerning the automobile industry, but after all it is hardly less in keeping with the progress of the times than the attempt of the sub-committee of the Massachusetts Legislature to prepare a new schedule of registration fees. It may be added that the conservative reputation of the latter state with respect to motoring laws should have precluded the possibility of suggesting such unfair methods of taxation.

The automobile is rapidly becoming a universal vehicle. There are any number of men of moderate means who are looking forward to the time when they can use a small car and enjoy it with their families. That these people should be encouraged in their ambition to get into the open air and enjoy the pleasures of country opportunity generally will be admitted. The proposition that the automobile does damage to the road out of proportion to its contribution to the public treasury is false. The system of collecting registration fees is fast becoming a means of raising revenue, purely and simply.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



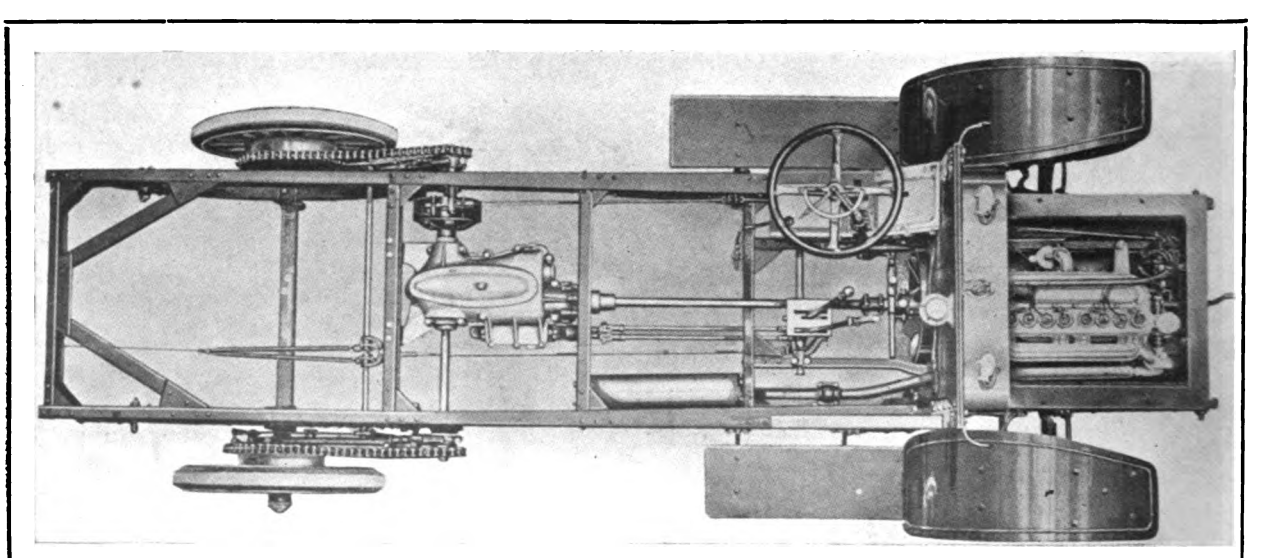
ADAMS ONE-TON TRUCK.

Simplicity, stability, efficiency and appearance are the cardinal points in the construction of the Adams one-ton truck, made by the Adams Bros. Company, Findlay, O. At least, that is the object sought by the designers, and inasmuch as the concern has been engaged in the manufacture of machinery for some 40 years there is abundant reason for believing that it has attained its object in the first three particulars. So far as appearance is concerned, that speaks for itself.

The motor is a four-cylinder, four-cycle, water-cooled unit with a bore of 3.875 inches and stroke of five, giving a rating of 30 horsepower. The cylinders are cast en bloc, with liberal provision for the circulation of cooling water. Pistons are accurately ground and fitted with rings ground on all working sides. The crankshaft is drop forged of 3.5 per cent. nickel steel, large diameter and unusual length of bearing journals, and with three bearings of special composition, insuring excellent service. The camshaft also is drop forged with integral cams, being entirely enclosed in the upper half of the crankcase and actuated by means of spiral gears. All valves are mechanically operated and interchangeable. They are of liberal diameter and located on the right side of the motor.

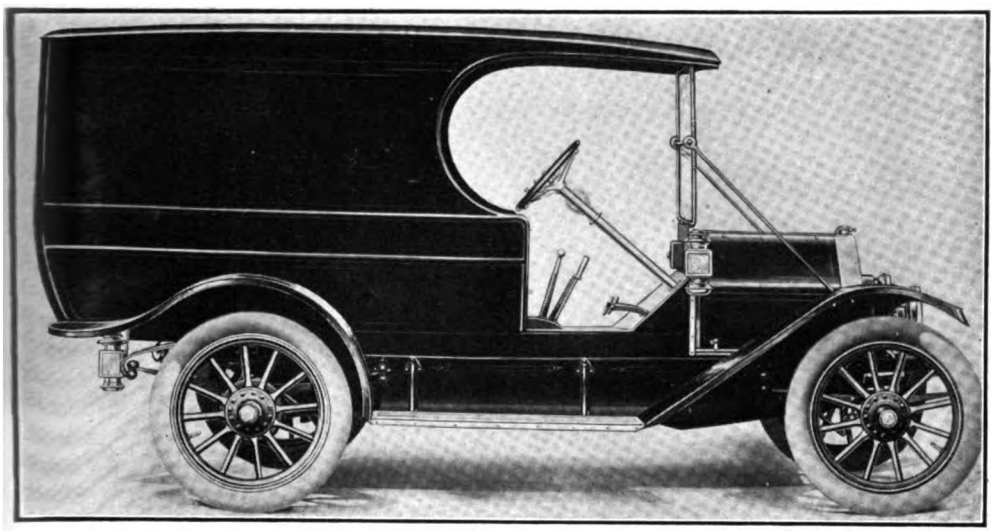
The crankcase is made of high grade aluminum alloy, and is so designed that the upper half contains all the working components while the lower half constitutes the oil reservoir supplying the lubricant to these parts. The oiling system is so arranged as to offer the combined advantages of the constant level splash and force feed systems. Positive water circulation is effected by a spiral gear driven centrifugal pump, aided by a fan located in the flywheel.

The radiator is of the vertical tube type, provided with two filler caps, permitting filling from either side, a distinct advantage in itself. However, the principal feature in connection with this member is the location, at the rear of the motor in front of the dash. It is held that this not only protects it from danger due to possible collisions, but the mounting is such as to eliminate any damage emanating from the unequal motions to which the side rails of the frame are subjected by reason of traversing rough roads.



Plan View of Adams One-Ton Chassis, Showing Simplicity of Design and Limited Number of Working Parts.

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Latest Type of Overland Light Delivery Wagon Known as Model 59 Special.

Ignition is by a dual system, employing an Eiseman high-tension magneto. Steering is accomplished by an irreversible screw and nut Ditwiler type post located on the left, affording left hand drive with its advantages of a clear view of the road in either direction and easy ingress and egress from the seat. The spark and throttle control is mounted on the steering wheel, and with the location of the magneto and carburetor all connections between these are established by two straight rods. The carburetor, which is a Kingston, is also controlled by pedal. The arrangement and location of magneto, water pump, filling funnel and oil gauge on the front end of the engine affords extremely easy access to any part of the motor by simply lifting the hood, and this may be removed without disturbing any other adjoining part.

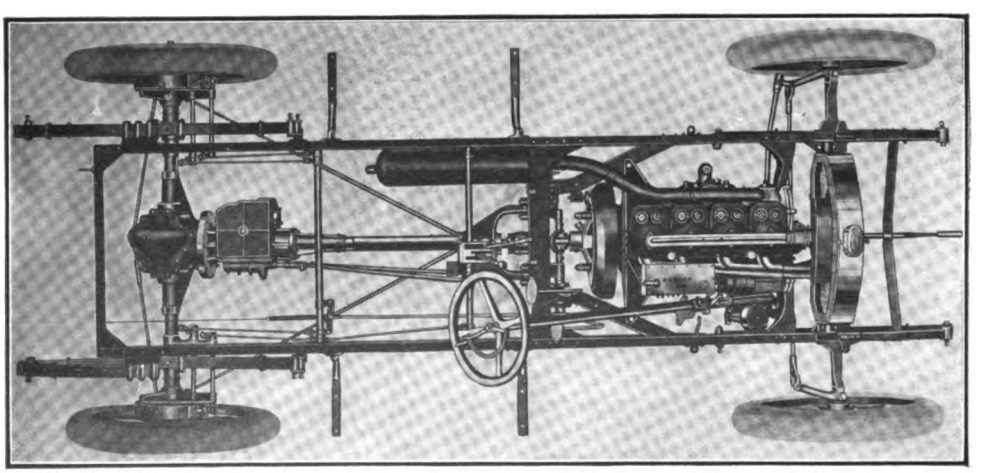
OVERLAND LIGHT DELIVERY.

Several new features are brought out in the 1912 model 59 Overland light delivery wagon, made by the Willys-Overland Company, Toledo, O. Only one chassis is provided but this is fitted with two types of body, one of which is shown herewith. This is known as the Special, while the other is the Express, the latter being fitted with open flare board body.

Last year, the motor was rated at 25 horsepower, having a bore of 3.75 inches and stroke of 4.5. This year the motor is rated at 30 horsepower, with bore of four inches and stroke of 4.5. It is of the four-cylinder, four-cycle, water-cooled, L head type, with all valves on the left hand side, where they are operated from a single camshaft with integral cams. The cylinders are cast separately of a high grade gray iron, and are arranged vertically under a hood.

The reputation of the Overland concern in the production of pleasure cars has lost nothing in the careful workmanship and attention to detail which is manifested in the construction of this chassis. All pistons and rings are accurately ground to size. The cylinders are supplied with ample water jacketing surface, and particular attention has been paid to the matter of cooling, which is by the thermo-syphon system. The radiator is of the honeycomb tubular type, supported on either side by trunnions which take up all road stresses. The special design is with reference to securing the minimum amount of wind resistance. The six-bladed adjustable fan is hung from an arm of the crankcase, extended upward, and is driven by belt from the crankshaft.

This latter is of special grade of alloy steel, hardened and ground. The bearings are of liberal area, five in number, plain, die cast, and very accurately fitted. The same extreme care is manifested in the matter of fitting the inlet and exhaust manifolds, to permit easy ingress and egress of all gases. The camshaft is of a selected quality of steel fitted with three bearings of the same material and design as those of



Chassis of Overland Light Delivery Wagon Presents Neat and Attractive Appearance.

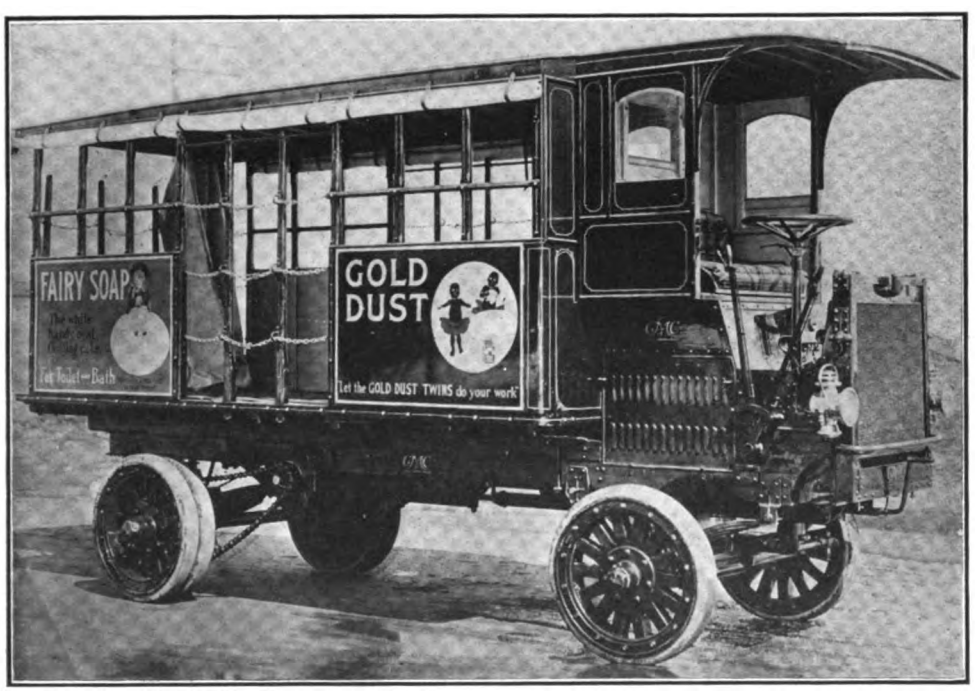
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the crankshaft. The camshaft is hardened and ground to limits, thus insuring the size of the bearings and the certainty of valve timing.

Lubrication is by force feed oiler to the cylinders with constant level splash in the crankcase. Ignition is by jump spark, utilizing Splitdorf dual magneto and dry cells. The carburetor is of the float feed type and ignition and carburetor are controlled by levers located on the steering post.

The clutch is a cone member with a woven asbestos and wire facing, which is heat proof and will not char. The transmission last year was planetary. This year it is selective, affording three speeds forward and reverse. Drive is by shaft, through the torsion tube to the bevel gear on the live rear axle, which is of the semi-floating type and equipped throughout with Hyatt roller bearings. The frame is channel section cold rolled steel. The front springs are semi-elliptic and the rear three-quarter elliptic. The front axle is an I beam forging. Service brakes are expanding on the rear wheel hubs controlled by pedal, the emergency members, contracting on the rear wheels and operated by lever. The wheelbase this year is 106, as compared with 102 in 1911. The tread is 56 inches. Wheels are of the artillery wood type, with 33 by four-inch tires all around.

It will be noted from the accompanying illustrations that the control is in the centre, although right hand location of driver is provided. Every effort has been made to present a satisfactory delivery wagon from every viewpoint. To this end the body dimensions are very liberal. That illustrated has a length of 60 inches and width of 43, while the Express is 67 by 42. The height of the interior in the enclosed car is 53 inches.



G. M. C. 3.5-Ton Truck Owned and Operated by N. K. Fairbanks & Co., Chicago.

G. M. C. FOR GOLD DUST TWINS.

N. K. Fairbanks & Co., Chicago, Ill., maker of the famous Gold Dust washing powder, with which housekeepers throughout the land are more or less familiar, has adopted the motor vehicle in solving its transportation problem in its home city. As will be seen by the illustration herewith, it utilizes a 3.5-ton G. M. C. gasoline truck, made by the General Motors Truck Company, Detroit, and it may be added that side panels have been arranged so as to afford ample opportunity for still further advertising the product of the company. The vehicle is propelled by a four-cylinder, four-cycle, water-cooled motor, having a bore and stroke of five inches, and rated at 40 horsepower. The location is under the seat with driver and levers at the right. Cooling is by cellular radiator, and ignition is double, with two sets of plugs, current being furnished by a Mea magneto and storage battery. A ball type speed governor is fitted to prevent the operator from exceeding the rated speed of the vehicle. The clutch is of the disc type, the transmission progressive, affording three speeds forward and reverse, and final drive is by side chains. Two sets of brakes are employed, these being of expanding and contracting types on the rear wheels, which are equipped with 36 by four-inch dual solid tires. The front members are 36 by five-inch single solid. The front springs are semi-elliptic and the rear full platform. It will be noted that the body is of the stake platform type with top and side curtains, and that the driver is fully protected from the weather by a cab.

NEW ELECTRIC LINE.

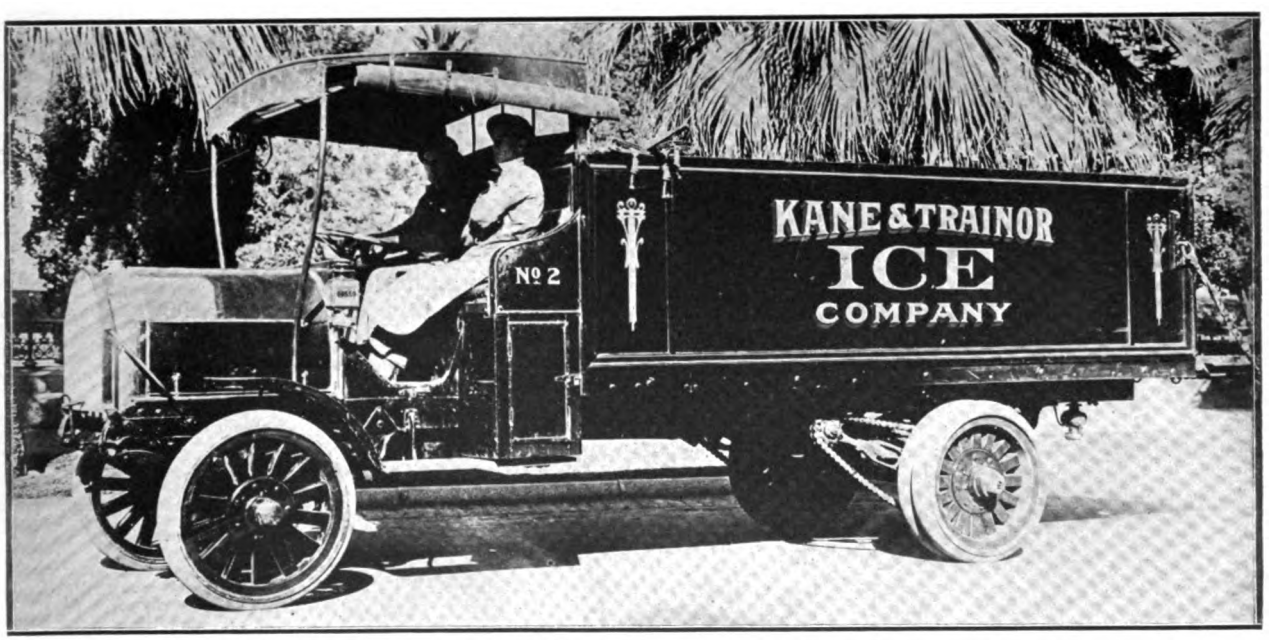
The Atlantic Vehicle Company has been organized in North Newark, N. J., for the purpose of producing a line of electric trucks, which will be known as the Atlantic. Four models will be constructed, of one, two, 3.5 and five tons capacity, respectively. The designer is Arthur J. Slade, who has been connected

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with the production of electric vehicles for a number of years, in co-operation with others who are extremely well versed with the demands of the mechanical transport problem. The officers of the company are: President, McKinley Boyle; vice president and sales manager, Ralph Sanger; chief engineer, Arthur J. Slade.

KISELKAR FOR ICE TRANSPORTATION.

An accompanying illustration shows one of the KisselKar trucks, made by the Kissel Motor Car Company, Hartford, Wis., in service with the Kane & Trainor Ice Company at Stockton, Cal. It will be noted that special attention has been paid to the body design, which not only presents a decidedly attractive appearance but is extremely well executed for the work in hand, particularly in the climate in which the vehicle operates.



KisselKar Truck in Service with the Kane & Trainor Ice Company at Stockton, Cal.

The motor is a four-cylinder, four-cycle, water-cooled unit, placed forward under a hood, with driver and levers at the right. The clutch is a large cone member of the adjustable type, and power is transmitted through a selective sliding gear, affording four speeds forward and reverse. Final drive is by side chains of ample dimensions.

A feature of the rear system is a differential locking device by means of which it is possible to lock the driving axles as one member, thereby facilitating traction when one rear wheel is in mud or on slippery ground. It also provides an emergency drive in the event of the chain breaking, as the car could be propelled by the remaining member. The Kane & Trainor Ice Company is very much pleased with the vehicle, since it has demonstrated its value, economy and power in the successful transportation of ice under severe conditions.

LAMBERT TRACTORS ANNOUNCED.

The Buckeye Manufacturing Company, Anderson, Ind., well known in the industry as maker of the Lambert pleasure and commercial lines, employing the patented Lambert friction drive, has decided to locate a factory in Los Angeles, Cal., for the production of the Lambert friction driven orchard and farm tractor, on which it has been working for some little time. It is understood that this plant will be operated as an entirely separate institution, and that no trucks or pleasure cars will be constructed, at least for the present.

The new tractor is a three-wheeled vehicle, with the single wheel in front. The entire assembly is with an extremely low centre of gravity, the total height being 42 inches. The driver is located at the rear on a skeleton type of seat, with the steering wheel immediately in front. This is of the usual automobile construction, except that the column extends to the bottom of the centre of the vehicle, thence by the ordinary arrangement to the front wheel.

The motor is over the rear wheels and the friction transmission in front. It will thus be seen that the method of drive is exactly the reverse of that in the present construction of Lambert cars and trucks, in that the motor first drives forward to the discs, thence backward to the rear wheels. These latter are shod with rubber, but in addition metal cleats are fitted for auxiliary tractive effort when the machine sinks into soft ground. The front wheel rim is a broad band of steel with rubber in the centre, so designed

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Stegeman Fire Insurance Patrol Wagon in Service with Underwriters in Milwaukee, Wis.

that only the rubber comes into play when traversing hard road surfaces.

STEGEMAN FIRE PATROL.

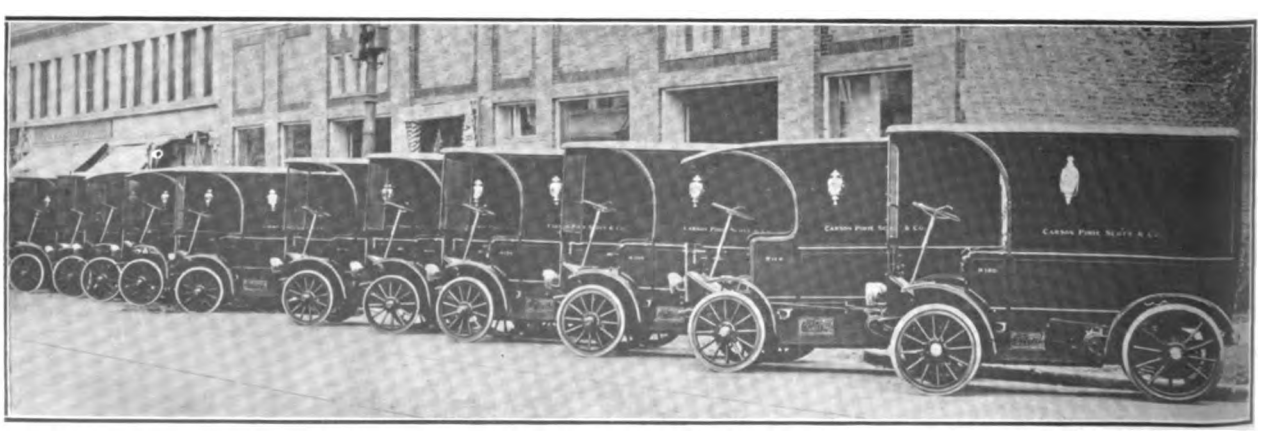
While the Stegeman Motor Car Company, Milwaukee, Wis., is best known through its production of the Stegeman truck, it is of interest to note that it has joined the ranks of fire apparatus manufacturers in that it has produced an exceptionally successful insurance patrol wagon which has been in service for some months with the Board of Fire Underwriters in its home city. It is stationed in house 2, at Ninth and Calena streets, and covers the outlying sections of the north,east and west sides, in which work it has had abundant opportunity to demonstrate its practical worth.

The motor is of the four-cylinder vertical type, giving 50 horsepower by dynamometer test with direct drive on the high speed, or when travelling from 35 to 40 miles an hour. The drive is by jackshaft to the rear wheels, through enclosed chains running in a bath of lubricant. All operating parts are enclosed and run in oil or grease. Oil holes have been eliminated and lubrication throughout is furnished by large and positive grease cups.

The frame is of pressed steel, reinforced with five cross sections and strengthened by thrust rods between spring centres. All mounting of the wheels is on ball bearings with a special thrust bearing to take up excessive side strains in making the necessary turns, so frequent with fire apparatus. Springs are semi-elliptic, front and rear, and supplementary coil springs and shock absorbers take up all injurious rebound. The body is constructed of welded steel, eliminating all rivets. Lockers are built on both sides with a through centre aisle.

ELECTRIC DELIVERY WAGONS.

An accompanying illustration shows a part of the fleet of 22 1000-pound Detroit electric delivery wagons, made by the Anderson Electric Car Company, Detroit, and in service with Carson Pirie Scott & Co., Chicago. These vehicles have been in operation for more than a year and have given entire satisfaction in covering various routes. These shown are garaged in South Chicago and operate in that territory, while others are stationed in Evanston and Highland Park. A few of the machines owned by the company are of one ton



Part of the Fleet of Detroit Electric Delivery Wagons Utilized by Carson Pirie Scott & Co., Chicago.

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capacity and are utilized in delivering goods to substations, from which these lighter cars operate.

The 1500-pound wagons are equipped with Edison 60-cell batteries, although it may be stated that all vehicles made by the Anderson company use the Edison battery exclusively. The motor is of the firm's own make, a series wound type, in which varied road and load conditions are handled without undue increased current consumption. The controller is of the continuous torque, drum type, also made by the Anderson concern.

Two sets of brakes are employed, these being expanding on wheels and countershaft. Springs are semi-elliptic, front and rear, resting on large axle seats, through which suitable holes are drilled for the clips. The frame is of channel, angle and T steel. All joints are hot riveted. Sheet steel is employed for the battery and motor compartments, this being riveted to the frame members and battery supports. The front axles are I beam and the rear rectangular, both being special drop forgings. All wheels are of the artillery type, made from selected second growth hickory. The wheelbase is 80 inches and the tread 56. Tires are solid, 32 by 2.5 inches in front and 34 by three inches rear. The rated speed is 14 miles an hour and the mileage, loaded, about 50.

NEW CONTINENTAL WAGON.

E. M. Anderson and Dr. J. G. Barnstable of Superior, Wis., have incorporated the Continental Motor Truck Company for the purpose of producing a new wagon of one to three tons capacity to be known as the Continental. Only one chassis will be made at present, to which three standard types of body will be fitted, one an open express, one with closed panels and the third a stake platform.

The motor will be a four-cylinder, water-cooled unit, with bore of 4.125 inches and stroke of 5.25. Ignition will be by high-tension magneto mounted on the side of the crankcase and in a most accessible position. Water will be circulated by the gear driven pump through a radiator which forms a part of the dash, out of the way of both accident and injury. An automatic governor will be fitted to regulate speed.

The clutch will be a cone member, from which the drive will be through a four speed transmission to the jackshaft which will carry the differential and sprockets, final drive being by chain. The frame will be of steel, double trussed and mounted on semi-elliptic springs in front and full platform members in the rear. Brakes will be of the internal expanding and external contracting types. Tires will be 36 by 3.5 inches in front and 40 by four in the rear, solid rubber. The wheelbase will be 120 inches and the tread 56.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

NEW YORK LICENSE FEES.

Secretary of State Lazansky of New York has issued a statement showing that since Feb. 1 the revenue from automobile licenses has totaled $609,073.50. This amount was paid by 58,732 owners and 30,470 chauffeurs. The greater part of this money was taken in by the New York office, with Buffalo and Albany next in order of receipts.

SUCCESSFUL COLE DISTRIBUTOR.

One of the most genial and popular of the New York motor men is Sydney H. Veal, the secretary of the Colt-Stratton Company, eastern distributor for the Cole car, made by the Cole Motor Car Company of Indianapolis, Ind. This concern has one of the finest automobile establishments in New York City, at Broadway and 68th street, and has been unusually successful, which Mr. Veal's many friends assert is due in great part to his activities. The company has over 50 agents in its territory, handling a large number of cars annually.



Sydney H. Veal, Secretary Colt-Stratton Company.

Mr. Veal has had considerable experience in the automobile industry, having served in responsible positions with a number of prominent concerns. During 1905 and 1906 he was chief accountant for the Cleveland Motor Car Company in Cleveland, O., and in 1907 he was appointed secretary of the company. In the fall of that year he was sent to New York as the manager of the branch there, where he was associated with William M. Turner, who was his sales manager and who is now manager of the Amplex agency in Boston. In the spring of 1909 the Cleveland company went out of business, and the following fall Mr. Veal, with William L. Colt and Harry L. Stratton, formed the present organization of the Colt-Stratton Company to handle the Cole car in the eastern section of the country. The combined activity of these three men has done much to bring about success for the maker in Indianapolis, and their advice has been sought frequently in the matters of design and construction.

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The cup defense committee of the Aero Club of America has invited proposals for the construction of an American aeroplane with which to defend the Gordon-Bennett cup in the fourth international race at Chicago, Sept. 9. These proposals will be received by the committee at its office, 297 Madison avenue, New York City, until June 1, and each must be accompanied by a certified check for $1000. The committee requires the following test:

"Each aeroplane shall be tested over a course which shall be a closed polygon whose perimeter, 3.106 miles (five kilometers) in extent, shall enclose an area 25 times the perimeter and contain no acute angle. The aeroplane shall make 124.27 miles (200 kilometers) over this course in one continuous flight in the same direction in a time to exceed 1:14:33.4.

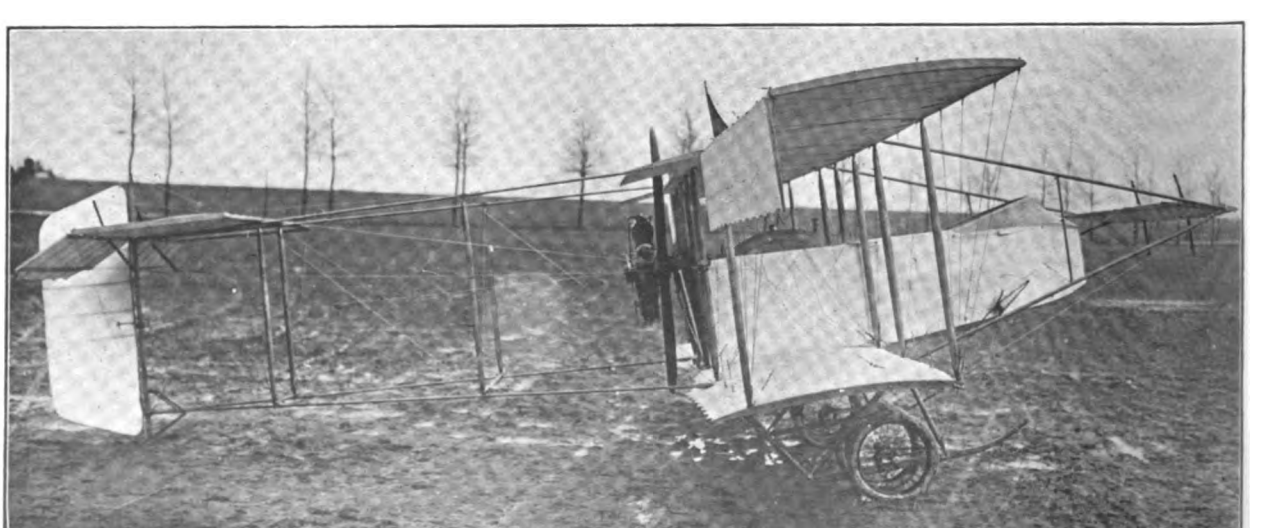
"The place for the trials shall be determined by the committee, and the aeroplane shall be delivered thereat ready in all particulars for the trial on or before Aug. 1, 1912, and each machine shall be accompanied by an American pilot who shall drive the same during the trial and who shall have agreed to drive in the international race if nominated for same. After having landed at the completion of the trial each aeroplane, with all its parts and accessories, shall be in a suitable condition to repeat this performance 24 hours thereafter without replacing any except unimportant minor parts.

"During the trial each machine shall be flown at the risk and expense of the manufacturer, and the defense committee shall be free of all liability of any nature whatsoever that may have arisen previous to the acceptance of the machine."

The winning machine will be purchased by the committee for $10,000 and will represent America in the race. Other specifications provide that the power plant, as well as minor details of the machine and accessories, may be of foreign design and construction.

The latest type of Henri Farman military biplane offers some slight differences in detail, chief among which may be mentioned the larger hinged ailerons on the upper main plane, the enclosure of the engine housing and in the use of but one tail plane. Some of these innovations, if such they may be termed, have appeared in a modified form in previous construction, and as a whole, the machine cannot be said to offer any radical departure from accepted Henri Farman design.

One of the accompanying illustrations shows the



Latest Type of Henri Farman Military Biplane, Which Presents Some Slight Departures from the Standard Design Heretofore Employed.

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construction of the pilot's cockpit, in which it will be seen that provision is made for the passenger at the rear of the operator and somewhat lower down. Disposed on either side of him are compartments in which are carried eight bombs. Provision also is made for discharging these projectiles through the bottom of the machine between the passenger's feet. This device is so arranged as to be governed with relation to the speed of the biplane, in an attempt to drop the missiles upon a given spot. The other details are apparent from a careful study of the photograph.

The first annual German aviation exhibition in Berlin last month was of special interest because of its indication of the present attitude of Germans toward the aeroplane. As is more or less well known, this country was particularly absorbed in the dirigible balloon, while others were engaged in exploiting the heavier-than-air machine. However, among the exhibits was the original Wright biplane, with which Orville Wright made flight at the Templehof field early in September, 1909. This machine, now the property of the German museum at Munich, stood beside the latest Wright biplane constructed for the German army.

The comparison was somewhat striking, and was an interesting commentary upon the advancement in the science during the past 2.5 years. The first machine had two light propellers and its equipment comprised only the indispensable things. Of course, it was not supplied with a tail. The latest military machine made under license in Germany has but one propeller, which is a distinct departure from the Wrights constructed in this country and elsewhere abroad, and a tail. Its equipment includes all the accessories now considered so necessary, including a wireless telegraphy outfit.

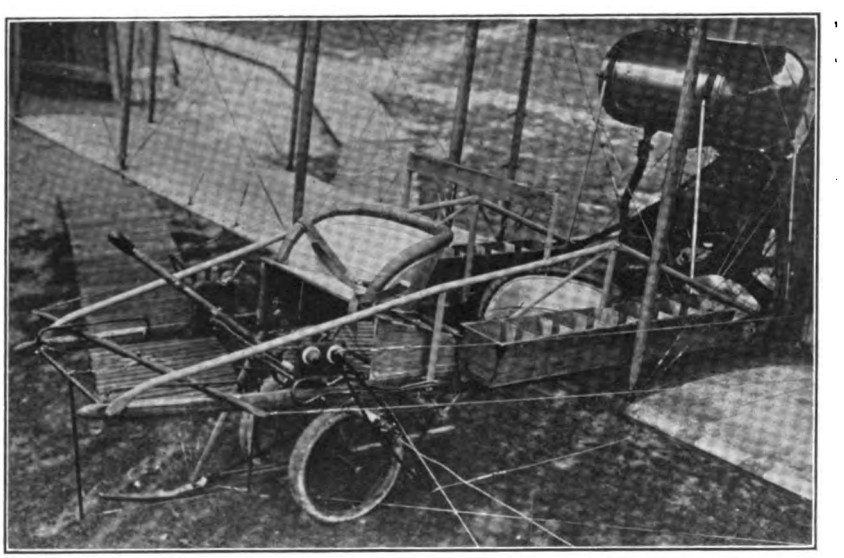
Other notable exhibits were the Euler biplane in which Prince Henry of Prussia secured his pilot's license. Beside it was the latest Euler military biplane, termed an aeroplane destroyer, on which was mounted a rapid firing machine gun; that is, there was a gun on it once; although as exhibited the mounting only was shown because the German government is not yet ready to disclose the details of the gun itself.

One monoplane was shown with three propellers, and another was equipped with two propellers, each working separately from an individual motor. Still another exhibit was a Sigismund, displayed by Prince Frederick Sigismund of Prussia, many times a millionaire. He proudly declared the machine was built entirely by himself without the assistance of engineer or mechanic.

Of particular interest in this connection is the matter of ignition. Sixty-eight of the motors and completed machines were equipped with magnetos, and of these 53 employed the Bosch, seven the Eisemann, five the U. & H., two the Mea and one the Pintsch.

Corbet Wilson flew across the Irish channel from Fishguard, Wales, to Enniscorthy, Ireland, April 22, being the first aviator to make a continuous flight between the two countries. The distance flown was approximately 60 miles.

Harry N. Atwood, who made a new mark in American aviation May 1, by flying from Saugus, Mass., to Wells, Me., the first man to fly into the State of Maine from another state, is laying his plans to start on his proposed trans-Atlantic flight June 29. In a recent letter to Secretary George von L. Meyer of the United States Navy, Atwood requested that a torpedo boat



Cockpit of New Henri Farman Military Biplane, Showing Provision for Carrying and Dropping Bombs.

destroyer be assigned to accompany him on his trip.

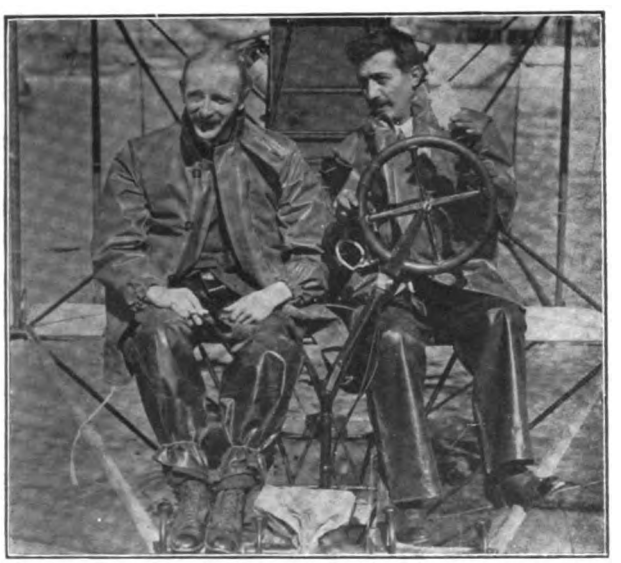
Secretary Meyer points out in his reply that in his opinion the detailing of a boat of this character probably would be impractical, in view of the fact that notwithstanding its great speed it hardly would be a match for an aeroplane. Atwood desires that the American government detail a boat to be stationed about 500 miles off the New England course, to the deck of which he might fly in case it proved necessary. Secretary Meyer wishes further information upon the subject before granting the request, and suggests that it will be granted only on the condition that the government shall not be held responsible in any way for the success of the undertaking. He concludes:

"This department is desirous of encouraging efforts to popularize the sport of marine flying, and to afford a dignified means of imparting useful information concerning the art of aviation, its scientific possi-

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bilities and its future usefulness; but I wish to make clear to you in the case of your proposed trans-Atlantic trip that the department, even if able to co-operate with you in any way, could not assume the slightest responsibility for the venture or give any assurance of the extent to which you might rely upon any naval vessel for assistance."

Louis Paulhan, who recently secured the European agency for the Curtiss hydraeroplane, has established what he calls an aquaplane school at Juan-le-Pias. An accompanying illustration shows Paulhan and a passenger about to take flight in one of the Curtiss machines. Inasmuch as this is the first picture of the pioneer aviator in an American made machine, as well as the first view of him seated in any machine for several months, it will prove of interest to his many friends in this country. Perhaps it need not be stated



Louis Paulhan and Passenger About to Make Flight in Curtiss Hydraeroplane.

that Paulhan is at the wheel, holding a small card in his hand, while the passenger is at his right.

Flying a Wright biplane at the Nassau Boulevard field on Long Island, April 27, George Beatty carried five passengers twice around the course, creating a new American record for passenger carrying. The world's record is held by Roger Sommer in a Sommer biplane with 12 passengers, a total load of 1532 pounds. Beatty's load weighed 845 pounds.

The Loening aeroboat, designed by Grover C. Loening and constructed by the Queen Aeroplane Company of New York City, was given its first official tests at Bayonne, N. J., April 27. The machine is sustained on the water by a hull about 25 feet long, resembling that of a motor boat. In this the pilot sits well forward, a windshield and the control mechanism alone being in front of him. Behind is the 50 horsepower Gnome, and above a single pair of planes with a wing area like a small Berliot monoplane, spreading 28 feet. The light boat takes the place of a monoplane body, and at its stern is a special type of rudder. The total weight of the machine is 700 pounds. Its first trial demonstrated that it is a practical craft, arising from and alighting on the water with ease.

Following the recent hydraeroplane meet at Monte Carlo, Monaco, the British Admiralty has purchased a Henri Farman machine fitted with hydraeroplane attachment, similar to that flown by Fischer in winning first place at the meet. Inasmuch as several other European governments have been purchasing Curtiss machines, which are designed and constructed throughout as hydraeroplanes, it is significant that the British government should have decided upon an ordinary biplane fitted with floats.

It is understood that the Aero Club of Ilinois, which will have direct supervision of the international meet, at which the fourth international race will be flown, already has been guaranteed of the receipt of $100,000 pledged by interested citizens. The administration of the meet will be in charge of the following: General manager, James S. Stephens; secretary, Harold W. Robbins; controller, John B. Cunningham; consulting engineer, Sidney V. James.

The grand circuit race, starting and ending in Chicago will begin Sept. 15. The following stopping places, or controls, have been selected: Des Moines, Ia.; Omaha and Lincoln, Neb.; Kansas City and St. Louis, Mo.; Indianapolis, Ind.; Cincinnati, Dayton and Cleveland, O., and Detroit, Mich. These cities will share in the expense of the race.

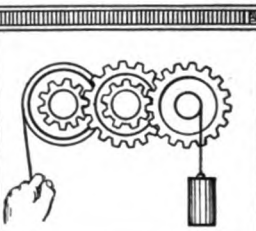
The Aero Club of New England has decided definitely to hold an aviation meet at the Atlantic flying field, Squantum, Mass., June 29-July 7. This is the same site on which two successful meets of the Harvard Aeronautical Society have been held, although neither of them proved satisfactory from a financial viewpoint. William A. P. Willard has been engaged as manager of the third venture, and it is stated that eight aviators already have signified their intention of making entry.

Capt. Thomas S. Baldwin, who with Lee Hammond has been spending five months in the Orient, flying in 20 cities in Japan and China, has returned to America.

It transpires that among the survivors of the ill fated Titanic was Pierre Marechal, who was on his way from France to Hammondsport, N. Y., for the purpose of securing a contract with Glenn H. Curtiss to represent the Curtiss hydraeroplane in Switzerland. Marechal returned to France last week and will give exhibition flights over Lake Geneva this summer.

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RECENT MOTOR VEHICLE PATENTS



Scheller Valve Grinding Tool.

The valve grinding tool which may be rigidly attached to the motor during the work, and which is adjustable to any type of engine, has been patented by John Scheller, Milwaukee, Wis. It comprises a post member which is screwed into the opening of the cylinder utilized for the spark plug, and locked by a nut. The top of the post carries a horizontal arm on which is fitted a slidable extension and provision is made for locking the parts securely. The adjustable extension is hinged, and is equipped with a vertical member which serves as a guide for the vertical rod carrying the valve turning bit. The upper part of the rod is fitted with horizontal extensions which carry handles for the purpose of rotating the tool in either direction. During the process of grinding in the valve, the latter may be lifted from its seat by means of the hinged member.

Stevens Battery Holder.

The utilization of dry cells in the motor car requires caution in installing else the efficiency of the members is apt to be impaired through short circuits. The usual practise is to employ waste or paper to secure the batteries and to prevent the terminals from coming in contact with one another. Herbert A. Stevens, Malden, Mass., has been granted a patent for a battery holder which permits the installation or removal of the cells as a unit and it is claimed that the device will hold the members securely. It comprises a series of belts or band members attached to a vertical support and the lower band is equipped with cross sections which serve as retainers for the cells. These bands conform to the shape of the batteries and when the latter are in position it is stated that they will not jar out of their relative positions.

Shlosberg Muffler.

Maris Shlosberg, Chicago, has patented a muffler which varies from those of usual construction in that it is cone shaped. It consists of a pair of hollow cones secured together at their bases and separated by a divisional plate having slight communicating openings between the cones located near its periphery. One of the cones is connected to the exhaust pipe while the other is equipped with a tube having an opening considerably smaller in diameter than that of the pipe. The exhaust gases from the motor enter the first cone, encounter the divisional plate, and are deflected through the openings into the second chamber, thence out into the open air. The inventor claims that back pressure is eliminated and that the noise of the explosions is reduced to a minimum.

Gilbert Automatic Funnel.

A patent has been granted Fred E. Gilbert, Jacksonville, Fla., for an automatic funnel having a valve mechanism whereby the flow of liquid either up or down may be controlled as desired by the operator. It is similar to the ordinary funnel except the upper portion is bowl shaped and the tube carries three valves having seats. The lower valve is fitted with a float, its function being to close the tube preventing an overflow of the funnel. Another valve controls the ports through which the liquid flows while the third member is provided with locking mechanism, preventing the movement of liquid in either direction.

Hoffman Number Plate.

One of the objections to attaching number plates to the front of the radiator is that the efficiency of the cooler is reduced thereby, also that the supporting members are likely to chafe the thin metal of the fins causing leaks. Peter M. Hoffman, Chicago, has been granted a patent for a number plate designed for attachment to the radiator, which he claims overcomes these difficulties. The plate is perforated, said openings corresponding to those of the cooler, and the extensions of the plate are provided with means for holding the member securely and thus eliminate chafing.

Sinclair Safety Crank.

The introduction of the self-starter for internal combustion engines has stimulated the efforts of inventors along the lines of safety devices for attachment to the starting crank so that in the event of a backfire the operator will not be injured. George B. Sinclair, Medford, Mass., has been granted a patent for a device which, it is claimed, will automatically release the clutching member of the starting crank when the latter is rotated other than in the normal direction of the motor. The extension of the crankshaft of the motor carries an integral clutch member which engages with a similar part slidably mounted, and attached to this is the starting handle. The moving member has a shoulder which engages with a bell crank pivotally mounted, and is actuated by a pawl in engagement with a ratchet wheel integral with the sliding clutch. A spring holds the pawl in contact, the latter permitting the ratchet to rotate in one di-

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rection but if the latter be reversed as by a backfire, the pawl member imparts motion to the bell crank, which being in contact with the shoulder in the sliding clutch automatically disengages the latter.

Mallins Self-Starter.

Although the self-starter is not taken as seriously in England as in this country it is interesting to note that an American patent has been granted Charles William Mallins of Liverpool, England, for a device for starting internal combustion motors from the seat of the car. It is unique in its construction, inasmuch as it is operated by pulleys and a cable. The latter, which is equipped with a shovel shaped handle on the dash, extends therefrom to the front of the motor passing over a pulley fitted to a pivotally mounted arm. The latter carries a larger pulley on which the operating cable is coiled, and is attached to an axially movable shaft provided with a coupling for engagement with the end of the crankshaft of the motor. The large pulley is equipped with a spring, the function of which is to coil up the cable, after the latter is unwound by operation. Means are provided for disengaging the clutch coupling from that of the engine shaft if the rotation of the latter be reversed. In practise the handle is grasped by the operator and when pulled brings the movable arm and clutch into engagement with the crankshaft. A further movement of the cable rotates the larger pulley which in turn imparts motion to the crankshaft of the engine. Upon releasing the handle the spring rewinds the cable. It is claimed by the inventor that the device is operated easily and that it may be attached without any great alteration to the car.

OTHER PATENTS GONE TO ISSUE.

Tank Bracket and Step, Russell Huff, Detroit. A combination of step and bracket for holding an acetylene gas tank.

Spring, William R. Park, Taunton, Mass. A vehicle spring composed of resilient leaves in sliding contact with each other and having a film of wax between adjacent leaves.

Windshield, Chicago Coach & Carriage Company, Chicago, Ill. A windshield in which both upper and lower parts may be moved into various positions, each part independently of the other.

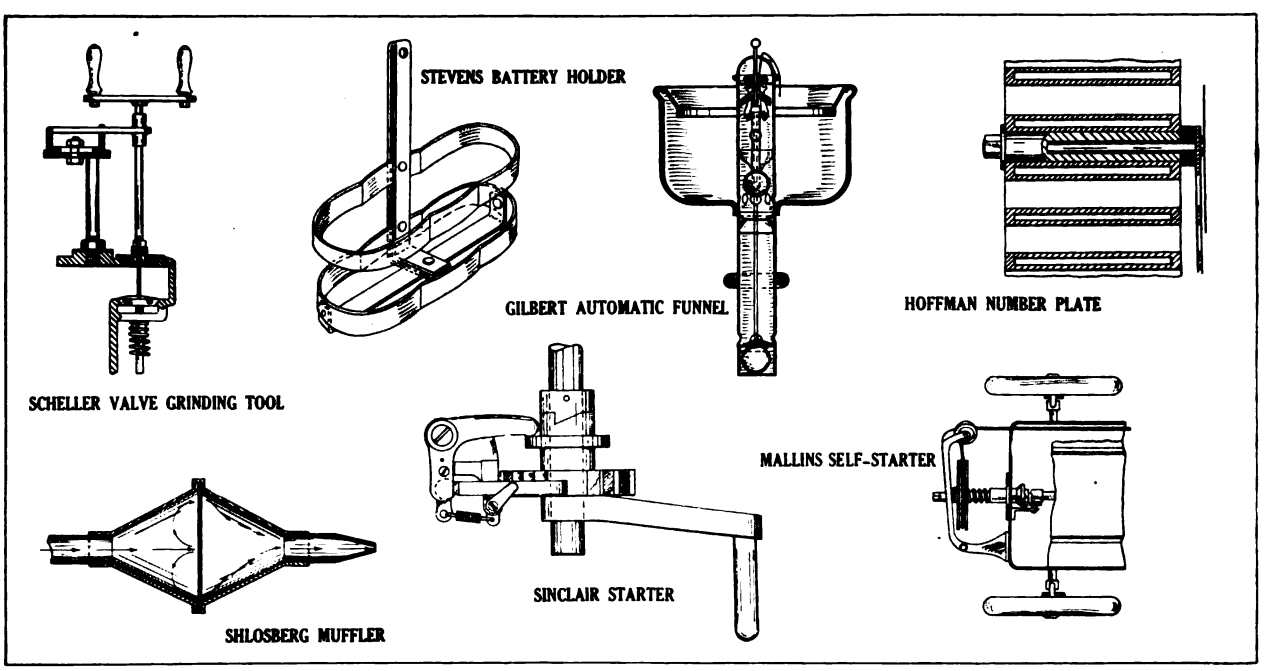
Solid Tire, Alexander Dow, New York City. A solid rubber tire containing several separated layers of fabric, each layer being formed into undulations whose crests extend diagonally of the tire, and with the weave of the fabric extending diagonally of the piece.

Self-Starter, Louis T. Weiss, Jr., New York City. A starter using acetylene gas under pressure, a handle on the dash operating tank valve and individual cylinder valves.

Motor, James C. Peache, Rugby, England. A two-cycle engine with a single sleeve bearing the inlet and exhaust ports at opposite ends.

Clutch and Starter, E. U. G. Reagan, San Antonio, Tex. A combination of clutch and starter, in which a spring is used to turn over the motor, being wound by the latter when running.

Tire, A. William Torkington, Purley, England. A solid tire in two circular halves, held by a band bearing cross arms bolted to plates at the side of the tire.



Some Recent Patents of Interest to the Manufacturer, Agent and Owner, Including Safety Starting Crank, Valve Grinding Tool, Self-Starter, Dry Cell Holder, Number Plate Holder, Automatic Funnel, Etc.

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Lamp, William K. Lenhart, Philadelphia. An acetylene lamp containing one central fixed burner and two adjustable burners, one on each side of the central burner.

Spark Plug, William Ellis, Harrod, O. Has a number of electrodes in two sets with two terminals.

License Tag Holder, John W. Yochem, Tiffin, O. Plate is held top and bottom in channels, the lower part of the device being adjustable to take different size plates.

Motor Fire Apparatus, Harry W. Eisenbise, Reading, Penn. Combination chemical and water pump, the chemical tank valves being three-way allowing chemical to be directed to chemical hose line or mixed with water in the water hose.

Pneumatic Wheel, W. W. Guest, Alameda, Cal. The tread of this is in sections, each section being connected to a piston working in a cylinder containing air. Each cylinder is connected to a compression chamber except when the piston moves inward under the weight of the vehicle.

Lamp, R. G. Harris, Knoxville, Tenn. A lamp containing three reflecting partitions whereby rays of light from one source are directed through bull's-eyes to the right, left and below.

Muffler, Joseph Hall, Manchester, England. The first baffle plate has a dome shaped head which deflects the gases to perforations in the flat portion. The course of the gases is changed three times before they exit.

Electric Horn, Adam Lungen, assignor to Edwards & Co., New York City. A diaphragm is struck by a spring vibrated by an electro magnet, similar to the manner of the vibrator of a coil.

Tire, S. T. Allen, assignor to Triplex Tire Company, Detroit, Mich. The felloe is surrounded by a resilient band around which are arranged interlocking T shaped members, reinforced by metal pieces and held by a flange.

Electric Lighting and Starting System, Charles E. Bonine, Philadelphia. Consists of a shunt and series wound motor-generator, and storage battery with aumatic switch.

Rotary Engine, Jules F. Bourlon, Everett, Mass. Cylinder is annular with a continuous slot in its inner periphery. The pistons are provided with flanges overlying the slot and explosion chambers are formed by movable abutments.

Anti-Skidding Device, Edmund Kron, Milwaukee, Wis. Consists of a runner attached to wheel hub and adjusted a short distance above road surface, becoming effective in snow or mud when wheel sinks in same.

Lamp Bracket, Thomas C. Luce, assignor to the Luce Manufacturing Company, Dalton, Mass. This may be clamped to the frame of the vehicle, and the arms are separate and adjustable to different sized lamps.

Automobile Clock, Henry W. Matalene, New York City. A clock which may be either wound or set by rotating a ring located on the outside of the case.

Carburetor Attachment, H. E. Rogers, New London, Conn. A tube feeding a mixture of oxygen and air to the carburetor.

Carburetor, R. S. Hill and O. P. Underwood, Indianola, Ia. A carburetor in which the air supply is regulated by means of two plates, one covering openings in the other, the separation of the plates determining the volume of air which passes.

Differential, Otto Zachow, assignor to Four Wheel Drive Auto Company, Clintonville, Wis. Sleeves over the axle are connected to the driving member of the differential and may be engaged with the axle forming a differential lock.

Spark Plug, Franz Bartl, New York City. The outer shell of this has an annular shoulder on the interior, against which the core is tightened, and the electrode is circular.

Pipe Wrench, H. R. Sinclair and Carl Ekman, Worcester, Mass. The gripping member of this is a strap held in a wedge shaped passage on the handle by means of a wedge.

Piston, M. F. Bates, Lansing, Mich. The head of this is removable, being bolted onto the body of the piston.

Direction Indicator, J. A. Givens, Los Angeles, Cal. An arrow on a staff on the front of the automobile is moved to indicate direction by means of a hand wheel located on the dash.

Tire, J. A. Goodman and E. S. Ruff, Stockton, Cal. This contains a protective armor in two overlapping layers composed of plates movably held by eyes, slots and pins.

Saddle for Motorcycles, Edward Lycett, Olton, England. The saddle is connected to the frame by a hinge at the nose and at the rear is supported on rods connected to tension springs attached to the frame.

Dumping Body, Thomas Wright, Jersey City, N. J. Bottom converges to the centre, and body may be raised by means of a screw, to deliver the load from the side through a gate.

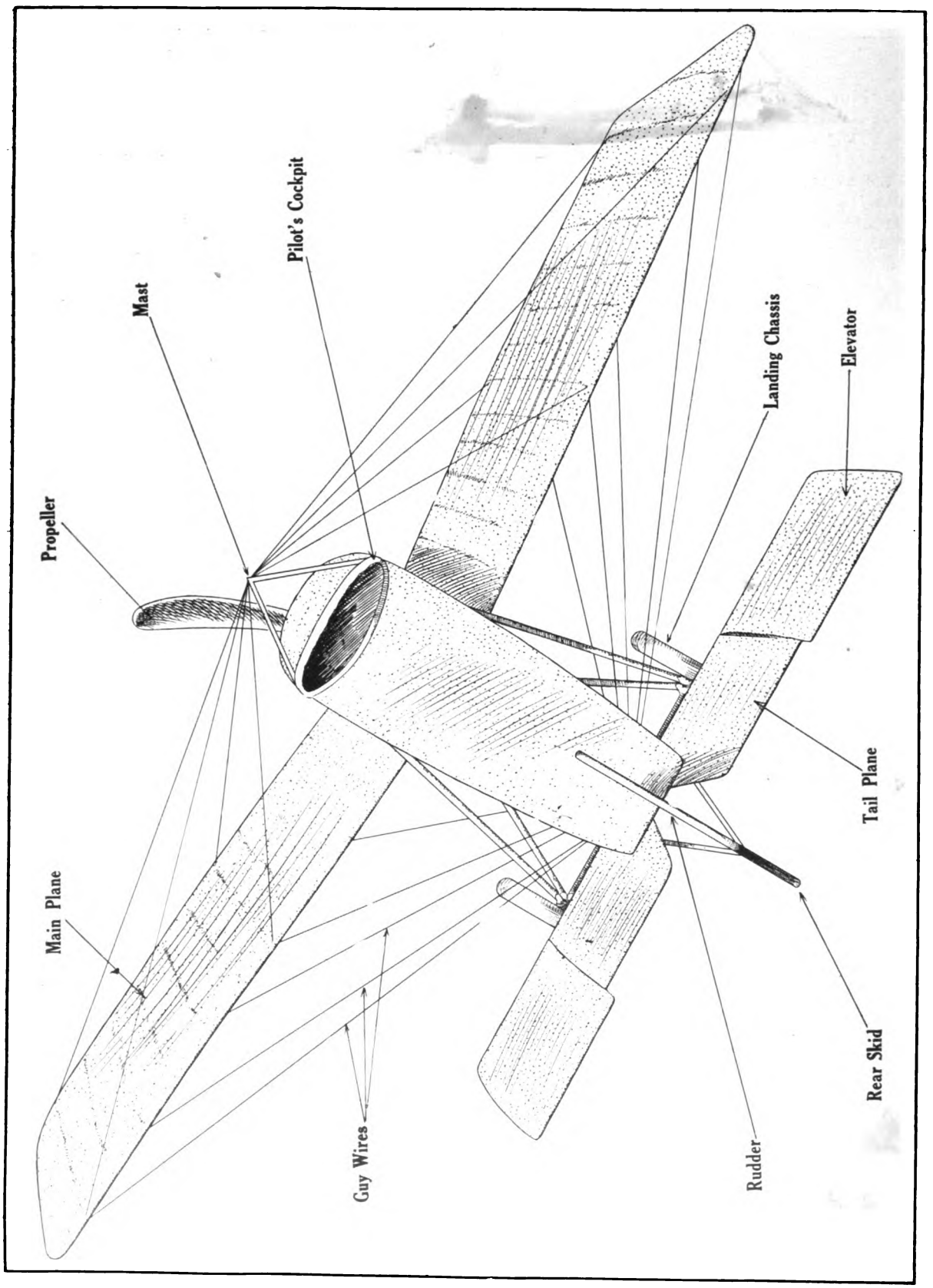
Cutting Tool, O. T. Anderson, Waterloo, Ia. Specially designed for cutting teeth on worm wheels, the tool has an enlarged head, with spiral threads diminishing in diameter and running back from the end cutting faces.

Pipe Wrench, F. H. Dickson, Oswego, N. Y. Handle is provided with two double reversible blocks each of which bears two hooks which engage the chain after it has been passed around the pipe.

JOHNS-MANVILLE IN LARGER QUARTERS.

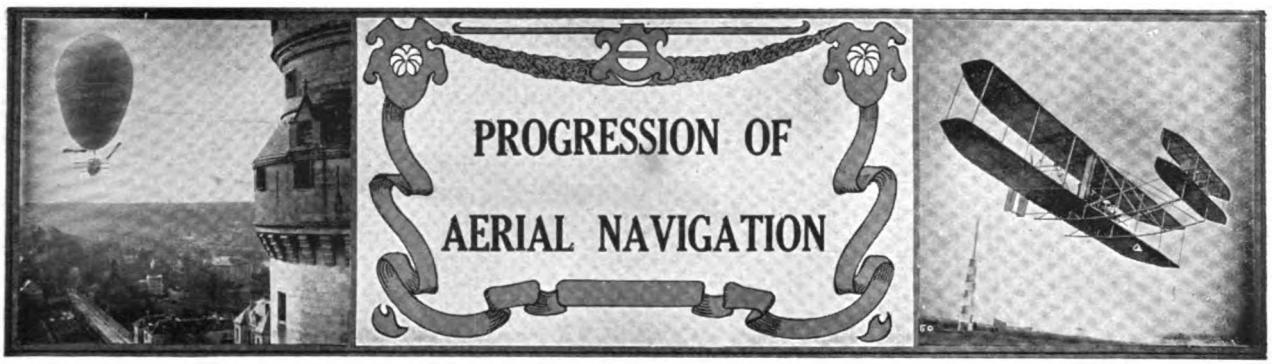
On the 54th anniversary of the firm, April 20, the H. W. Johns-Manville Company moved its New York offices and show rooms to the new 12-story Johns-Manville Building at Madison avenue and 41st street. The entire building, a total of 61 acres of floor space, is occupied by the company.

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Perspective View of the Morane-Saulnier Racing Monoplane, as Seen from Above, Indicating Extreme Elimination of Head and Wind Resisting Construction.

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MORANE-SAULNIER RACING MONOPLANE.

Something over a year ago Leon Morane of France decided there was more money to be made in the construction of aeroplanes than in flying them, albeit he had been decidedly successful at the wheel of the Bleriot monoplane, while a member of Louis Bleriot's school of aviation. Several prizes were taken by him and at one time he was among those who were exceeding the altitude record almost weekly. If memory serves correctly, he was the first to fly a machine equipped with a 100 horsepower revolving Gnome engine.

When he decided to become a constructor, the first Morane monoplane followed closely the design of the Bleriot, although there were some very marked differences, particularly in the matter of landing chassis. In his latest design, the racing machine under discussion here, there is much evidence of originality along these lines. In fact, it may be said that the landing chassis in this machine is a decided attempt to eliminate everything of an unnecessary character.

But to return to Leon Morane: Soon after leaving the Bleriot school he identified himself with the Borel firm, and while his first machine was known as the Morane monoplane, the name of Borel soon afterward became identified therewith. While with this concern Morane became associated with R. Saulnier, and recent designs have been the joint workmanship of these two men. Last fall, for some reason, both Morane and Saulnier retired from the Borel factory and started in business together.

The new series is known as the Morane-Saulnier, and comprises no less than four models, the racer, fitted with 50 horsepower Gnome; a school machine, with 35 horsepower Anzani engine; a two-seated military monoplane, with 70 horsepower Gnome, and an all-steel military machine, with gun carriage and 70 horsepower Gnome. It may be added that the last named has still to be given its preliminary tests, so far as is known in this country.

The racing machine has proved very fast in actual work, and already is looked upon as one of the successful designs in the forthcoming French elimination trials to select a team for the fourth international cup race at Chicago in September. During its initial test Jules Vedrines took it to an altitude of 1000 feet on the first attempt, flying 20 minutes at a speed of 78 miles an hour, which is considered decidedly remarkable for a machine equipped with a motor of only 50 horsepower.

It will be seen that it has been designed especially for speed. The chief aim has been to reduce head resistance to a minimum, and in this respect it has been particularly successful. Every detail contributes toward this end, including the landing chassis mentioned before.

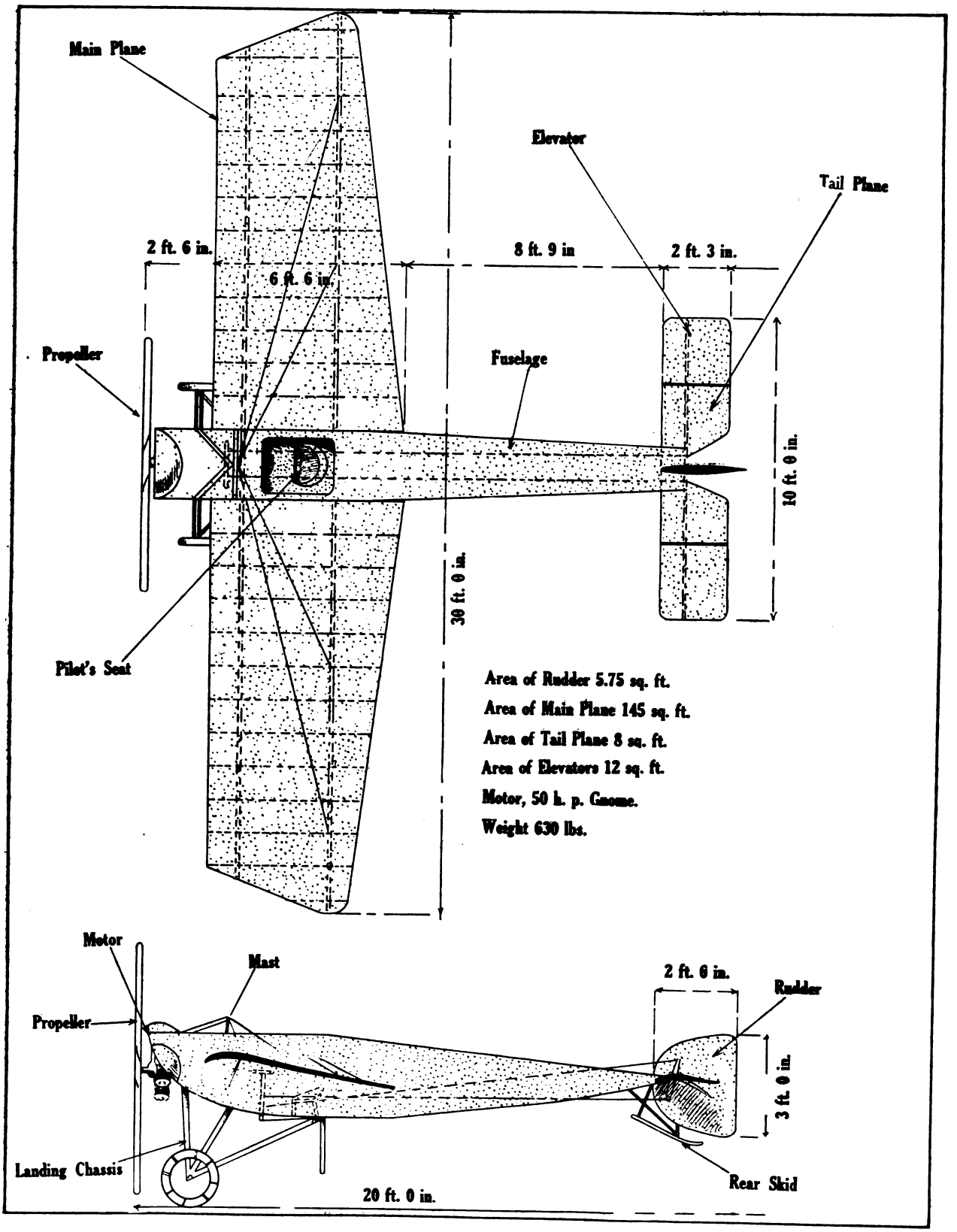
The fuselage is enclosed throughout its entire length, the perspective shown herewith, which presents a view from above, bringing out this feature. The pilot's cockpit is the only break, with the exception of the lower portion of the motor housing, this construction being deemed necessary for the proper cooling of the revolving cylinders. So deep is the body at the pilot's seat that he sits well down into the machine, only his head protruding above the fuselage proper. This is done for the purpose of protecting him from the rush of air which strikes the forward part of the machine at great speeds. It follows that the control levers are entirely hidden, and their exact location may be noted from examination of the side elevation.

The construction of the fuselage is of the customary box girder type covered with fabric. From a point slightly back of the cockpit, it tapers gradually in square section to the empennage. The covering for the motor forms a wind and oil shield, which prevents the occupant of the cockpit from becoming spattered with lubricant. This is of steel.

Little change is noted in the design of the main plane, over that utilized in the older machine, now known as the Borel. In plan form the wings are almost analogous to a blade of the Chauviere propeller, which is utilized. The entering edge is shorter than the trailing edge, and it is claimed that the strain felt at the tips is reduced in a great measure by this design, and that it is possible by this means to obtain a more powerful warping effect for correcting balance. The wings are guyed to a mast just forward of the pilot's cockpit and to the middle point of the undercarriage by stranded steel cable.

The empennage consists of a fixed tail plane, or rather two tail planes,one on either side of the rudder, and two elevators. It will be noted that the rear end

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Plan View and Side Elevation of Morane-Saulnier Racing Monoplane, Showing Detailed Dimensions, Etc.

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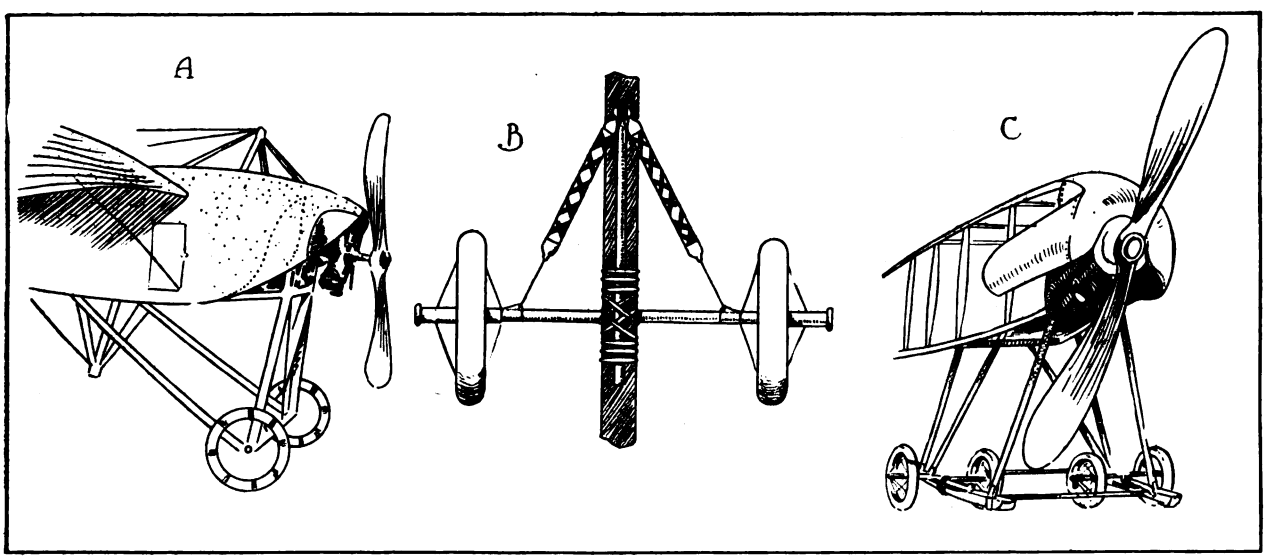
of the fuselage is recessed for a short distance, and that the tail plane fits into this. On either side of the balanced rudder this fixed plane is cut away to permit of easy turning of the former. The plane itself acts the part of a stabilizer, and the rotatable elevators govern the altitude of the machine.

Control of wing warping mechanism and the rear elevators is by a vertical universal jointed lever, of which the action is identical with that of the Bleriot. The rudder is operated by a pivoted foot bar, conveniently located.

As has been stated, the chief interest attaches to the landing chassis, and although Morane first came into prominence as a constructor through his attention to this particular detail, it is somewhat surprising to note the revolutionary character of the design in this respect. It must be remembered, however, that the object sought was a racing machine capable of great speed, and it was not contemplated that it guy wires from the wings are fastened. The running wheels are provided with steel spokes, which may add a modicum of flexibility.

The construction of the other models follows along the same general lines, with the exception of the chassis, which are of the Henri Farman type, in which the skids are upturned in front and apparently are not intended to come into action in landing. The wheels also are mounted in a slightly different manner, as indicated in B and C of the accompanying sketches. The fuel tanks are arranged under the steel windshield, which is heavily padded along its rear edge to prevent any personal injury to pilot or passenger in case they are thrown forward in landing.

The fuselage of the all-steel "war" monoplane is of torpedo form and constructed throughout of sheet steel. From its blunt nose, which is ventilated and which encloses the motor, to a point at the rear of the pilot's seat, this steel body is circular in section,



Some Constructional Features of Morane-Saulnier Monoplanes: A, Landing Chassis and Engine Mounting in Racing Model; B, Diagrammatical Sketch of Landing Gear on Other Types; C, Front View of Two-Seated Military Design.

should be flown except in contests, where a suitably smooth landing place would be provided.

All means for shock absorbing, other than the resiliency of the pneumatic tires, have been eliminated, effectually reducing the head resistance. There is no skid in front, although the tail is provided with a small one. This rear skid takes up some of the shock, so that when the machine comes to a full stop it rests on this at the back, the pair of rubber tired wheels at the front, and a short steel tubular post just back of the pilot's seat.

The chassis itself is constructed entirely of oval section steel tubing. Struts lead from either end of the axle directly up to the lower portion of the engine housing, and backward to the vertical post, previously mentioned. Additional struts lead from the centre of the axle to either side of the engine housing, and it is to the bottom of these struts that the under but from that point to the tail it flattens out horizontally. Even the skeletons of the wings and the rear controlling surface are carried out very cleverly in metal. As said before, no announcement has been made in this country as to the success of this machine in actual flight.

GRAND RAPIDS CLUBHOUSE COMING.

Work on the clubhouse of the Automobile Club of Grand Rapids, Mich., is to begin soon, plans having been completed and contracts for excavation and foundation work having been let. The building will be located seven miles north of Grand Rapids, at Plainfield.

Advocate uniform motoring laws in the interests of pleasant and profitable interstate touring.

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MOTORING NEWS OF NATIONAL IMPORT.

New York Motorists Secure Good Roads Man---Inventor of Diesel Engine Here---Activities Among Manufacturers---New Concerns Organized---Haverhill Holds Show---National Association Hold Meetings.

The directors of the New York State Automobile Association held their regular quarterly meeting at Rochester recently and elected Frank D. Lyon, of Binghamton, secretary. Mr. Lyon was formerly deputy state highway commissioner, and has been connected with highway work in New York for a number of years, so that he is one of the best posted men on the situation in the state. In the association he succeeds Mr. Ritchie, who resigned on April 1 to take up another line of work. Mr. Lyon was recently appointed secretary of the executive committee of the National Congress of Good Roads, but was prevailed upon to decline this honor and accept his present position.

The $50,000,000 bond issue, which will be placed before the voters of the state at the coming fall election was considered at the meeting of the directors which elected Mr. Lyon, and plans outlined for a campaign of support for the project. The meeting authorized the executive committee to use every means and all available funds to carry on a publicity campaign to influence and educate the public during the coming summer. The necessity of this additional $50,000,000 to properly carry on the present highway work and to provide for the future will be emphasized.

ENGINEERS IN DETROIT.

Splendid Programme of Entertainment and Discussion Being Prepared for Summer Meeting.

The dates for the summer meeting of the Society of Automobile Engineers, which will be held in Detroit, have been fixed for Thursday, Friday and Saturday, June 27, 28 and 29. The headquarters will be in the Hotel Pontchartrain, where the meeting will be held in the convention hall. Several matters of importance to the industry as a whole will be taken up, although the full programme of papers and matters for discussion has not been announced as yet. Naturally, the members of the society in Detroit are anxious to provide something decidedly out of the ordinary in the way of entertainment; something befitting the centre of the industry, and a programme of entertainment and sight seeing is now in the hands of the following committees:

Entertainment—H. E. Coffin, Hudson Motor Car Company, chairman; H. W. Alden, Timken-Detroit Axle Company; Russell Huff, Packard Motor Car Company. Finance—H. M. Leland, Cadillac Motor Car Company, chairman; Tracy Lyon, General Motors Company. Transportation—F. H. Floyd, chairman; F. E. Sweet, Cadillac Motor Car Company; H. R. Corse, Lumen Bearing Company. Hotels—G. W. Dunham, Chalmers Motor Company, chairman; F. H. Berger, Oakland Motor Car Company; J. G. Vincent, Hudson Motor Car Company.

DIESEL ENGINE COMING.

Famous Inventor Declares Its Suitability for Automobiles and Seeks American Maker.

Dr. Rudolph Diesel of Germany, inventor of the famous Diesel engine, is at present in this country for the purpose of interesting American automobile makers in the utilization of his motor. He declares that within a year it will be adopted as the propulsive agent for motor trucks, and that it is only a question of time before it will be employed in pleasure cars as well. The Bureau of Commerce and Labor in Washington learns that at least one American manufacturer is considering the subject seriously, and while this concern is not engaged directly in the production of vehicles, it is possible that it contemplates future possibilities.

As is more or less well known the Diesel engine was originally produced in 1897. It is built in both two and four-cycle types, and will burn any hydrocarbon from the very heaviest of crude oils to the lighter distillates. It is even claimed that animal and vegetable oils may be utilized for fuel, excellent results having been obtained with both castor and palm oils.

Dr. Diesel delivered an address concerning his motor before the American Society of Mechanical Engineers in New York, April 30, this lecture being under the auspices of the gas power section.

PEERLESS COMPANY EXPANDS.

New Stock and Bond Issues Place Liberal Fund at Disposal of Truck Department.

Because of the recent growth of the company's business the Peerless Motor Car Company, Cleveland, O., maker of Peerless pleasure and commercial lines, recently offered for sale to its stockholders only, $300,000 of additional capital stock, which was largely over-subscribed. It also has sold its six per cent.

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bonds in the amount of $1,100,000, these maturing in installments covering a period of 12 years.

It is understood that the sale of bonds was for the purpose of providing funds for developing and extending the business, particularly to meet the requirements of the commercial vehicle department. The additional capital stock provided money with which to take up the company's floating indebtedness.

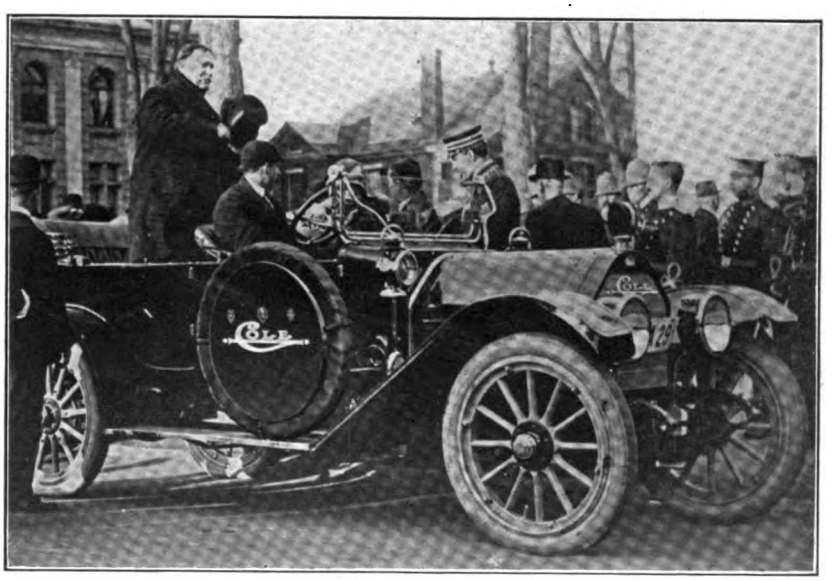
PRESIDENTIAL CAMPAIGNING.

Automobile Is Destined to Play Important Part in Political Situation This Year.

Apparently the automobile is destined to play an important part in the forthcoming presidential campaign. As has been true of all political activities during the past few years, those in charge of the various candidates have discovered that in the mechanically propelled vehicles they have a valuable means of covering large territory in a limited time. Heretofore it has been necessary to charter a special train and subject the candidate to the task of speaking from the rear platform at such stations as it was possible to make stops. Nowadays the railroad schedule is eliminated largely, and the automobile takes the speaker to towns which have but one or two trains a day, and the candidate is able to show himself to a much greater percentage of the voters.

The entertainment committees charged with the duty of making plans for the reception of candidates and speakers have little trouble in securing the necessary automobiles, since every dealer throughout the country is quick to appreciate the publicity accruing to him through the use of his car for such purposes. There is another view of the matter as well. Politicians have shown decided unfamiliarity with the needs of motoring in the past, and it is possible that many of them will be led to appreciate the necessity for more uniform legislation and less attempts to discourage the motorist will result. Of course, pre-election promises are easily forgotten, but there is room for hope along this line.

As is well known, President Taft is an ardent and consistent motorist. It does not seem at all out of place to find him in an automobile. In fact, it is to be expected that he will make use of this form of conveyance wherever possible, because he is well aware of the advantages to be gained thereby. An accompanying illustration shows him speaking from the tonneau of a Cole car in Concord, N. H., during his recent visit to that state. It is probable that this will prove one of the characteristics of the present campaign.



President Taft Speaking from Cole Car at Concord, N. H., with W. H. Alexander, Local Agent at the Wheel.

BUFFALO ELECTRIC MERGER.

Completed Organization Discloses Men and Concerns Interested in $1,000,000 Company.

Additional information concerning the organization of the Buffalo Electric Vehicle Company, the announcement of the incorporation of which was made last month, reveals the fact that it is to become a merger of four big business enterprises in that city. The company is capitalized for $1,000,000, of which $700,000 is common stock and $300,000 preferred. The latter has been entirely underwritten by Buffalo people, and a large portion of the common has been taken by capitalists who are residents of that city.

Immediately after the election of officers the concern took over the capital stock of the Babcock Electric Carriage Company, Clark Motor Company, Buffalo Automobile Station Company and the Buffalo Electric Carriage Company. By the purchase of these plants the new concern comes into possession of a splendid factory for the manufacture of electric pleasure vehicles, another for electric trucks and one of the best garages in the city. In addition it takes over the branch houses of the Babcock Electric Carriage Company in Chicago, Cleveland, Rochester and other cities.

The officers are as follows: President, Samuel J. Dark; vice presidents, A. A. Landon and W. A. Morgan; treasurer, Harry Yates; secretary, Alfred W. Thorn; directors, Messrs. Dark, Landon, Morgan, J. T. Steele and W. Van Allen. S. J. Dark, the president, is secretary of the Buffalo Dredging Company and of

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the German-Bock Asphalt Company, and a director of the Commonwealth Trust Company. Of the two vice presidents, Mr. Landon is president of the Clark Motor Company and superintendent of the American Radiator Company, while W. A. Morgan is president of the Buffalo Taxi Company, director of the Buffalo Copper & Brass Rolling Mill and local manager for Swift & Co.

HAVERHILL'S FIRST SHOW.

Manager Corbett Also Plans Novel Exhibition of Used Cars for Boston During June.

The first automobile show ever held in Haverhill, Mass., was staged in Mt. Washington hall, April 22-27, under the management of O. D. Corbett of New York City, who has been instrumental in the success of several displays of this character in Massachusetts cities both this year and last. Some 25 cars were exhibited, as well as motorcycles and accessories. The attendance was quite satisfactory from every viewpoint, and the number of sales exceeded expectations.



O. D. Corbett, Manager Haverhill Automobile Show.

The general color scheme was pink, white and green, and so artistically were the side walls and ceiling draped with bunting that there was no evidence of these to be had. Streamers of electric lights, encased in green floral shades, extended from the balconies to the ceiling, giving an added touch of brilliancy to the interior. An orchestra of young women furnished music.

The following made display of cars: Lawrence, Inc., Lexington; Hovey & Bagley, Maxwell and Stoddard-Dayton; Jackson Motor Car Company, Jackson; A. G. Willis, Hudson; Sawyer & Dean, Mitchell; W. H. Stevens, National; E. E. Elder, Rambler; M. J. Doyle, American; Empire Motor Car Company, Stutz; Treat Hardware Company, International wagon.

Other exhibitors were: H. E. Sawyer, Pope, Thor and Harley-Davidson motorcycles; George E. Seavey, Indian motorcycles; McCart Company, Martel blowout patches; Meyers Bros., novelties.

As has been stated, Mr. Corbett has been decidedly successful in holding motor car shows in the smaller cities of New England. He is now planning to enter Boston with a decided novelty, insofar as automobile displays are concerned. The proposition has not taken definite form as yet, but he contemplates holding a used car show in that city some time next month. Briefly stated, the idea is to enable the various agencies to dispose of their second hand cars and start the season with nothing but new machines on hand.

MONEY FOR GOOD ROADS.

More Than 1,000,000 Miles of Highway to Receive Attention in Various Sections.

According to the good roads board of the American Automobile Association, more than 1,000,000 miles of highways in all sections of the United States will receive attention of one form or another during 1912, and most of this work can be traced directly to the influence of the self-propelled vehicle. In the spring reports received by this board there is an unusual fund of information to be secured in regard to this matter.

New York, Maine and Pennsylvania will vote this fall on referenda providing for bond issues to be placed at the disposal of the highway departments. In Nebraska, the legislative committee of the state automobile association is preparing three measures, one providing for a state highway commission, another permitting the use of convicts on roads, and a third appropriating money for state aid, these to be presented at the next session of the legislature.

President T. G. Norris of the Arizona Good Roads Association expects the legislature of that state to make an appropriation for this work before adjourning. Similar results are expected in New Mexico. At the annual meeting of the Idaho State Automobile Association steps were taken to pledge the money necessary to complete what is called the Ross Fork sand road, giving a graded highway from Salt Lake City to Island park and on to Yellowstone National park. These organizations are actively engaged in promoting an effort to open this latter park to automobile traffic.

Concurrent with the opening of New Jersey to non-resident tourists, comes the information that the legislature passed three bills during its concluding session, one of which provides for a state system of highways, another for distributing the cost of their construction and maintenance, and the third adding the state treasurer to the highway commission. State Commissioner Stevens has decided to expend $2000 of the automobile money in posting the way from Jersey City to Camden, this being interstate in character, in that it is used chiefly by non-residents in going from New York to Philadelphia and southern points.

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TRUCK STANDARDIZATION.

National Association of Automobile Manufacturers Decide to Assist Body Making Industry.

At the meeting of the National Association of Automobile Manufacturers in New York City, May 1, much of the time was taken up in a discussion of motor truck matters. It may be added, as well, that the Federal Motor Truck Company, Detroit, maker of the Federal line, was admitted to membership.

Among other things the association recommended the following standard truck frame sizes: Width, 36 and 42 inches; length, 48, 60, 72, 84, 96, 108, 114, 120, 126, 132, 138, 144, 150, 156, 168, 180, 192, 204, 210 and 216 inches. The object of this action was to arrange matters with a view to providing for interchangeability of bodies, and to enable the body maker to prepare standard stock bodies which may be delivered to the purchaser at once. The desirability of such standards is better understood, when it is learned that there are at present some 88 different models presenting 19 varying widths from 28 to 46 inches, and over 100 models with 41 differing lengths from 48 to 218 inches.

The question of making charge for commercial vehicle demonstration also was taken up, and resolutions recommending the following charges were adopted: Half-ton truck, $10 a day; one-ton, $10; two-ton, $15; three-ton, $20; four-ton, $25; five-ton, $30; six-ton, $30; seven-ton, $35; eight-ton, $35; nine-ton, $40; 10-ton, $40.

FEDERAL REGISTRATION BILL.

American Automobile Association Takes Action Somewhat Reversing Its Former Position.

The action of the executive committee of the American Automobile Association concerning the matter of federal registration at its meeting in Buffalo, N. Y., the last week in April, has occasioned some little surprise. It will be remembered that this association drafted the first federal registration bill presented to Congress and strenuously urged its passage. At this meeting a resolution was prepared by H. L. Vail of Ohio, C. M. Robinson of Connecticut and John Wilson of Pennsylvania, in which it was stated that:

"In the opinion of the members of the A. A. A. executive committee a federal registration act is not only unnecessary at the present time, but against the interests of automobilists of the different states," and "that the imposition of an additional tax for federal registration would be unfair and unreasonable discrimination against users of automobiles, and that the passage of such a law would be most unjust."

It is understood that the resolution was influenced somewhat by the recent action of the New Jersey legislature in opening the roads of that state to non-resident motorists, and more largely by the fact that the bill prepared by this association has been so amended that instead of being optional with motor car owners, federal registration is made compulsory and drastic penalties have been inserted in the bill.

HEADS MARION COMPANY.

J. I. Handley Becomes President of Reorganized Concern Which Increases Capital.

Official announcement is made of the reorganization of the Marion Motor Car Company of Indianapolis, Ind., negotiations which have been under way for some weeks having resulted in the signing of the necessary agreements. The capital of the concern has been increased from $100,000 to $1,125,000, with $625,000 common stock and $500,000 preferred.

Under the terms of reorganization J. I. Handley, until recently vice president of the United States Motor Company, becomes president, and the major portion of the stock is owned by him and John N. Willys, president of the Willys-Overland Company of Toledo, O. It is stated, however, that the new concern is in no way connected with the manufacture of Overland cars, or with the American Motors Company, with which it will be remembered Mr. Handley was long connected as president.



J. I. Handley, President Marion Motor Car Company.

The Marion Motor Car Company, which has been closely identified with the Overland interests for some time past, now becomes an absolutely independent and self-contained organization and will continue the manufacture of two models of touring cars. Within a few weeks, it is expected that President Handley will announce a strong personnel of Marion officers, which, it is understood, he has been recruiting from the ranks of his competitors. In addition, it is stated that plans are under way for the construction of another large and modern plant in connection with that now owned in Indianapolis.

Advocate uniform motoring laws in the interests of pleasant and profitable interstate touring.

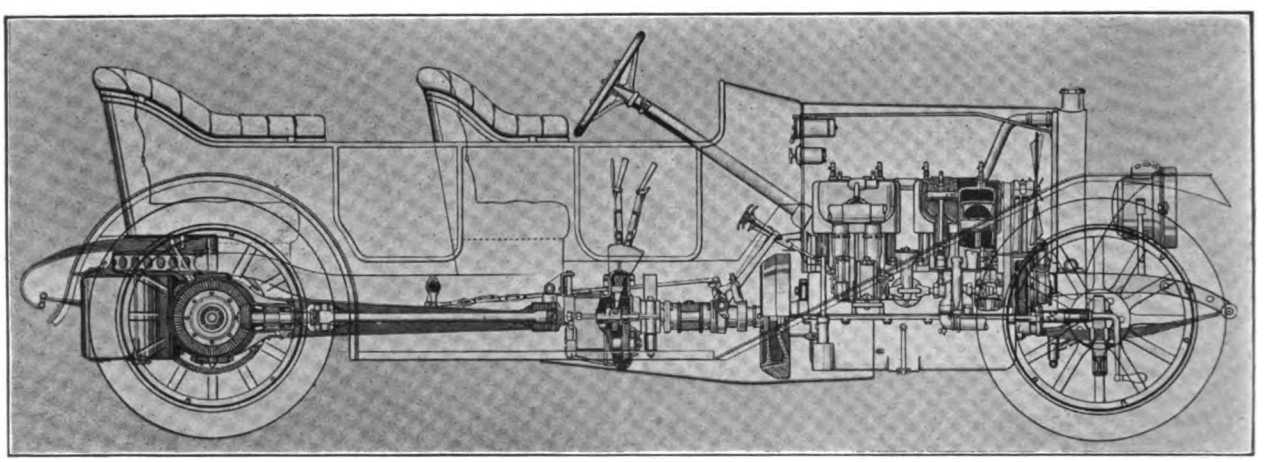
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THE SERIES V NATIONAL CARS.

WHILE it is remembered that the National Motor Vehicle Company, Indianapolis, Ind., maker of National cars, ceased to bring out what is termed the annual model in 1910, the new series V, announcement of which has just been made, is in every particular a 1913 design. It may be added in this connection that the series S, which was announced early in 1911, is continued practically without change, except in such minor details as make for refinement.

Quality, reliability and service supply the basis upon which the success of the National cars has been founded. For 12 years the manufacturing forces of the National Motor Vehicle Company have had no other standards, and the increasing popularity of this product has been such as to demonstrate that the motoring public recognizes the vital significance of these principles. In presenting series V, the officials of the company are confident that it completely typifies the developing a machine which will meet the exacting requirements of a discriminating clientele. The National 40 may be said to be the result of experimentation in every form of contest—road races, speedway and motordrome meets, beach events, hill climbs, track meets and reliability trials. In each of these it has stood forth pre-eminently as a successful competitor.

The official records for 1911 show that National cars, whether in the hands of professionals or amateurs, secured nine firsts, three seconds and two thirds in road races; 11 firsts, seven seconds and five thirds in speedway and motordrome meets; 20 firsts, 10 seconds and five thirds in beach events; 29 firsts, nine seconds and five thirds in hill climbs, and 15 firsts, 19 seconds and 13 thirds in track meets. Out of 202 entries for the year, cars of this make finished first 83 times; second, 48, and third, 31.



Sectional View of New National Series V Toy Tonneau Model, Outlining the Straight Line Shaft Drive.

aims of all makers of cars in all countries as to power, reliability, design and comfort.

But one chassis is offered, this being equipped with five body designs—a seven-passenger touring, a five-passenger touring, a toy tonneau, a speedway roadster and a three-passenger coupe. The motor is a four-cylinder, 40 horsepower unit, which is extremely noiseless in operation. The bodies are long, low and spacious. The lines are particularly graceful, being strong and straight, with long wheelbase, wide doors, smart sloping hood, large tires, deep luxurious upholstery, and every appointment which makes for comfort and easy riding. The equipment is most complete, including self-starter, gas and electric lights, tire pump integral with the motor, and all the other little niceties which enter into the convenience of motoring.

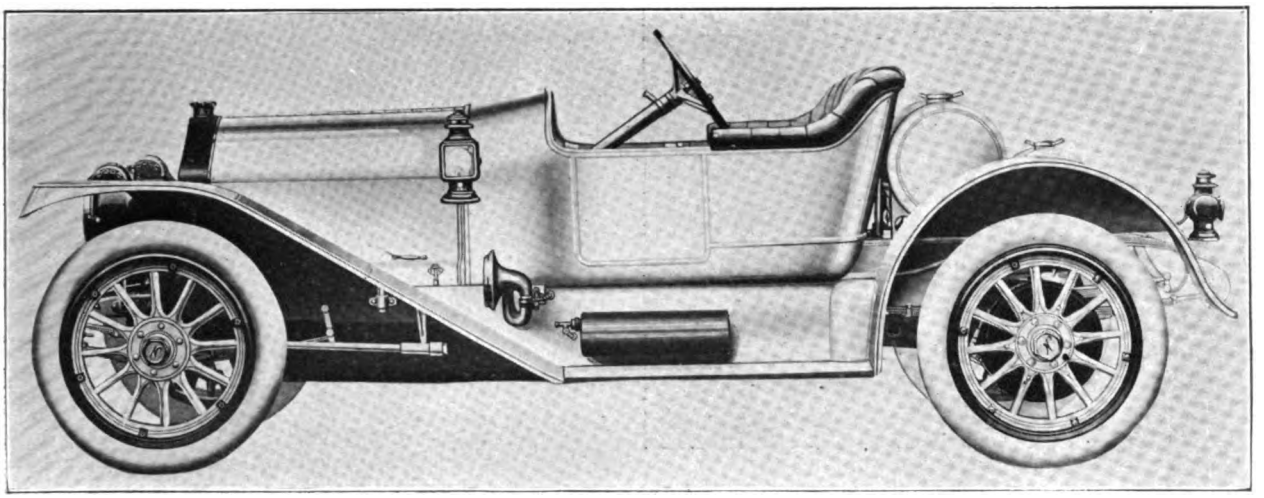
National cars enjoy an enviable reputation in contest work, and the company considers this of inestimable value, particularly as it has been the means of

This in itself is a remarkable record. No other manufacturer was able to present a showing in any manner approaching it. It follows that series V represents not only all that modern engineering and designing can produce in the matter of comfort and attractiveness, but it is the result of consistent experimentation under conditions which actually demonstrate its ability to meet the requirements of the most exacting owner.

Constructional Details.

Although several changes in constructional details are noted, these making for quiet operation, durability and accessibility, as well as low cost of maintenance, the series V retains the general characteristics which have become standard with the National. The most striking innovation is the adoption of the left hand position of the driver, which combines the advantages of providing a clear vision of the road in either direction, negotiating corners with safety, easy access to both front seats, etc. However, with this

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Two-Passenger National Speedway Roadster, with Particularly Low Centre of Gravity and Graceful Body Lines.

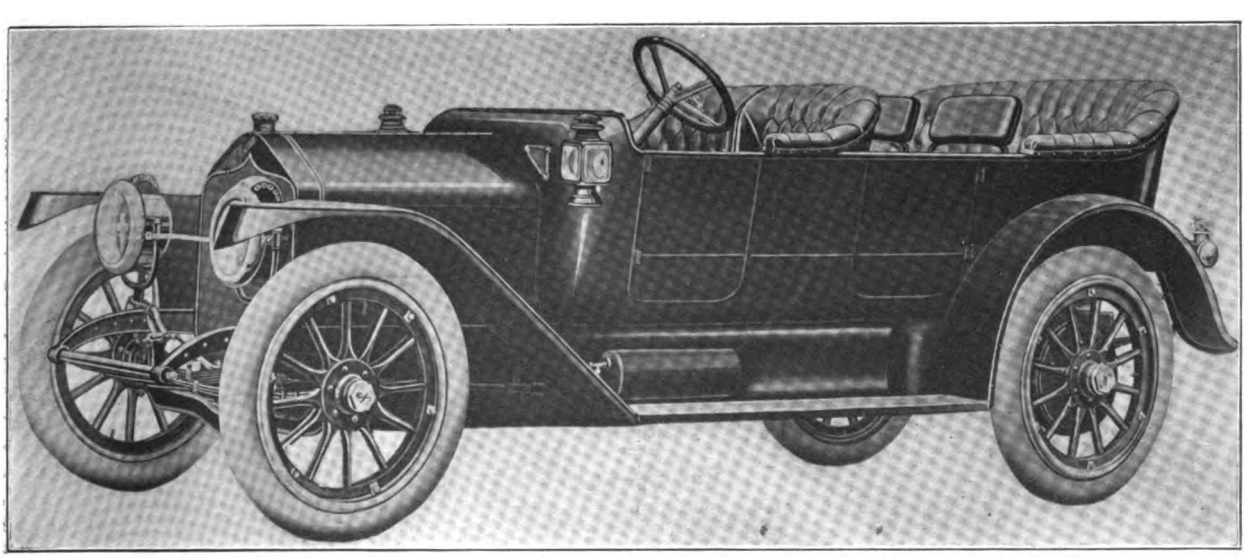
the control levers are in the centre, a feature which will appeal to those familiar with the right hand control.

This locating of the steering column at the left has been productive of changing the inlet valves, manifold and carburetor to the left hand side of the motor, the exhaust valves, manifold, water pump and magneto being on the right. The design of the motor has not been altered, the T head vertical, four-cylinder, four-cycle, water-cooled type, so successful in the past, still being employed.

Power Plant.

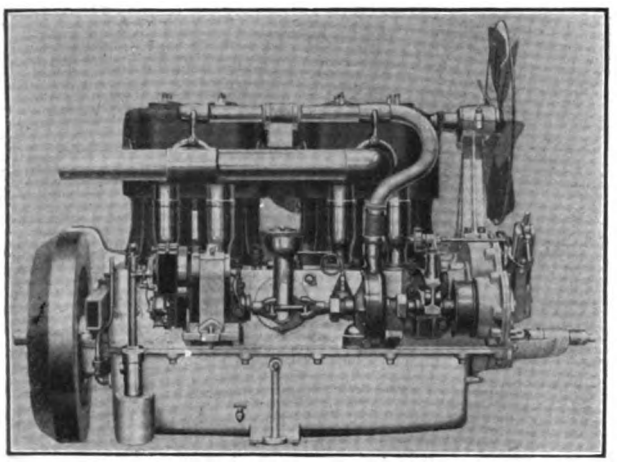
The cylinders are cast in pairs of a special high grade, close grained gray iron, thoroughly annealed, and the integral water jackets are of ample size, insuring maximum efficiency through proper cooling under all conditions. The practise of utilizing stiffening ribs extending from the water jackets to the base of the cylinders, is still adhered to, a feature making for sturdiness. A slightly longer stroke is noted, the cylinder dimensions being 4.875-inch bore and six-inch stroke, while those of the series S are five and 5.6875-inch, respectively. Although the bore and stroke have been changed, the horsepower is rated as formerly, but it is stated that the series V motor will develop between 15 and 20 per cent. more power than its precedessor.

The design of the piston is the same, the slightly domed head and inside web bracing features being retained. Four eccentric piston rings are located above the wristpin which is secured by a single set screw passing through one of the bosses. Both piston and rings are machine ground accurately to size, insuring a perfect and even compression in all cylinders. The mechanically operated and interchangeable valves are of liberal size, having nickel steel heads, and both



Seven-Passenger National Touring Model Having Luxurious Upholstery and Complete Appointments.

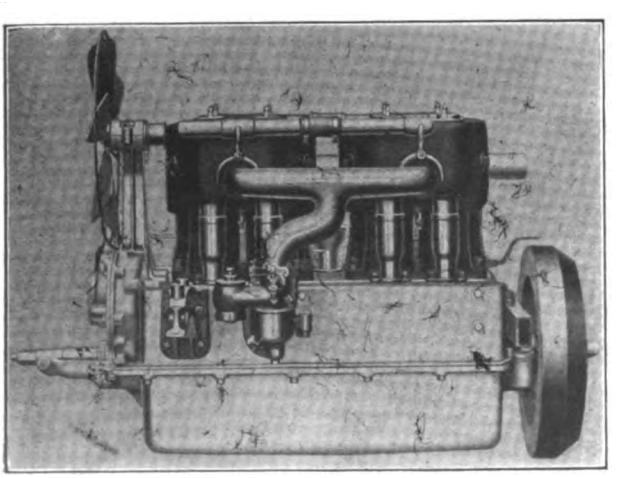
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Right Hand Side of Motor, Depicting Location of Magneto, Water Pump and Method of Drive.

the intake and exhaust members and springs are enclosed, a new feature, one making for noiseless operation as well as eliminating dirt and abrasive foreign elements. These housings are of sectional pressed steel, the two halves being held together by a spring clamp device, facilitating easy removal and replacement without the aid of tools. Their bearing is provided by the top of the flanges of the pushrod guides. The latter are fitted with hardened and ground steel rollers, operating in bronze guides. The design is such that perfect alignment is secured and means for proper lubrication are incorporated. The construction throughout insures durability and accurate timing.

The connecting rods are of drop forged steel, having liberal sized bearings of specially designed phosphor bronze, babbitt lined, this bronze retainer being a new feature in the National motor. The crankshaft is of chrome vanadium steel, ground to .001 inch, with extra long bearings, these being die cast Parsons' white bronze. All studs and bolts are made of especially heat treated chrome nickel steel. The crank

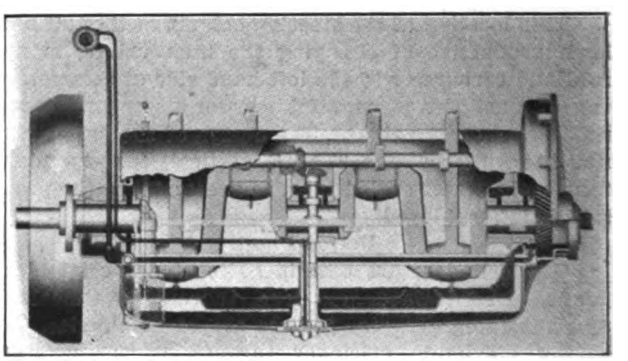


Left Side of Power Plant, Showing Carburetor and Method of Enclosing Valves.

and camshafts are retained in the upper half of an aluminum crankcase and the operatng gears are of silico manganese steel, noted for its toughness and shock resisting qualities. These gears are spiral, accurately cut and finished, and operate in a bath of oil, insuring quietness, as well as eliminating friction. The design of the cams is such that an accurate and noiseless operation of the valves is secured as well as correct timing.

Oiling System.

The distinctive National oiling system is retained, the severe tests of hill climbing, road and track contests having demonstrated its reliability under all conditions, as well as insuring the maximum mileage with the minimum amount of lubricant, combining as it does the efficient features of constant circulation and splash. A constant level, force feed oiler, actuated by a gear driven pump located on the right hand side of the crankcase, delivers oil to all working parts of the motor, positively lubricating bearings, gears, etc. The ends of the connecting rods, which are fitted with oil scoops, dip into reservoirs filled with lubricant, and



A Gear Driven Pump Delivers Oil to All Working Parts, Insuring Perfect Lubrication.

constant level is maintained by the surplus oil flowing from these compartments back to the sump located in the lower oil compartment whence it is pumped to the bearings. The crankcase capacity is four gallons, but the roadster is equipped with an auxiliary oil tank on the rear deck containing 10 gallons, with pressure feed to the crankcase.

Carburetion.

The Schebler carburetor is continued, the 1.75-inch size being fitted to all models except the roadster, which is equipped with a two-inch. Vibration is prevented by a metal strap connecting the carburetor rigidly to the crankcase at a point a little forward of the centre on the left hand side of the motor. A Miller carburetor is optional on the roadster, and a Diezemann on touring and toy tonneau models. The design of the aluminum intake manifold eliminates bends and curves thus affording an unrestricted passage of the vapor to the combustion chambers, and like the cylinders, is finished in black enamel. The exhaust manifold and muffler are designed to afford a quiet exhaust with minimum back pressure, the former be-

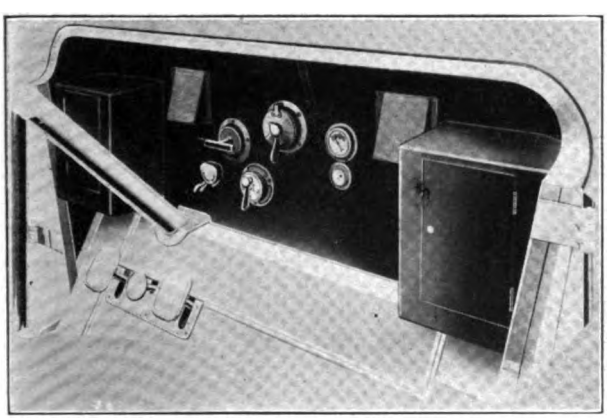
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ing of liberal size. A feature of the National motor is that no gaskets are utilized, all connections being accurately ground providing perfectly tight joints.

Pressure feed is utilized on the series V models, pressure being secured from a small pump located in the crankcase and driven from the camshaft. A cam actuates a one-inch piston, attached to which by an arm extending from the piston head is a roller held in contact with the cam by means of a spring, .625 inch in diameter. A ball check valve allows the compressed air to pass from the piston barrel on the instroke of the piston to the pipe leading to the fuel tank. The gasoline capacity of the touring and toy tonneau models is 21 gallons, that of the roadster, 30 gallons.

Ignition.

The efficiency of the motor is augmented by new ignition system providing two simultaneous sparks in each cylinder at the gaps of two separate plugs, current being supplied by a Bosch gear driven high-tension magneto having a double distributor. The

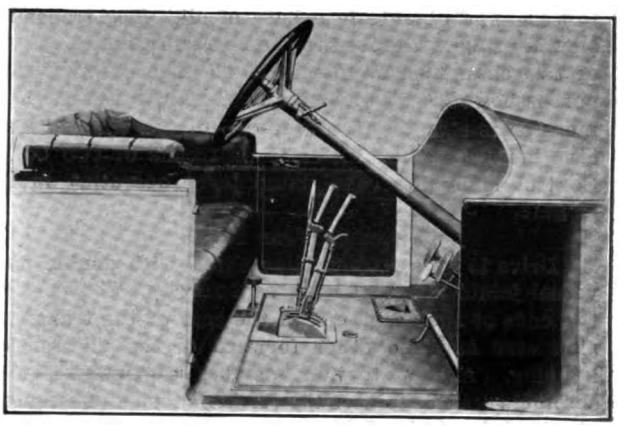


Showing Control Pedals at the Left and Dash Equipment Including Two Lockers.

spark plugs are located in the valve caps on either side of the cylinder heads, this arrangement making for more rapid and complete combustion of the mixture. The roadster is equipped with a double distributor Splitdorf magneto and two sets of plugs. All types utilize storage battery as reserve. Each system, by the utilization of the double distributor, operates both sets of plugs.

Cooling.

The same type of centrifugal water pump is utilized, although it is made slightly larger. This is located on the right hand side of the motor and is gear driven from the half time gears, an extension of the pump shaft actuating a universal coupling attached to the magneto. The cooled water enters the cylinder jackets between the exhaust valves, and after circulating through the jackets passes out between the inlet valves, maintaining a proper temperature under all service conditions. The radiator is the same distinctive cellular type of construction but is supported on trunnions instead of being bolted by means of plates, as formerly, an arrangement making for easy



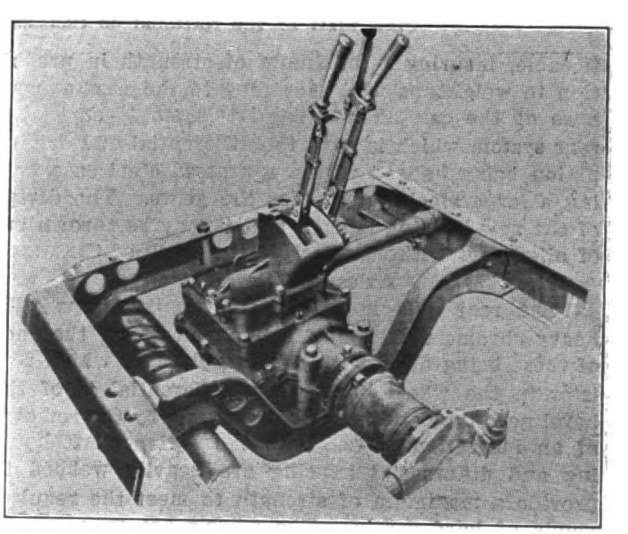
Driver's Position is at the Left with Centre Control, Permitting of Easy Access.

removal and replacement as well as eliminating vibration and road shocks. Cooling is aided by a six-bladed ball bearing adjustable fan, driven by a broad, flat leather belt.

Clutch and Transmission.

The clutch is a self-contained aluminum cone, leather faced and spring cushioned, this giving gradual engagement. The design is such that it may be removed easily without disturbing the transmission. Connection between the two members is by a double universal joint.

A number of changes are noted in the transmission which is of the selective sliding gear type, providing three speeds forward and reverse, direct on the high, as formerly. High grade annular ball bearings are utilized on the main and countershafts. The transmission has virtually been reversed so that the countershaft rotates much more slowly than in previous types, which arrangement with special cutting of gear teeth eliminates all noise when operating at low and intermediate speeds. The gears are constructed of silico manganese steel, oil tempered by a special



Outlining Centre Control and Transmission and Method of Suspension, Making for Accessibility.

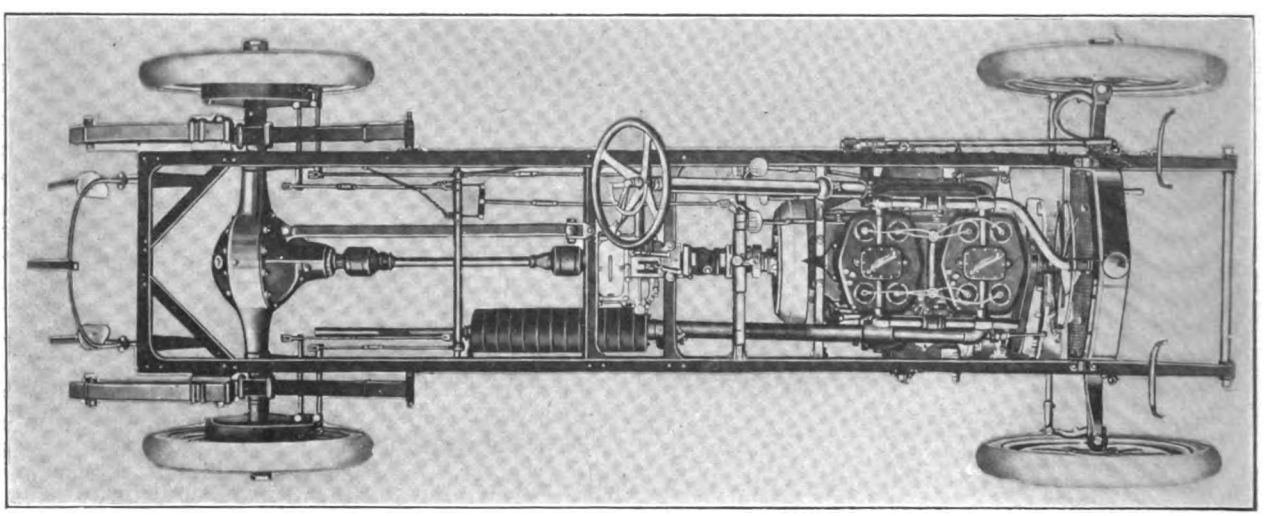
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process, and operate in a bath of oil. The transmission housing is attached to the chassis frame by means of two channeled cross members. The forward support is bowed so as to pass underneath, while the rear member is straight, the rear end of the transmission case being fastened under it by means of two bolts. Control is by the usual hand lever operating in an H gate.

Straight Line Drive.

Drive is by a straight line shaft, with double universal joints instead of one as formerly. They are at the ends of the shaft, one at the rear of the transmission case and the other forward of the differential housing. A new torsion member of pressed steel channel section replaces the former tube, being located on the left of the drive shaft and is attached at its front end to the rear cross support of the transmission case and to the differential housing at its other and larger end.

The utilization of pressed steel throughout is noticeable, insuring a maximum of strength in proportion to weight, as well as adding to the neat appearance of the car. This material is employed in the rear system which is new, the differential and driving pinion being housed within a pressed steel case having a large steel support for the gears. The design of the new housing is such that it may be thrown out of alignment without affecting the mesh of the gears.



Plan View of the National 40 Chassis, Depicting New Torque Rod of Pressed Steel.

Axles and Frame.

The rear axle is of the full floating type with heavy chrome nickel steel driving members, the ends of these being fitted with five jaw clutches which register in the wheel hubs. The differential is of the bevel gear type and is easily accessible by the removal of an inspection plate. Both the pinion shaft housing and differential housing are heavily webbed to provide a maximum of strength to meet the requirements of hard service. The wheels are mounted on a double row of Timken roller bearings on a hollow axle, which carries all the weight, making the removal and replacement of the axles, differential gears, etc., an easy matter.

The front axle is of I beam section and is a one-piece steel forging. The general form has been retained, the centre being bowed. The steering jaws and spring seats are formed integral, the springs being retained by two heavy steel spring clips. Large adjustable roller bearings are utilized in the wheel hubs, also at the tops of the yokes.

The frame is of pressed steel, wide flanged and of 4.5-inch channel section, firmly riveted and is curved up over the rear axle. Diagonal braces are also riveted in place across the rear corners. Sub-frames are not utilized, the motor being secured to the main frame.

Longer rear springs are employed, these being three-quarter scroll elliptic, 50 inches long, 2.25 wide, and constructed of silico manganese steel providing strength and flexibility, as well as adding to the easy riding qualities of the car. The front members are half-elliptic, 40 inches long and 2.25 wide. The forward end of the rear members is retained by brackets attached to the frame side rails and held securely by three heavy steel clips. Provision is made for ample lubrication of spring bolts through grease cups.

Steering System.

The steering system is of the worm and gear type with ball and socket connections to the steering knuckle and an 18-inch wheel is fitted to the steering column which is inclined in accordance to the model. The cross connection is located back of the axle, protecting it from possible damage, and the draglink is fitted with ball and socket joints and spring checks to absorb road shocks. The quadrant on which are located the spark and throttle levers, is placed above the wheel, while the auxiliary air valve lever is on the column just below the wheel and convenient to the operator. The dash control of the air to the

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carburetor is retained, but the auxiliary air valve on the intake pipe has been altered, a small poppet valve being utilized in place of the sleeve device. The lever on the steering column opens the poppet valve against a spring which retains the valve on its seat in the usual manner.

Brakes.

Two sets of brakes are utilized, the service being of the internal expanding type, operated by pedal, and the emergency external contracting, actuated by hand lever. The same diameter, 16 inches, is retained although the width is greater, affording additional frictional surface. The metal-to-metal system has been replaced with Thermoid, a special brake lining. Both brakes are located on the rear wheels, are so designed as to prevent dragging and are adjusted easily. Brake energy is imparted through adjustable steel pull rods of ample size and an equalizing rocker shaft carried within the chassis.

The clutch, brake and accelerator pedals are located on the floor in the same position as in previous models, although improvement is noted in the fitting of an aluminum heel rest to make easy the operation of the accelerator when traversing rough roads.

The wheels are of wood, artillery type, of carefully selected material, and the use of larger tires is noted, the speedway roadster being fitted with 34 by 4.5-inch shoes; the toy tonneau and five-passenger touring, 36 by 4.5, and the seven-passenger touring, 36 by five. Firestone demountable rims are standard equipment on all models, with option of five makes of tires.

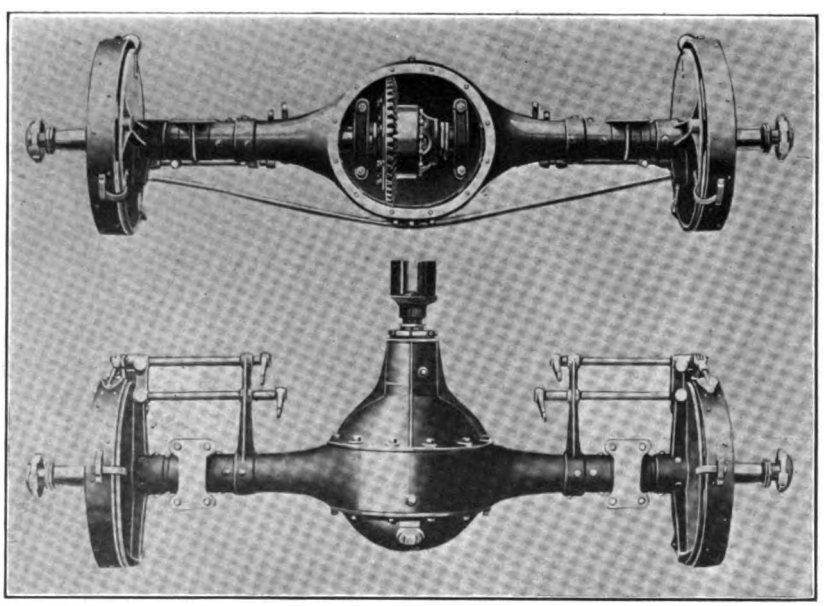
The wheelbase of the touring cars and toy tonneau has been lengthened from 124 to 128 inches, that of the roadster remaining the same, 120 inches. The gauge is standard, 56 inches, although an option of 60 inches may be had for southern roads.

On all models except the roadster, rectangular fuel tanks are carried at the rear, being suspended from the frame and with the touring models provision is made for carrying extra shoes at the rear by means of substantial, adjustable tire irons attached to the rear cross frame member. In all fuel tanks fine wire mesh strainers are incorporated for separating gasoline and water.

A very noticeable and striking feature of the fore-door bodies is their low and attractive appearance, this being partly due to the fact that they are suspended 2.5 inches lower than formerly and to the distinctive and advanced design, this being along lines of a noted foreign body builder. A high grade of sheet metal is utilized, contributing to the exceptionally high grade finish, the stock color being National blue, although option is given of National green, maroon and gray body and gears. All metal trimmings are nickel plated, except the black enameled radiator.

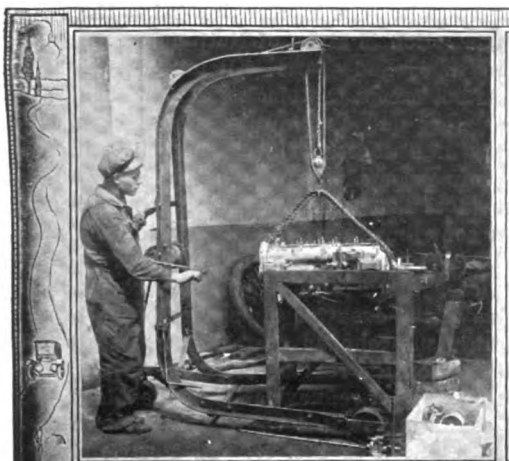
The upholstery and appointments have been carried to a very high degree of perfection in the touring and toy tonneau models, 10-inch upholstery being utilized instead of five as formerly and special Turkish cushions contributing to the comfort of the passengers. Finish is either dull or bright black leather. Two small boxes fitted with locks, are provided on the inner side of the dash for the safekeeping of articles, and within the tonneau there is a coat rail and leather protector on the rear of the front seat.

The same degree of refinement is noticeable in the equipment, consisting as it does of a self-starter and tire pump in addition to gas, oil and electric lights, Prest-O-Lite tank, horn, tools, jack, tire irons, two storage batteries, etc., all of which is included as standard. Tire pump is of the single-cylinder type and is located on the left side of the motor and in front of the exhaust camshaft gearcase. It is actuated by a cone clutch, which is thrown into engagement only when its use is desired, and operating as it does within the camshaft gear, makes a simple and compact arrangement. The clutch is connected with the crankshaft of the pump, the piston of which is actuated through a five-inch connecting rod. The piston is 1.375 inches in diameter and has a stroke of three inches. Air is admitted to the cylinder for compression through a small spring seated poppet valve which is opened by suction created by the down-stroke of the piston. Air is taken through openings in the flat sides of the hexagonal nut which secures the valve housing to the cylinder head.



The Full Floating Type of Rear System Is Entirely New with National Cars, and Is Designed to Withstand Severe Service.

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USEFUL HINTS FOR REPAIRMEN

Handy Ways of Doing Work and Practical Ideas Picked Up in a Round of the Repair Shops, or Contributed by Workmen

A GEARBOX REPAIR.

The repairman is called upon frequently to exercise his ingenuity when making a repair on a car the owner of which objects to the expense of a new part or to losing the service of the machine. At Fig. 1 is depicted how a gearbox was repaired. The recess in the aluminum holding the bronze bearing had worn oval shaped, owing to the retaining screw having been left out in a previous overhaul or repair, and the bearing having revolved with the shaft. The method illustrated was adopted to obviate the necessity of reboring the aluminum and making and fitting a new bearing.

The bronze member was removed and a lining fitted accurately as shown in the sketch. Four .25-inch holes were drilled and tapped in the aluminum casing and four set screws fitted, these being utilized to adjust the bearing, as well as to line up the shaft and its gears. A paste was then made of clay and the inside and outside faces of the bearing covered with this material. White metal was next poured through the oil hole, filling up the oval space, after which the heads of the set screws were cut off. The metal filling the oil hole served as a retainer for the bearing, a new hole being drilled for the purpose of lubrication.

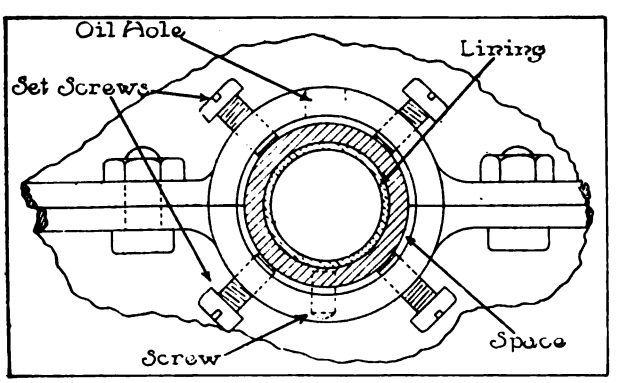


Fig. 1—Depicting How Loose Bearing of Gearbox Wore Casing, and Method of Repairing Damaged Part.

SMALL REPAIR SHOP METHODS.

With the rapidly increasing number of motor cars in service, both for pleasure and business purposes, means must be provided for their care and maintenance. There is and always will be a demand for repair shops employing skilled workmen and in this respect it may be stated that the small shop, when properly equipped, may compete successfully with the larger and more established concerns. Many of the latter began operations in a small way with one or two workmen and through diligence and practical methods built up a profitable business.

Many competent workmen, thoroughly familiar with the motor car and its needs, have endeavored to establish a business of their own but although their work was entirely satisfactory to the trade as employees, they have failed to attain success in their new venture because of a lack of executive ability. Four or five skilled mechanics might decide to establish a repair shop, and while capable of undertaking and completing successfully any work, might fail to hold their trade because of a number of reasons, some of which will be outlined herein.

Example of Failure.

Assume that three expert repairmen form a partnership in the repair business. One is particularly efficient upon motors, while the second makes a specialty of the components of the chassis, is a skilled machinist and fully capable of handling any work of this nature. The third member of the firm is a general all-around man, clever at locating motor car troubles as well as proficient with ignition and carburetion. Such a combination should be able to establish a paying business.

It is natural to presume that the nucleus of the new trade will consist of those owners who have followed the workmen from their former place of employment. Personal solicitation and friendship also proves a valuable asset in securing a large clientele and in a short time the new firm appears to be established upon a sound basis and its members are working overtime, including Sundays.

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Leaks and Overhead Expenses.

To reduce the overhead expenses as much as possible the new concern dispenses with a bookkeeper, one of the firm filling the office, the only salary paid out being that of an apprentice who runs errands, cleans the cars and acts as an assistant to each workman. From the start the company, although having a good equipment of tools, has been obliged to secure supplies and material which makes deep inroads into the capital.

At the end of the month the firm proceeds to take an account of its financial standing, and although the books show that the business for the month has been all that could be desired, there appears to be a shortage of ready cash, and it is probable that one member of the company will begin to compare his financial standing with that of the past when on Saturday he received his envelope with its regular sum of money and frequently its contents were swelled by reason of overtime.

A month later the firm discusses its business. Although all have been working overtime to turn out the work and new customers have been secured, after paying the lighting, power, telephone and supply bills, it may develop that the amount of cash available when divided into three parts, proves to be a small salary and particularly discouraging when the overtime labor is taken into consideration. The books show a handsome profit, but many of the outstanding accounts are hard to collect and several are discovered to be almost worthless.

As a result the clerical member of the firm takes an account of supplies and goes through the books and begins to check up material and compare that on hand with that charged. He is apt to discover that there are many leaks. The books show that during the month 500 gallons of gasoline were purchased and that 200 were charged up. The tank reveals but 250 on hand, leaving 50 gallons unaccounted for. The oil question is next looked into and a similar discrepancy discovered. Other supplies also show a balance on the wrong side of the ledger, small amounts it is true, but when figured on a yearly basis they total a considerable sum.

Lack of System.

The bookkeeper decides to check up stock at the close of each day. It has been customary for each workman to make up his time slip and material account at night, relying upon his memory for details. Taking each slip the bookkeeper compares the charges with stock of fuel and oil and discovers a shortage of five gallons of gasoline. One member of the concern recalls having put this amount in Mr. Blank's car. Another refilled the crankcase of a motor and told the boy to enter it at the office. Another sold a gallon and put the change in his overalls. Although each member resolves to remedy the faults, the errors occur frequently, eating into the profits.

The new concern also learns that considerable diplomacy is required in handling customers and that some of its trade is taking work to other shops, the result of one member completing work ahead of an-

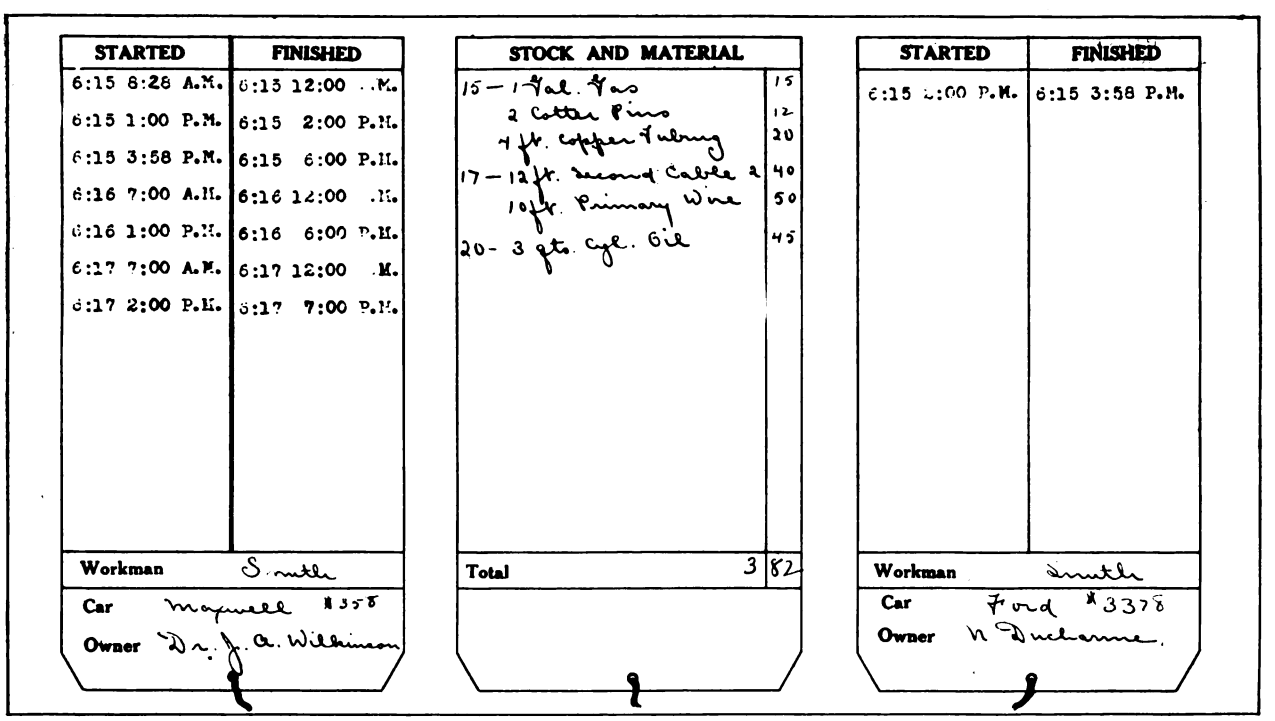


Fig. 2—Depicting Time and Labor Checking System, Showing Start and Finish of Work, Reverse Side of Card for Material, and Tag for Workman Called Off to Attend Another Customer—It Will Be Noted That Each Minute Is Accounted for by the Time Stamp.

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other customer whose car should have been turned out first. Work promised is not delivered on time, creating dissatisfaction, as well as numerous other minor difficulties which could have been avoided if the firm in its anxiety to please had been more conservative in its estimation of time and labor.

Need of Management.

A small concern operating under these conditions will not be successful, unless one member possesses executive ability and the others agree to conform to his orders, discussing each step before it is taken. While such a combination is capable of accomplishing satisfactory work, it must have the proper management. The same workmen, when employed under a capable foreman, in a large shop, observe the rules and maintain the system in vogue. They have their instructions and follow them.

The writer personally knows of cases where a skilled repairman established a shop of his own and for a while was very successful, but failed to hold his trade because of his lack of executive ability and diplomacy. Unconsciously he favored certain customers, which was noted by others who naturally became dissatisfied. This same workman, who later became identified with a large concern, was one of their best employees, giving perfect satisfaction to customers he failed to please when in business for himself.

Labor and Check System.

It is conceded by those familiar with the operating conditions of the repair shop employing two or more workmen that more or less difficulty is experienced by the proprietor in keeping an accurate account of the time and material utilized by the employees. This is meant to apply to the shop not equipped with a system, and which is experiencing a steady growth of business compelling the owner to add to his force from time to time and especially during the busy season.

Under such circumstances the new men are prone to emulate the example of the older employees in making up their time at the end of the day's work, which if it consist of 10 hours results in like number being charged up to one or several jobs as the case may be. Material and stock is charged in a similar manner. Operating under such conditions is bound to be costly to the proprietor in more ways than one.

Faulty Time Keeping.

Not only is the workman liable to forget minor charges, but if he is called upon to work on a number of jobs during the day he cannot very well remember the exact amount of time on each unless possessing a wonderfully retentive memory. If the workmen compute their time at the completion of the day's work, they are interested only to the extent of accounting for 10 hours' labor, a method which may be satisfactory to the proprietor, but not to the discriminating customer.

For example: Mr. Brown brings his car to the shop to have the valves ground and wants his machine that afternoon. Being a good customer and the work permitting, the job is promised, and Mr. Brown sees the work started. An hour afterward he passes the garage and notes the same repairman working on a car in the street. Repassing the place still later he finds the street job is not yet completed. That afternoon Mr. Brown gets his car and asks for his bill. He notes the time for labor and does a little figuring and is of the opinion that he is paying for some of the other owner's work. An investigation results in the workman "remembering" working on the other car. The bill is corrected, but Mr. Brown is developing an idea that he has not been given a square deal or else that the shop is not conducted in a business manner.

Sometimes it happens that a customer disputes the amount of labor on a job and demands an itemized account. These little difficulties are not uncommon and often a recourse to the courts is had to obtain an adjustment. Although to be regretted, it is a fact, nevertheless, there are many arguments over repair bills which might have been avoided if the shop maintained a system by which the owner could be shown an itemized account of the time and material, also that he could not be charged for labor not his or due to the absent-minded or careless workman.

Such a system should include means for checking the time of the workman hourly and in fractions thereof, as well as for all material and stock utilized. In large shops cards or sheets with duplicates are employed and the small details looked after very carefully. In the event of disputed work the records are valuable as evidence.

Many shops hesitate to install some systems because of the expense and necessary clerical labor involved. With small garages, employing three or four men, the proprietor may keep the books and attend to many small details usually looked after by the bookkeeper, etc. With such a concern the system should be as simple as possible yet provide accurate means for checking up the labor and material.

Clocking System.

At Fig. 2 is outlined a system which would not be expensive to install, and in addition to keeping an accurate account of the time spent on each job, would serve also to check up the time of the workmen; that is, denoting the time they began and finished each day. It requires a form of time clock which provides for stamping the month, day, hours and minutes, a device employed by many firms to register the time orders or letters are received and answered. This clock is located in or near the office and is fitted with a rack for each workman, also another holder containing blank cards.

Assume that Dr. Wilkinson drives up to the shop and makes arrangements to have his motor overhauled. The proprietor instructs Smith to start on the job the next morning. Smith is given a copy of the orders entered upon the order book, and upon arrival the next morning takes a blank card and stamps it in the clock device. Smith was late that

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morning, and the "started" side of the card shows he began work at 8:28. At noon he stops, stamps his time and leaves the card in his rack, restamping it upon his return.

At 2 he is called off by the foreman to do a little work on Mr. Ducharme's car, who has just driven up. Smith goes to the time clock, stamps his card, places it in its holder, takes a new card and stamps it at 2, and enters Mr. Ducharme's name, the type of car and its number, before proceeding to work. At 3:58 he completes his task, returns to the clock and stamps the card denoting that the work was finished at that time. He also stamps the card bearing Dr. Wilkinson's name at 3:58 and resumes work on that job, but leaves Mr. Ducharme's card in the rack. At the completion of the day's work at 6 the card is again stamped and left in the rack from which it is taken by the bookkeeper, entered on the day book and replaced on the clock.

The reverse side of the time card is utilized for entering the stock and material used, the prices of these being carried out and added up by the bookkeeper, and entered in the day book or ledger. The total time is figured easily as well as that of the workman. Upon the completion of the work the card is taken into the office, entered and filed away for reference.

By utilizing a separate card for each job, whether it be for 15 minutes or several days, the customer is assured that some other owner's car is not being repaired at his expense. In the event of a workman requiring the aid of another for an hour or fraction thereof, the time card will show the double time and how utilized. Should the customer desire an itemized bill of the labor, it is made up easily. One time card could be employed for a job taking several days or a separate one utilized each day as desired. The system could be made to fulfill a number of requirements and to make it successful it would only be necessary to insist that each workman use a card in connection with the clock upon starting and completing each job, as well as for working hours.

CLUB PLANS CHEAP INSURANCE.

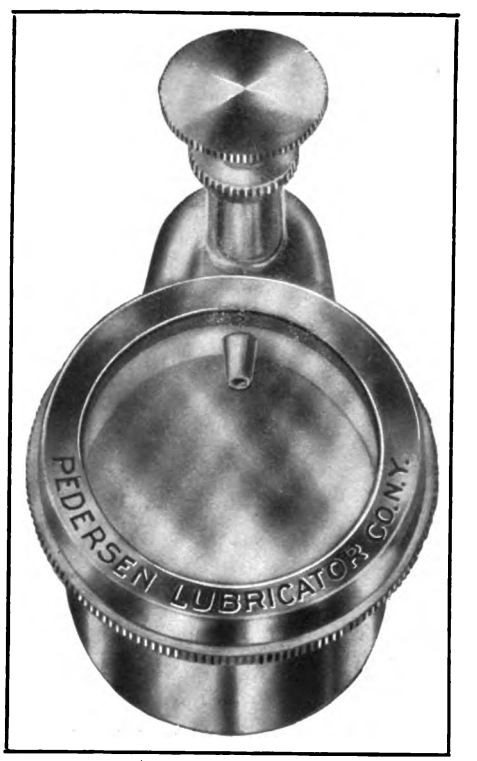
The Benson Automobile Club, Benson, Minn., is planning to give the automobile owners of Swift county insurance at less than the 2.5 per cent. figure of the regular companies. The full plan and rates have not been made public but it is stated that the first assessment is to be $5, if paid before the loss of a car insured under the plan is reported. The system is to extend to motorists outside the county if it prove successful. The club may be remembered as the one which originated the $1 road post sign for the State of Minnesota.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

THE PEDERSEN LUBRICATOR.

A new sight feed indicator of novel design is presented in the accompanying illustration, this being of the bull's-eye type, but in addition is provided with a special device so that the oil can be regulated and observed from the seat. It is the product of the Pedersen Lubricator Company, 636 First avenue, New York City, and is used in connection with its small rotary pump on oiling systems as applied to different makes of cars, and particularly with the model T Ford.

The pump used in combination with this sight feed has an overflow or bypass valve, so that when the lubricant is reduced by means of the adjusting screws on the indicator, or is entirely shut off, it circulates through the pump, in this manner avoiding any excessive pressure in the piping and possible leakage at the joints. The adjusting screw is provided with two check nuts, so that when the proper regulation for ordinary running is obtained, these nuts may be located, and when it is desired to give the motor a little extra oil, the screw may be turned, and the original adjustment obtained at once.



The Pedersen Lubricator.

The type utilized on the model T Ford is attached to the timer shaft without making any alterations whatsoever.

NEWARK TO BE QUIET.

Newark, N. J., has passed an ordinance aiming to stop the excessive use of loud horns thus joining the ranks of the anti-noise cities. The ordinance prohibits signals louder than necessary to be heard over ordinary conditions of traffic, and provides that they are to be sounded only when necessary as a warning of danger. Muffler cut-outs are not mentioned, as a state law prohibits their use.

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CORRESPONDENCE WITH THE READER

The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Question of Compensation.

(1366)—Please inform me what it is worth to take care of an automobile in the owner's garage, the work involving washing, polishing, replenishing the supply of fuel and oil and inflating tires when needed?

E. L. TRAVIS.

Washington, D. C., April 28.

There are a number of conditions to be considered, such as how many times the machine will have to be washed and polished and how particular its owner is as to its appearance, also how much service will be required. Garage charges vary from $5 a month for dead storage, where the owner takes care of his own machine and pays for the washing and polishing, to

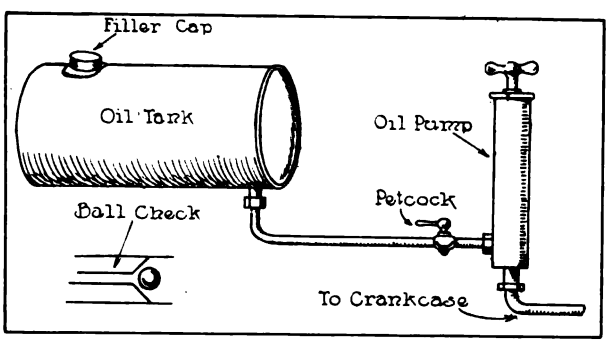


Fig. 1—Auxiliary Oiler for Pumping Lubricant to Crankcase of Motor.

$30 a month for full care. The price for the work mentioned varies from $1 for a small runabout to $2 for a large machine. Charges for live storage are $15 upward, depending upon the size of the automobile and location of the garage; that is, in some cities the cost of garaging is considerably more than others. Regarding the salary, this would appear to be a subject in which the owner would be interested as well as the caretaker.

Firing Order of Motor.

(1367)—Will you explain why a four-cylinder motor fires 1, 2, 4, 3, or 1, 3, 4, 2? I would like to know why the explosions take place in these orders instead of 1, 2, 3, 4.

WILLIAM SHAKESPEARE.

Waltham, Mass., April 28.

The object of a four-cylinder motor is to produce power by a series of impulses of frequent occurrence rather than a lesser number of stronger explosions. The arrangement of the components is such that while one cylinder is firing, those next in order are compressing, exhausting and inspiring a fresh charge respectively, and at the end of the power stroke, the piston that has just compressed is ready to transmit the power produced by the explosion of the gas and keep the crankshaft revolving.

The construction of the crankshaft of a four-cylinder motor is such that two pistons are up while the other two members are at the bottom of the stroke and the explosions instead of occurring simultaneously during one stroke, and then waiting till three idle strokes had taken place before repeating, are spaced equally, one occurring each half revolution of the crankshaft in the following order, for example, 1, 2, 4, 3. As two pistons are going up while two are going down, the parts are mechanically balanced, one set of moving parts weighing exactly the same amount as the other.

With the motor firing as above referred to the piston of the No. 1 cylinder would be at the top of its stroke ready for firing. That of the No. 2 cylinder would be at the bottom of its stroke or ready to compress its charge of mixture. The piston of the No. 3 cylinder would also be at the bottom of its stroke, but about to expel the burnt gases on the exhaust stroke. The piston of the No. 4 cylinder would be at the top of its stroke about to descend for the intake of the mixture. When exploding 1, 3, 4, 2, the only difference is that the No. 2 cylinder is exhausting and the No. 3 compressing, or reverse to that of the firing order 1, 2, 4, 3.

Parts for Pope-Toledo.

(1368)—I have a Pope-Toledo in my care and wish to know where I can get parts, instruction book and diagrams of engine, transmission and differential. I do not know what model or what year the machine was made. It is a seven-passenger, has a rocker arm valve movement with mechanical inlet valves, double chain drive. Would like to know how to time the valves and magneto. If you can give me some information on same would greatly appreciate it.

CLYDE ADAMS.

Bentonville, Ark., April 17.

The Pope Manufacturing Company, Hartford, Conn., will doubtless supply the desired information. It is customary to mark the motor or components of the chassis and these will be of assistance in writing the concern above referred to. While a general valve

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timing diagram could be published in these columns it is best to obtain the timing from the maker.

Fitting Auxiliary Oiler.

(1369)—I have a ——— car which gives excellent service but believing in using plenay of oil am writing for advice upon the installation of an auxiliary oiler. The oiling system of the machine is splash and the lubricant is poured in through an opening in the crankcase. After running about 50 miles the gauge does not show enough oil to suit me. I frequently take long trips and have to stop to replenish the oil. Is there not some way I can supply the oil without leaving the seat?

OSCAR L. MERTON.

Canton, O., April 29.

While it is an excellent idea to use enough oil too much results in the car smoking and creating trouble with the spark plugs as well as causing carbon. The writer knows of several machines of the make referred to and their owners have not experienced any trouble as they follow the direction of the maker. A force feed or mechanical oiler may be installed and the Pedersen Lubricator Company, New York City, makes a device adapted for this machine. It pumps the oil in proportion to the speed of the motor, is attached easily and is not expensive.

At Fig. 1 is presented a suggestion for pumping oil as desired to the crankcase. It consists of an oil tank, metal tubing, a petcock and an oil pump. The tank may be mounted inside the dash and should be higher than the pump to obtain a flow of lubricant to the latter by gravity. A pump may be secured having a petcock or the latter inserted in the line as shown in the drawing. To utilize the device, the petcock is opened and the pump handle pulled up, which will take in a charge of oil. The petcock is then closed and the handle depressed which will force the lubricant to the crankcase. As the pump is made in several sizes and stated capacities, the amount of oil pumped to the crankcase could be computed easily.

If it is not convenient to mount the oil reservoir above the pump, the former may be attached to the side of the car and ball checks employed, these being so fitted as to allow oil to be drawn into the pump in the direction as denoted by the arrow in the illustration. When the pump handle is depressed the ball will be forced against its seat preventing the lubricant from returning to the reservoir.

Making Asbestos Gaskets.

(1370)—In overhauling my ——— car I spoiled the asbestos gaskets used between the exhaust manifold and cylinders. The bolt holes are very close to the edges of the manifold and in trying to fit the gaskets have broken a large number, as the asbestos crumples and tears easily. Have tried several ways without success. Can you suggest some way to make them without using up considerable of the material? J. V. D.

Houston, Tex., April 30.

Asbestos, especially if thin, is difficult to handle unless one be familiar with the material. As the manifold is of iron the gaskets may be made easily by taking a piece of asbestos of the desired thickness and slightly larger than the part of the manifold. The asbestos is then placed upon the latter as depicted at Fig. 2 and held securely while the sharp edges of the metal, as shown by the dotted lines in the drawing, are tapped lightly with a ball pein hammer. The blows will cause the metal to cut through the asbestos so that the gasket proper will be separated easily from the piece. This is a method utilized by repairmen in turning out gaskets for cylinders, etc., as it insures a perfect fit.

In cutting out gaskets for aluminum members care should be exercised, as the metal is broken easily. In fitting these gaskets they should be smeared with a paste composed of powdered graphite and oil which will enable their removal without damage, thereby saving the trouble of making new members. If more than one gasket is essential for the same port member, because of any variation of the manifold, the members should be cemented together with shellac

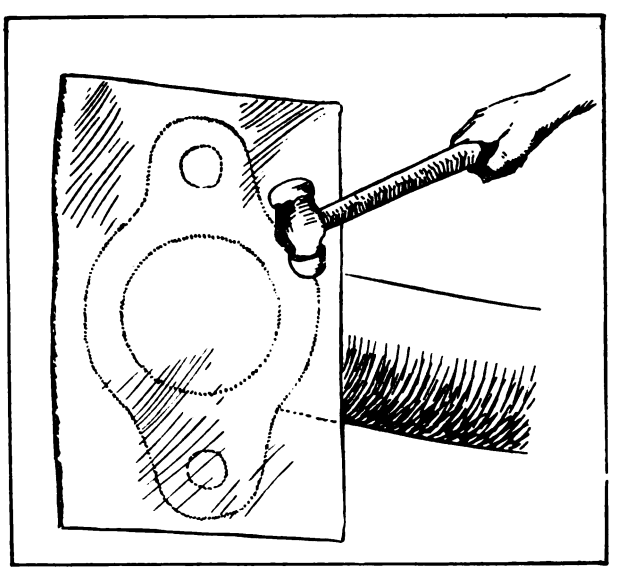


Fig. 2—Outlining Method of Cutting Out Asbestos Gaskets with Ball Pein Hammer.

and the graphite utilized on the exterior surfaces, as previously outlined.

Series and Multiple Series Wiring.

(1371)—I have noticed reference made to series and multiple series methods of wiring batteries, and that when dry cells are wired in multiple more current is obtained and that it is the best way, as it is cheaper. Will you kindly explain the difference between the methods and why more electricity is secured?

CHARLES KENYON.

Portland, Me., May 3.

A single dry cell of standard construction is capable of developing only 1.5 volts and has a capacity ranging from 15 to 23 or more amperes, the amount varying according to the make. It may be explained that the voltage represents the strength of the current and the amperage the flow or amount.

If voltage be desired, for example, six or eight volts for operation of a coil utilized for ignition purposes with the motor car, a number of cells would be

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connected together by what is known as a series connection; that is, so that the current flows through the cells in succession each increasing the voltage of the preceding cell by an amount equal to its own voltage. Thus six cells wired in series as depicted at the top of Fig. 3 would give six times 1.5 volts or nine volts. Connecting cells in this manner does not increase the amperage or quantity of current, but rather decreases the amount as the resistance is increased by the series connections, cutting down the current flow.

To increase the rate of current flow, the cells are connected by what is termed parallel, in which all of the zinc terminals are connected in one group, and the carbons in another, each terminal wire being connected to all of the battery terminals of the same kind as indicated in the second row. When cells are thus wired the voltage is the same as of a single member, but the amperage is increased by an amount equal to the product of that of one cell multiplied

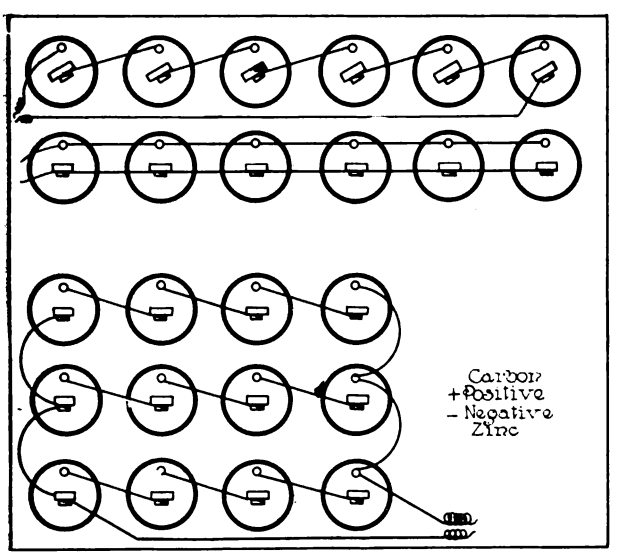


Fig. 3—Explaining Wiring of Dry Cells, Six Being Connected in Series; the Same Number Wired Parallel, and 12 in Multiple Series.

by the number of cells. Single members, or groups in series, may be connected in parallel, and these groups may be considered a single cell of large voltage.

When series groups are in parallel the combination is known as series parallel or multiple series. This arrangement is shown at the bottom of the illustration in which three groups of four cells in series are depicted connected in multiple. The total voltage in this instance is equal to that of four cells in series, or four times 1.5 equals six volts, and the rate of flow is equal to three times that supplied by one series group. If the cells be connected to an outside circuit requiring a given amount of current, the demand on each battery is one-half of that on a cell in a single series group.

The advantage of the multiple series is that the demand on the individual cells is reduced thereby increasing their life, and at the same time the desired voltage is obtained. The efficient output of a single group of cells in series is usually limited to one-quarter ampere, and by placing two such groups in parallel it is possible to secure double this value or one-half ampere, and with but one-half the demand upon the batteries. The greatest efficiency from dry cells is obtained when the lowest discharge rate in amperes is obtained. Any number of cells may be connected in multiple series and by increasing the groups of series the service will be augmented proportionately.

Lubrication of Motor.

(1372)—Please inform me which is the best make of oil to use with an automobile engine? I have a Ford car and last year used a standard make of lubricant. This year I purchased a cylinder oil less well known. Do you think it is a better oil for a Ford machine?

ELIZA B. HART.

Princeton, Mo., April 24.

It is poor policy to change from a recognized high grade oil to a new product because of its attractive price, as the experiment may prove costly. It may be pointed out that the difference in cost at the end of the year will amount to a few dollars at the most, while on the other hand, should the new lubricant not perform its function properly, the repair bills would be greatly in excess of the net cost of the highest priced lubricant on the market.

It is poor economy to experiment with lubricants, and it will be noted that every manufacturer recommends the use of a recognized standard oil for his motor car. The experienced automobilist is not misled by the attractive literature and prices of unknown concerns, and adopts a high grade lubricant and continues its use thereby effecting economy.

Representative manufacturers of lubricating oils have conducted exhaustive experiments and tests to ascertain the best grade of lubricant to meet each and every individual requirement, be it for automobiles, motorcycles, motor boats, aeroplanes or stationary engines, and this information dealing with every make of automobile will be mailed free upon application. The product of these makers is sold in cans or barrels bearing their name and trade mark and the buyer is thus assured of protection in purchasing. By referring to the Classified Buyers' Guide in each issue of The Automobile Journal, the names and addresses of the leading representative makers of cylinder oils and lubricants may be ascertained.

VANGUARD COMPANY EXPANDING.

The Vanguard Manufacturing Company of Joliet, Ill., has doubled its capital stock, now having a total of $50,000. The number of directors has been increased from three to five, the new members of the board being W. H. Whitmore and William Thoeming, who join C. F. Jensen, Edward Steinhart and Nathaniel Hurd. A new and larger factory is to be purchased for the manufacture of Vanguard windshields.

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ADVANCES IN MOTOR CAR LUBRICATION.

THE following discussion is prepared by Harry Tipper of the Texas Company, New York City. The subject is one of decided interest to motorists and they will no doubt welcome the opportunity to consider it from Mr. Tipper's viewpoint, particularly as he has had long experience with the manufacture and sale of the product which he analyzes.

(By Harry Tipper.)

It is one of the curious features of the automobile industry that the importance of proper lubrication has, up to the present, hardly been appreciated by the average motor owner and indeed the manufacturer of the motor car. The utmost care is taken in securing the very best materials for the manufacture of the car so that the minimum weight can be combined with the maximum strength and durability. An immense amount of time and trouble is spent in ascertaining the character of the materials necessary to make the car most efficient in all directions, and almost all manufacturers of cars and accessories maintain extensive laboratories for the purpose of investigating the possibility of further improving these materials.

When the car has been built and put in service its durability, the absence of expensive repairs and the proper running depend almost entirely upon the method and material used in the lubrication. Given a well built car in the first place and outside of accidents, there is practically only one reason for excessive depreciation or imperfect service, and that is the quality of the lubricant employed and the method of getting it to the parts to be lubricated.

Considered from this standpoint, it is somewhat astonishing that so little progress has been made in the science of lubrication of internal combustion engines and that so much unsuitable material still has a wide sale for lubricating purposes. This is probably due to the fact that this science is quite complex, and the consideration of oils to suit the requirements has been approached almost entirely from the commercial marketing proposition and not from the scientific end. Moreover, for many years, it was only possible to secure one class of oil for this purpose and the users of lubricating oil for internal combustion engines were limited to that extent in any consideration of the problem.

The question to be considered is not whether the lubricating oil is of a certain gravity or answers other arbitrary tests of this nature, inasmuch as these tests have practically nothing to do with the suitability of the lubricant for the reduction of friction and the elimination of wear. The question at issue is: What are the practical requirements to be demanded of an oil in order to fulfill the purpose of lubrication in an internal combustion engine both in regard to the cylinder and the bearings? These requirements, briefly stated, are as follows:

The lubricating oil should maintain a film in the bearings and between the piston rings and walls of the cylinder at the temperature of such bearings and cylinders as to reduce the friction to a minimum and prevent undue wear.

As some portion of the lubricant used in the cylinders may get past the piston into the compression chamber where the explosion takes place, the lubricant should be of such a character that it will burn up completely in the compression chamber without leaving any troublesome carbon deposit of a hard and flinty character.

As the oil must be used under exposed conditions in cold weather, it should be such that it will not congeal at the reasonably low temperatures which may be encountered.

It will be observed that none of these requirements relate to the gravity of the oil, which test merely indicates the weight of the oil compared with the weight of the water, and does not illustrate the lubricating qualities in one way or another. Consider for a moment the requirements as stated above.

The necessity for maintaining the films in the bearings and between the piston rings and walls of the cylinder indicate that the oil should be sufficiently viscous at the crankcase temperature to prevent its being pressed out or escaping from the bearings, etc. An oil which is not sufficiently viscous for this purpose will not be a good lubricant.

As cars vary in regard to the size of bearings and crankcase temperatures, according to the make and character of the engine, the requirements vary in this regard to this extent. The crankcase temperature, however, is usually quite a little lower than the temperature in the cylinder, and the necessities for bearing lubrication make it a distinct advantage if the oil is more viscous at the temperature of the crankcase than it is when it reaches the cylinder.

If the oil at temperature of the cylinder is calculated to maintain a film between the piston rings and the cylinder walls, so that the proper compression is secured and the lubrication of the cylinder carried on without undue wear, the increased viscosity secured from this character of oil in the bearings will have the advantage of giving more complete lubrication to these parts and at the same time eliminating some waste of oil.

It is obvious that, in lubricating the walls of the cylinders, some oil will get past the piston into the compression chamber. If a troublesome carbon deposit is to be obviated the oil should in the explosion of the motor be sufficiently low in flash point so that it will be consumed along with the explosive mixture and pass out as part of the exhaust gases.

It has been common practise in the lubrication of internal combustion engines to consider of special value an oil with a high flash point, this high flash

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point being supposed to obviate the deposit of carbon by preventing the combustion of the oil. This practise has arisen from an entire misconception of what takes place in the compression chamber when the explosive mixture is fired. The temperature in this compression chamber at such a time will reach approximately 2000 degrees, Fahrenheit. At this temperature the highest flash oil which can possibly be produced would of necessity be burned up, with this difference—that the combustion in this case is not complete, as the character of the oil is such that in the short time taken up by the explosion when the compression chamber reaches this high temperature, complete combustion of the high flash oils cannot be secured and a certain portion of the free carbon contained in the oils is deposited upon the piston head, spark plugs, etc.

In Europe the manufacturers of motor cars, and the users of these cars in general, have come to a very much better appreciation of this point than we have in this country, the Russian oil from the Baku fields, which has an appreciably lower flash point than oils of the character of the crudes found in the northern states being generally used for this purpose. These oils are to some extent used on this side and evidently have been successful as they bring prices on the market which are almost double those ordinarily obtained for motor oils.

Oils of the same character as the Russian crudes can be obtained readily in this country, as those secured on the Gulf Coast in Texas, and some of those found in California have the same general characteristics. As a matter of fact, the asphaltic base crudes, as these are termed, have shown pre-eminently the qualities necessary for the most economical lubrication of internal combustion chambers, and the old bugbear—that these asphaltic base crudes, on account of the asphalt which is contained in them carbonize to a greater extent than other crudes—is disposed of entirely by the concrete evidence which is developed in actual practise. It should be stated that the refining conditions in the manufacture of lubricating oils from these crudes necessitate the extraction of the oil from the asphalt so that, before the lubricating oils are ready for the market, the entire quantity of asphalt contained has been removed.

Further, the conditions have demonstrated that the deposit of carbon is due entirely to incomplete combustion in the compression chamber. This has no relation to the actual percentage of free carbon which may be present in the lubricating oil, but is entirely a question of the possibility of converting the hydrocarbons of the oil together with this free carbon into gases of combustion. It has been demonstrated many times under all conditions that this is secured with the lower flash oils from the Texas and Russian crudes.

Automobilists should advocate uniform motoring laws, because in no other way can the present confusion of interstate touring be avoided.

NEW CONCERNS IN INDUSTRY.

Several new concerns have been organized for the purpose of constructing mechanical transports, and in one or two instances it is noted that well known wagon makers are taking up the manufacture of motor driven equipment. Among the latter may be mentioned the Geneva Wagon Company of Geneva, N. Y., which has held an enviable position in the older industry for a number of years. This concern will produce but one chassis, to which two types of bodies will be fitted, one having a capacity of 2100 pounds and the other 2300. The motor employed is a two-cylinder, opposed unit, water-cooled, located under a short hood in front of the dash. The horsepower rating is 20, with a bore of 5.125 inches and stroke of 4.5.

The F-S Motors Company has been organized in Milwaukee, Wis., for the production of a new light delivery car to be known as the F-S. It is understood that the backer is the Filer & Stowell Company of that city, which already owns a controlling interest in the Beaver Motor Company, the Petrel Motor Car Company, and other important concerns in that vicinity.

The Driggs-Seabury Ordnance Corporation, which is more or less well known through its connection with the parts industry, has been engaged in the construction of 20 motor trucks, which will soon make their preliminary tests. Three models will be produced, in capacities of three, four and seven tons, respectively.

A new concern has been organized in Clyde, O., to be known as the Krebs Motor Truck Company, for the purpose of manufacturing the Krebs truck of 1500 pounds capacity. It is understood that the motor will be a two-cylinder, two-cycle unit with bore of 4.5 inches and stroke of 5.5.

A. B. Perkins, his three sons, and G. E. Porter of Bay City, Mich., have organized the Wenonah Motor Truck Company, which will place in the market the Wenonah truck in two models, one of 1000 pounds and the other of 1500.

The Ewbank Power-Transmission & Motor Company, Portland, Ore., which was organized in December, is about ready to present its truck, and it is said that other products will include motor propelled fire apparatus and railway equipment. The basis of the new vehicle is a gasoline-electric traction system designed by H. B. Ewbank, Jr., which involves the use of separate driving motors for each rear wheel, speed control being accomplished through the regulation of the engine. The officers of the company are: President, S. M. Mears; vice president, George W. Stapleton; treasurer, R. S. Howard; secretary, Dr. H. B. Ewbank; chief engineer, E. H. Ewbank, Jr.

The Henry Manufacturing Company, maker of the Blitzen self-starter, has opened a branch in Chicago at 1120 Michigan avenue, which is in charge of Frank S. Murray.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



The Motorcycle Situation.

The present condition of the motorcycle industry is such as to reflect great credit upon the present and future popularity of the sport of motorcycling and the mount itself, and while the manufacturers have done their full share to bring this about, they doubtless will agree with the officials of the Federation of American Motorcyclists that its aims and efforts have done much toward the consummation of this object. It is a well known fact that the federation always has stood for the encouragement of the use of motorcycles, but for the past three years it has been working along intelligent lines and with the full co-operation of the makers.

Ninety per cent. of the 250 clubs affiliated with this national body is actively engaged in increasing interest in the two-wheeled mount. Eighty five per cent. of the 630 official repair shops are very much in evidence along the same lines. Several hundred individual members and club organizers are contributing their share. No one interest can lay claim to all the credit for the advancement of this cause, or for the present very high repute in which it is held.

Annual Herring Run.

Each year the official activities of the Providence Motorcycle Club, Providence, R. I., may be said to open with the annual herring run to Taunton, Mass., so-called because it is held at that season when the herring run up the river, a sight which is sufficient to cause many people to visit Taunton. About 125 riders assembled in Exchange place, Providence, April 28, for this event. Not all departed at the same time, and this accounts for the fact that when the camera man took the accompanying picture not all of the 125 were to be seen.

It is estimated that there were more than 300 riders in Taunton that day. Invitations had been issued by Secretary J. G. Edwards to all the clubs in the vicinity, and many accepted from Boston, Lynn, Brockton, Fall River, New Bedford and various other places. After watching the herring for a time, all were invited to the Taunton Cyclery, which is operated by Beauvais Bros., agent for Indian machines, where the members of the party became the guests of B. A. Swenson, Providence Indian agent for Rhode Island, at an elaborate lunch.

The Providence Motorcycle Club's season was thus opened officially, and from now on each Sunday will witness a run to some nearby point. The next really big event will be the house warming at Motorcyclists'



Part of the Members of the Providence Motorcycle Club at Exchange Place, Providence, R. I., Ready to Leave on the Annual Herring Run.

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Fred Peterson of Providence, R. I., and His Indian Mount.

Rest, the new club rooms in the Swenson building, now nearing completion at Broad and Blackstone streets. The club is increasing in membership very rapidly, and expects to be one of the largest and strongest in the country before the summer is well under way.

Nearing the 15,000 Mark.

The number of new members admitted to the Federation of American Motorcyclists during April was 841, bringing the grand total now in the organization to 14,361. According to Secretary G. B. Gibson of Westboro, Mass., these new members were divided by districts as follows: Atlantic, 289; Lake, 221; Southwestern, 89; New England, 82; Pacific, 51; Central, 41; Peninsular, 39; Insular, 16; Gulf, 12 and Canadian, one.

Classified according to states, the result is as follows: New York, 175; Ohio, 116; California 84; Massachusetts, 72; Pennsylvania, 49; Indiana, 42; Washington, 40; Illinois, 38; New Jersey, 33; Kansas, 26; District of Columbia, 25; Florida, 22; Philippine Islands, 16; Missouri, 16; Rhode Island, eight; Iowa, seven; Montana, seven; Maryland, six; Georgia, six; Tennessee, six; Kentucky, six; Michigan, six; Alabama, five; South Dakota, five; Texas, four; Wisconsin, three; Minnesota, three; Colorado, three; Oklahoma, two; Idaho, two; Oregon, two; New Hampshire, one; Connecticut, one; North Carolina, one; New Mexico, one; Utah, one; Canada, one.

Brewer Gets Bidwell Trophy.

John Wilmont Brewer defeated 15 other starters in the race for the Bidwell trophy over the 17-mile course on the Long Island motor parkway, April 23. J. U. Constant was second and F. L. Vanderpool, third. All three rode Indians. There appears to have been some trouble in deciding the contest, not because of position of the riders at the finish, Brewer being at least 50 yards ahead of Constant, but because Constant refused to allow the referee to examine his machine. The second prize has been held up by Dr. Thornley, chairman of the competition committee, pending an examination of Constant's mount, and apparently no definite time is to be announced until later.

Indianapolis Track Plans.

Jack Prince and W. A. Gibson of Indianapolis, the latter local manager for the Empire Tire Company, Trenton, N. J., have leased 41 acres of land near the entrance to the Broad Ripple amusement park in Indianapolis, for five years. A new board motorcycle track will be constructed at this point, and it is expected that the opening meet will be held May 25, followed by another immediately after the 500-mile automobile race on the speedway, May 30.

Chicago Gets Championship Race.

Announcement has been made that the annual two-mile national amateur championship race will be held on the Hawthorn track at Chicago, May 30, in connection with a race meet which the Chicago Motorcycle Club is planning for that date.

Fast Enough to Catch Emblem.

The Columbia Photographic Society of Philadelphia has brought out a new fast camera, which is intended for the purpose of taking pictures of objects travelling at an exceedingly high rate of speed. It is perhaps not at all surprising that the maker of this machine should have decided to test it in taking a picture of an Emblem motorcycle, made by the Emblem Manufacturing Company, Angola, N. Y., which was ridden by Rudolph



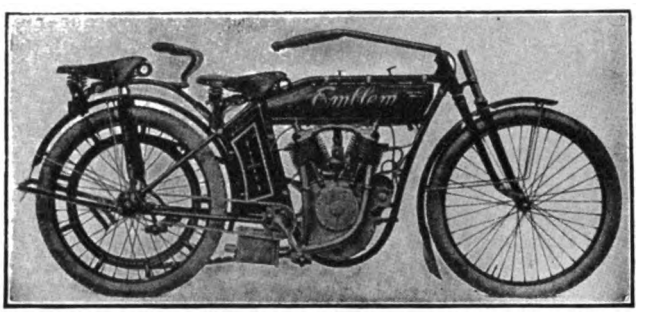
Rudolph Karl of Philadelphia, Trying to Beat the Camera on an Emblem.

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STRAWS SHOW WHICH WAY THE WIND BLOWS

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(Also Makers of the Famous Emblem Bicycles)

ANGOLA ERIE COUNTY NEW YORK

Karl, official demonstrator for S. A. Flamm, the Philadelphia Emblem agent. It will be seen that the camera does its work well, as the picture shows every evidence that the motorcycle was travelling at full speed.

Triumph Is Bosch-Equipped.

The Bosch Magneto Company, New York City, maker of Bosch magnetos, is authority for the statement that the Triumph Manufacturing Company, Detroit, which is to produce the new Triumph machine, has signed a contract for the Bosch as the exclusive ignition on this mount. The type of instrument which will be used is the latest enclosed model, in which the construction is such as to eliminate all possibility of moisture or dust finding its way into the operating parts of the magneto.

Cleveland the Convention Seat?

It begins to look as if Cleveland, O., would be the selection of the board of directors for the annual national assembly of the Federation of American Motorcyclists. The decision appears to rest between that city and Columbus, O., and inasmuch as the latter city had not filed its formal application previous to April 25, the chances look very promising for Cleveland.

One of the things which point toward the selection of an Ohio city is the announcement of Chicago, Indianapolis, Albany and Baltimore as the four cities from which the annual tour will start. The actual announcement of the date will be made in the near future, at which time President Hamilton will appoint the tourmasters.

Dayton's Endurance Run.

The 409-mile endurance run of the Dayton Motorcycle Club from Dayton, O., to Toledo and return last month resulted in victory for the New Era team, each member of which finished with a perfect score. Four of the individual riders, each on a Merkel, were the only ones in that list to return with 1000 points to their credit. There were five Merkel men, as shown by the accompanying illustration, and the fifth failed to make a perfect score because the pathfinding car ran out of confetti and he lost his way. His failure was in no way due to the machine he rode.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

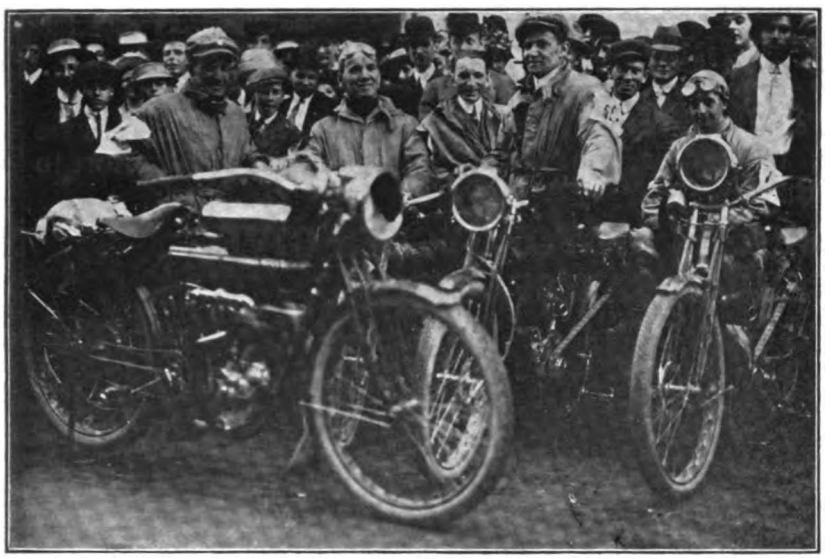
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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Merkel Riders in Dayton Endurance Run: From Left to Right, Ford Sanford, Roy Toms, Vincent Steger, William Bewley and Roscoe Miller.

The official score was as follows: New Era team, Jesse A. Campbell (1000), Ivan Jacobs (1000) and Edward Rischel (1000), 3000; Yale team, S. J. Chubbuck (1000), W. McMillan (1000), and H. G. Phoul (991), 2991; Indian team, William J. Teubner (1000), Erwin G. Baker (1000) and I. G. Howitch (failed to finish), 2000. The individuals scored as follows: Roy Toms, Merkel, 1000; W. Bewley, Merkel, 1000; J. F. Sanford, Merkel, 1000; V. A. Steger, Merkel, 1000; Joe Richards, Harley-Davidson, 999; Harry Hearn, Yale, 998; Roscoe Miller, Merkel, 995. E. R. Durkee, Pierce; W. E. Stokes, Thor; J. Otto Tresemer, Indian; C. F. Weiher, Indian, and G. W. Schneider, Indian, also ran.

Club Notes, Here and There.

E. B. Ellis, F. A. M. commissioner at Berkeley, Cal., is endeavoring to have the local club become affiliated with the national body.

The Little Rock Motorcycle Club, Little Rock, Ark., is conducting a membership campaign with the idea not only of increasing its own numbers but to add to the lists of the F. A. M. as well.

The Maryland Motorcycle Club and the Touring Club of Maryland, both of Baltimore, recently held a combined run to Annapolis, 50 riders taking part.

F. Madison Barrett has been appointed official F. A. M. referee for the Augusta Motorcycle Club, Augusta, Ga., which is planning a race meet on the Georgia-Carolina fair grounds, Memorial Day.

E. Mitchel Dodson has been elected president of the National Motorcycle Club, Washington, D. C., and the organization expects 100 riders to take part in its first Sunday run to Great Falls, Md.

Plans are rapidly nearing completion for the big meeting of the Federated Motorcycle Clubs of the San Joaquin valley in California, which will be held June 1-2. It is expected that at least 1000 riders will be in attendance.

H. R. Noyes of Buffalo, N. Y., was a recent visitor to the Binghamton Motorcycle Club, Binghamton, N. Y., urging that organization to support Cleveland for the national assembly of the F. A. M.

The Terre Haute Motorcycle Club, Terre Haute, Ind., is planning for its first 1912 race meet on the half-mile dirt track in that city, May 30.

Motorcyclists in Lockport, N. Y., recently organized two teams, the "Purples" and "Golds" and by conducting a membership campaign increased in numbers from 28 to 87 in three months.

More than half of the 450 motorcycle riders in Akron, O., recently lined up for a 25-mile parade through the city.

With a membership of 500, the Chicago Motorcycle Club recently celebrated the opening of its new club house with a smoker and vaudeville entertainment.



M. Marcel Krieger, Official Tester of the Flanders Manufacturing Company, Putting the Four Horsepower Flanders to a Severe Test.

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The Shortgrass Motorcycle Club, Pratt, Kan., already has signed up 172 riders for its annual district tour through four western states this summer.

The Evansville Motorcycle Club, Evansville, Ind., is considering plans for a long distance run to Indianapolis and return, a total of 408 miles.

New World's Records.

M. J. Graves, riding an Excelsior, created new world's professional records from two to 25 miles on the Los Angeles track, April 19. The same day, Donald Johns, also riding an Excelsior created new amateur marks from one to 14 miles. The previous records were held by the Indian, Jacob De Rosier holding all the professionals and Donald Johns the amateurs, with the exception of that for one mile, which was held by Ray Seymour. The new figures have been forwarded to Dr. J. P. Thornley, chairman of the F. A. M. competition committee, for official acceptance. Both the old and new records are given below:

World's Professional Records.

	Old	New
2 miles	1:24.2	1:17.0
3 miles	2:05.0	1:56.8
4 miles	2:47.0	2:36.8
5 miles	3:29.2	3:17.0
6 miles	4:11.6	3:57.2
7 miles	4:54.0	4:38.0
8 miles	5:36.2	5:18.6
9 miles	6:18.6	5:58.4
10 miles	7:01.8	6:38.6
11 miles	7:44.0	7:18.6
12 miles	8:26.8	7:58.4
13 miles	9:10.0	8:38.0
14 miles	9:52.2	9:17.2
15 miles	10:35.0	9:56.8
16 miles	11:18.4	10:36.8
17 miles	12:01.0	11:17.0
18 miles	12:43.8	11:56.6
19 miles	13:26.6	12:36.6
20 miles	14:10.0	13:16.0
21 miles	14:53.0	13:56.0
22 miles	15:35.6	14:36.4
23 miles	16:18.6	15:16.4
24 miles	17:01.8	15:56.2
25 miles	17:44.6	16:35.8

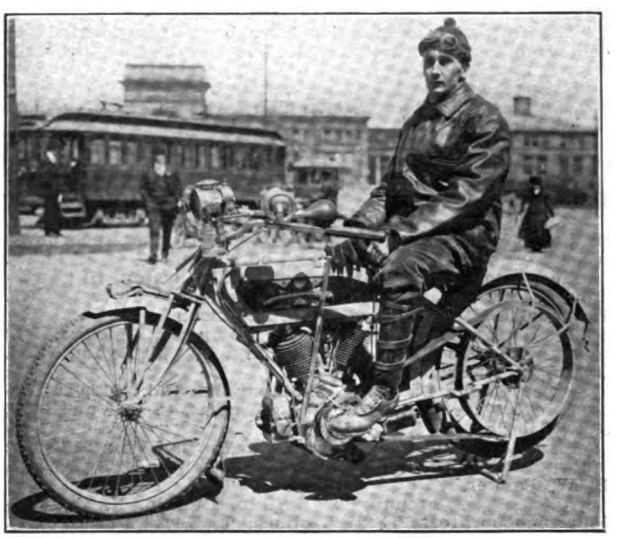
World's Amateur Records.

	Old	New
1 mile	0:41.4	0:39.8
2 miles	1:23.8	1:20.0
3 miles	2:07.0	2:01.0
4 miles	2:49.4	2:41.4
5 miles	3:32.6	3:22.4
6 miles	4:16.0	4:03.4
7 miles	4:59.2	4:43.6
8 miles	5:42.2	5:24.2
9 miles	6:25.4	6:04.8
10 miles	7:08.8	6:45.0
11 miles	7:52.0	7:25.6
12 miles	8:35.4	8:06.0
13 miles	9:19.0	8:46.0
14 miles	10:02.4	9:26.4

Krieger on a Flanders.

In explanation of the accompanying illustrations, it may be stated that M. Marcel Krieger, now a tester with the Flanders Manufacturing Company, Pontiac, Mich, maker of the Flanders motorcycle, was formerly an aeronaut. He was the originator of the four-by-eight scantling test for motorcycle forks, and excited no little comment when he made his first jump. The pictures show how he does it.

The company now has a number of testers who can perform this trick successfully, and there is no doubting that it offers a substantial test for the front



C. H. Frazier, Pawtucket, Taking Delivery of the First 1912 Excelsior Sold in Rhode Island.

forks as well as other parts of the construction. Krieger's record jump for height is 41 inches, and the distance traversed from the time the front wheel left the ground until it touched it again was 14 feet eight inches. To attain this record he drove his machine against an eight-inch perpendicular obstruction at a speed of over 50 miles an hour.

1912 Rule Book.

The 1912 rules for competition have been issued by the competition committee of the Federation of American Motorcyclists, and a copy may be secured by addressing Dr. J. P. Thornley, Hotel Ansonia, New York City. No club or individual who contemplates holding a motorcycle meet or taking part in one can afford to be without these official rules.

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Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

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The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Felipse Tire and Rubber Company, New York City; $50,000; incorporators, Simon Schwartz, S. H. Silverman, H. A. Bloomberg.

Louisville Lozier Company, Louisville, Ky.; to deal in supplies; $20,000; incorporators, Howard Lothrop, H. T. Martin, Robert Stewart, D. T. Marantelle and Mary S. Lothrop.

Kadix Newark Motor Truck Company, East Orange, N. J.; $200,000; to manufacture motor trucks; incorporators, D. Lester Dann, G. F. Kallberg, Russell M. Colburn.

Hoopeston Automobile Company, Hoopeston, Ill.; automobiles and accessories; $25,000; incorporators, F. W. Wallace, J. H. Norris and W. N. Ferguson.

Byam International Autotire Company, Chicago, Ill.; to manufacture tires; incorporators, W. W. Byam, E. C. Byam, W. A. Scott.

Vixen Motor Company, Indianapolis, Ind.; $12,000; incorporators, F. C. Schmid, W. J. Harris, C. O. Van Horn, S. B. Lindley, D. K. Lindley.

Hercules Truck Company, Alexandria, Va.; $100,000; incorporators, S. W. Woodward, O. Ducker, E. S. Parker, B. W. Parker.

Oldsmobile Company of Buffalo, Buffalo, N. Y.; $10,000; incorporators, E. E. Holmes, T. S. Buckingham, J. C. Cannon.

United Garage Company, Boston, Mass.; $15,000; incorporators, Jesse Goode, J. R. Jones, W. F. Waters.

Todd & Courtney Company, Barberton, O.: $10,000; to deal in automobiles and accessories; incorporators, John H. Todd, Cora A. Todd, I. O. Courtney, Laura M. Courtney, C. C. Courtney.

Roby Carburetor Company, Indianapolis, Ind.; $10,000; to manufacture parts; incorporators, F. S. Roby, C. J. Schuh, E. D. Salisbury.

Elton Garage, Inc., Waterbury, Conn.; $25.000: incorporators, A. C. Judd, E. W. Judd, J. R. Hughes.

C. & R. Auto Company, Los Angeles, Cal.; $25,000; incorporators, Jay C. Cook, A. B. Cram, B. F. Robinson, George H. Cram, F. D. McClure.

Monticello Automobile Company, Norfolk, Va.; $15,000; incorporators, E. L. King, G. F. Bailey, E. J. Hickford.

Dual Wheel Company, New York City; wheels and truck parts; $300,000; incorporators, F. B. Cochran, Alexander Dow, C. W. Jewell.

C. E. Hall & Sons, Inc., Malden, Mass.; $5000; incorporators, A. N. Hunt, R. J. Cram, F. M. Sawtelle.

Lewis Garage Company, Boothbay Harbor, Me.; $10,000; incorporators, J. Edward Knight, E. T. Lewis, C. R. Lewis.

Unique Vulcanizing Company, Jersey City, N. J.; $50,000; incorporators, J. H. Hutten, J. P. Becker, U. C. Huber, E. R. Hussey.

Buick Sales Company, Utica, N. Y.; $5000; incorporators, George Beatty, A. D. Beatty, Emma L. Beatty, Patrick R. Ervin, H. S. Wilson.

Sceptre Motor Company, Brooklyn, N. Y.; $5000; incorporators, G. B. Ellis, William Y. Chandler, G. A. Wingate.

Isotta Fraschini Motors Company, New York City; to manufacture and deal in motors; $25,000; incorporators, G. M. Heckscher, G. N. Thurber, C. B. Jacque.

Federal Trucking Company, New York City; to manufacture and deal in motors; $25,000; incorporators, Donald B. Abbott, J. D. Fackenthal, J. I. Kauffman.

Blaisdell Automobile Company, Dexter, Me.; $25,000; incorporators, Charles R. Blaisdell, F. D. Blaisdell, W. H. Judkin.

U-Nit Motor Company, Wilmington, Del.; to manufacture automobiles and motors; incorporators, Edwin C. Reed and others.

Salem Oil & Grease Company, Salem, Mass.; to manufacture oil for automobile use; $25,000; incorporators, Arthur H. Rowbotham, H. T. N. Smith, W. H. Rowbotham.



New Service Station Recently Opened in Detroit by the R-C-H Corporation, the Forerunner of Others to Be Established in Several Cities.

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American Pneumatic Starter Company, Alexandria, Va.; $150,000; to manufacture starters; incorporators, C. A. Douglass, G. L. Parker, A. E. Leckie.

WITH THE MANUFACTURER.

The Perfection Spring Company, Cleveland, O., has placed E. F. Lake in charge of its laboratory.

The Teel Manufacturing Company, Medford, Mass., which has been making the Teel truck and had announced a new one-ton machine to complete its line, has abandoned the latter project and is to handle the Federal truck instead.

The Mather Spring Company of Toledo, O., has appointed G. H. Brown sales manager with headquarters in Detroit. Mr. Brown was formerly with the Standard Sales Company.

The Yates-Upholt Brass Company, Saginaw, Mich., has resumed operations after being idle for some two months. The output is to be taken by the Jackson-Church-Wilcox Company and the Marquette Company in Saginaw, both of which are subsidiaries of the General Motors Company.

The Ignition Starter Company, Detroit, has opened in that city a special service department for users of the Disco starter. George Waller has been placed in charge of the new department, which is located in the Dodge building. V. J. Jacobs, formerly with the Studebaker Corporation, has been added to the Disco sales force.

The Enterprise Auto Machine Works, Pontiac, Mich., has just taken possession of a new factory with modern equipment.

The Billings & Spencer Company, Hartford, Conn., has discontinued by mutual consent the selling arrangements with the Claire L. Barnes Company of Chicago, and will market its line of tools and forgings direct. The Billings & Spencer Company has more than doubled its capacity in the last two years and now has its new plant at Dividend, Conn., in full operation.

The Harder Auto Truck Company of Chicago has secured F. J. Posta as sales manager. He was formerly with the Kissel Motor Car Company in Chicago.

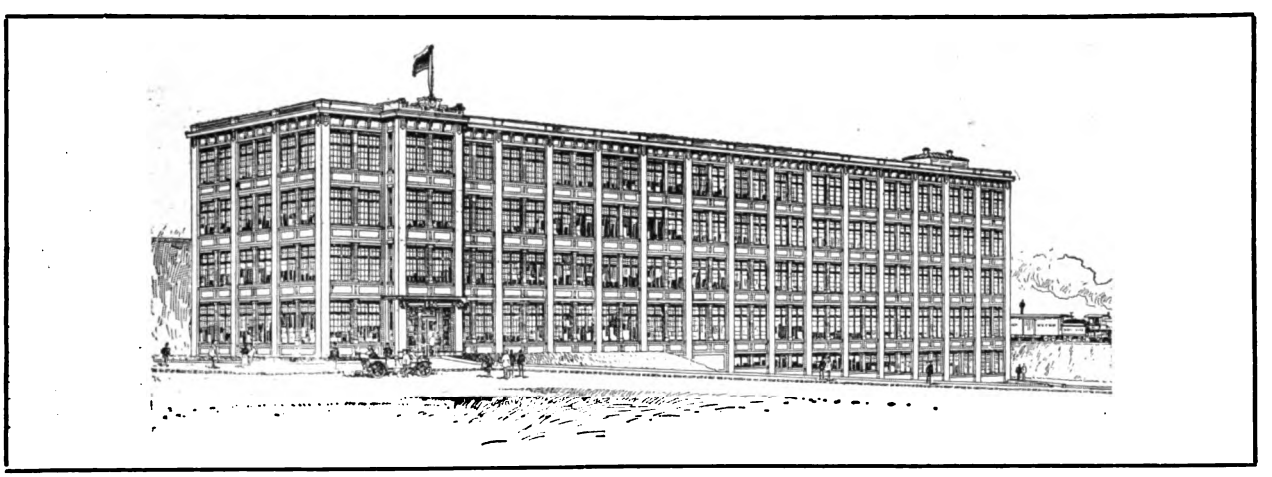
The Empire Tire Company, Trenton, N. J., maker of Empire tires, is distributing a neat little cardboard score keeper to baseball fans, enabling the runs, hits and errors to be counted.

The R-C-H Corporation of Detroit is planning to establish a chain of service stations throughout the United States and Canada, for the convenience of the numerous R-C-H dealers and users. At present the plans call for stations in the cities in which a branch is now maintained; namely, Detroit, Boston, New York, Philadelphia, Atlanta, Cleveland, Buffalo, Chicago, Kansas City, Minneapolis, Denver and Los Angeles. A complete stock of parts will be carried in each station, so that it will not be necessary to send to the factory for replacements. The first of the stations is already in operation in Detroit, and is illustrated herewith. It is elaborately equipped, 124 by 60 feet, of brick and concrete construction. Other stations are to be put into operation as soon as possible.

R. M. Owen & Co. of New York recently sent four Reo the Fifths by express from the factory in Lansing, Mich., to M. A. Young, the Detroit dealer, who had secured four orders on the condition that delivery be made within 24 hours.

Charles A. Trask has resigned as chief of the engineering department of the Cartercar Company, Pontiac, Mich., and is to make a three months' trip abroad. He will study automobile engineering practise and aeronautical work in the important European centres and will conduct investigations for several motor car concerns, as well as for the Cartercar Company.

The Randall-Faichney Company, the Mac-Kae Manufacturing Company, and the Babson-Dow Manufacturing Company are to occupy a new factory building in Jamaica Plain, Mass., on Atherton street, near Boylston station. The new building will be four stories in height, and will be thoroughly modern in every particular. It will be 60 by 250 feet, and with the basement will have a total floor space of 67,000 square feet. As shown in the accompanying illustration, the exterior will be attractive, and it may be said that the interior will be in keeping. The building will be erected and owned by the Randall-Faichney Company. Light and power will be electric, and the service is being designed by electrical engineers who will produce an ideal installation. The building is situated close to the railroad tracks, affording excellent facilities for shipping the products of the three firms, which all make automobile accessories and parts. The Randall-Faichney Company makes the well known Jericho and Jubilee horns, a line of grease and oil guns and other accessories. The Mac-Kae Manufacturing Company produces spark plugs, timers, terminals and other electrical supplies, as well as tire holders and tools. The Babson-Dow Manufacturing Company is a new concern, and will make a specialty of screw machine products in all metals. Rodger D. Babson is the general manager of this concern, coming from the Hartford Machine Screw Company. H. F. Dow will be the factory manager. He was for 15 years in charge of the screw machine department of the United Shoe Machine Company at Beverly, Mass.



Modern Concrete Factory Building to Be Erected in Jamaica Plain, Mass., and Occupied by the Randall-Faichney Company, the Mac-Kae Manufacturing Company, and the Babson-Dow Manufacturing Company.

GARAGE AND DEALER.

The Omaha Branch of the Studebaker Corporation at Omaha, Neb., is to give up the retail end of the business and devote its energies to wholesale work. The retail sales of Flanders and E-M-F cars have been taken by the E. E. Wilson Company, and both companies will occupy the same quarters as before.

The Austin Tire & Rubber Company has opened a salesroom in Salt Lake City, Utah, at 147 East First street, South.

The Buick Garage in Northampton, Mass., is being enlarged. Among the improvements is to be an electric elevator.

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The Baker Bros. Motor Company, the Buffalo, N. Y., agent for the Cole, expects to be in new quarters in the near future. The new building at 1024-26 Main street will have a salesroom, storage room and service department, and is already under construction.

The Collingwood Sales Company has been organized in Toledo, O., by M. E. Humbarger and Samuel Hoover. A garage will be operated and Apperson cars will be handled in the territory including northwestern Ohio.

D. M. Beal, manager of the Moline agency in Omaha, Neb., has taken temporary quarters at 2129 Farnam street while his new garage is being built.

H. R. Pfeiffer of York, Penn., who has the agency for the Baker electric in York, Lancaster and Adams counties, has added Dauphin county to his territory and opened a garage in Harrisburg.

The Robert F. Boda Automobile Company, Columbus, O., has doubled the space of its salesroom by leasing an adjoining storeroom.

The Everitt Sales Company has succeeded the Georgia Motor Car Company at Atlanta, Ga., which handled the Everitt, Brush and National lines. The new concern is practically a factory branch, and for the present continues to occupy the Georgia company's place at 33 Auburn avenue.

W. O. Durrant, Niagara Falls, N. Y., has purchased the Prospect garage and is having it remodelled.

The True & Blanchard Company, Newport, Vt., is building a large fireproof garage on Main street and Northern avenue, with approaches from both streets.

The Boston Automobile Clearing House has been started in Cambridge, Mass., by R. I. Kendall. Second hand cars will be handled at 55 Franklin street.

The Salt Lake Automobile Company has opened new quarters in Salt Lake City, Utah, at 162 East First street, South.

Frank S. Parsons is to conduct a garage in Northampton, Mass., ground having been broken for a structure capable of housing 35 cars on the first floor.

White & Durgin is to erect a large fireproof garage in Haverhill, Mass., plans having been approved.

Edward J. Gallien, Jr., has been appointed assistant to the president, and auditor of the Pierce-Arrow Motor Car Company, Buffalo, N. Y., maker of Pierce-Arrow cars.

Jesse Froelich, formerly with the Benz Auto Import Company of America, has joined the Times Square Automobile Company, New York City, and has also taken the agency for Imperial tires for New York, Connecticut, Long Island and northern New Jersey for the McGraw Tire & Rubber Company, East Palestine, O.

The Cole Motor Car Company, Indianapolis, Ind., has appointed new agents as follows: Meade McClachy, Canton, Ill.; J. C. Reeter, Lake City, Ill.; B. H. Kamp Auto Company, Mt. Carmel, Ill.; E. McMullen, Muncie, Ind.; Charlotte Auto Company, Charlotte, Ia.; Fairchild Auto Company, New Orleans, La.; F. L. Preston, Athens, O.; Norris & Cowis, Washington, D. C.; C. L. Culton, Edgertown, Wis.

A. D. Frost has been appointed manager of the New York branch of the American Locomotive Company, recently established.

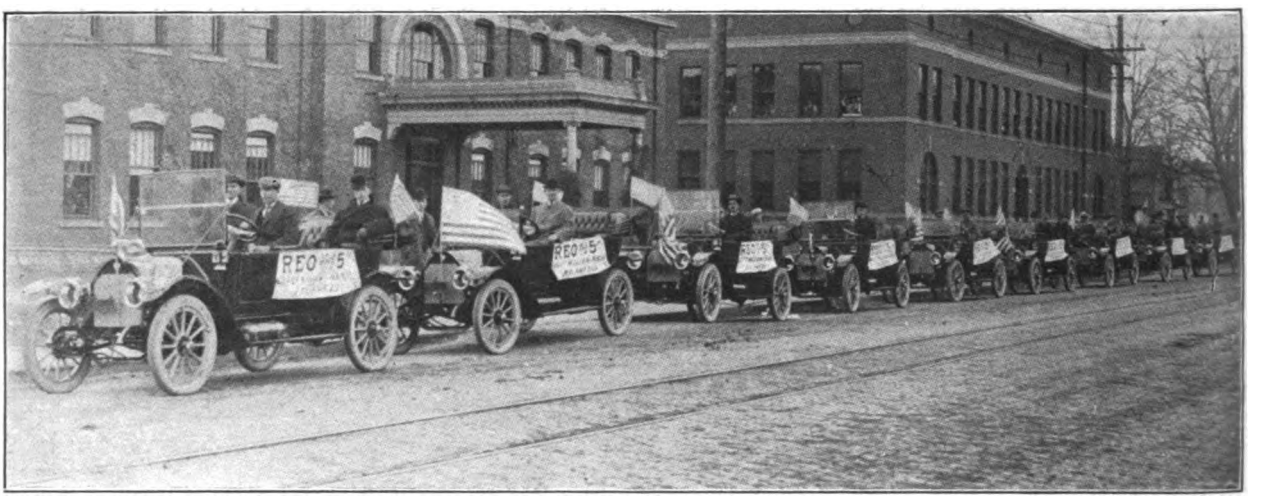
The Gewinner Company, Atlanta, Ga., has moved into new quarters at the corner of Harris and Peachtree streets, occupying two floors of a new building which was recently erected.

The Patterson Automobile Company, Hamilton, Can., recently moved into a new garage at 680 King street. The establishment has storage room for 20 cars, and a complete repair department and machine shop.

The Magna Bros. Automobile Company, Holyoke, Mass., is to occupy the whole of the building in which its garage is located, at the corner of Division and Railroad streets. The second floor is to be taken over and used partly as a showroom and partly for storage.

The Gessler Williams Tire Company, Denver, Col., has taken the agency for the Swinehart tire, made by the Swinehart Tire & Rubber Company, Akron, O.

New agents for the Adams trucks, made by the Adams Bros. Company, Findlay, O., have been appointed as follows: Electric Service & Repair Company, Duluth, Minn.; Central Automobile Company, Albany, N. Y.; Hoagland-Thayer, Inc., Newark, N. J.; L. G. Schoepflin Company, Buffalo, N. Y.; Milton G. Smith Auto Company, South Bend, Ind.; Commercial Auto & Repair Company, San Antonio, Tex.; Waco Auto Company, Waco, Tex.



F. N. Milliman of Kalamazoo, Mich., Overcoming the Difficulties Attendant upon the Shortage of Freight Cars by Delivering Reo the Fifths over the Road.

Mueller Bros., Pittsburg, Penn., representative for the Alco, has taken the agency for the Haynes. J. A. Stranahan, former representative of the Haynes having joined the Muellers.

The Standard Motor Car Company, Dayton, O., has secured the agency for Lippard-Stewart trucks in Dayton and adjacent territory. The concern also handles the Hudson pleasure line.

The American Locomotive Company, New York City, has appointed new agents as follows: Highland Garage Company, Birmingham, Ala.; Advance Auto & Machine Company, Evansville, Ind; Dubuque Rambler Auto & Supply Company, Dubuque, Ia.; Lawrence M. Connell, Scranton, Penn.; Walter K. Patterson, Portsmouth, O. and N. E. Holden, Danville, Ill.

F. N. Milliman, Kalamazoo, Mich., agent for Reo cars, made by the Reo Motor Car Company, Lansing, Mich., recently overcame the difficulty attendant upon the freight car shortage by taking 12 Reo the Fifths over the road from the factory to his salesroom, the cars negotiating deep sand and mud without trouble.

The Murray O'Neill Company, New Bedford, Mass., recently opened new quarters patterned after the most approved metropolitan style. The garage is provided with supply, repair and paint rooms, while a waiting room caters to the comfort of the patrons.

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MEA MAGNETO MAGNET POSITIONS.

In the article "Growth of Accessory Industries" published in the April 25 issue of The Automobile Journal, an error was made in the description of the Mea magneto, probably the best known accessory marketed by Marburg Bros., Inc., New York City, in that the cut of Fig. 4 created an entirely different impression than would have been made were it correctly described.

The illustration shown at Fig. 4 represented the relative positions of the pole shoes and the armature of the advance and retard positions of the horseshoe type of magneto. It is reproduced with the correct description, which is as follows:

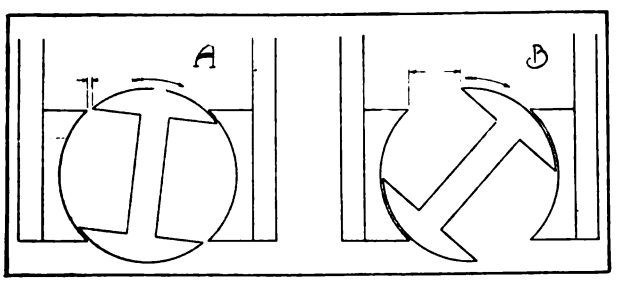


Fig. 4—Horse-Shoe Type Magneto. Relative Position of Magnets and Armature at the Moment of Sparking in Advance Position (A), and Retard Position (B).

The actual relative position of the armature and magnets of the Mea magneto do not vary no matter what the position of timing, as will be seen from the following Fig. 6:

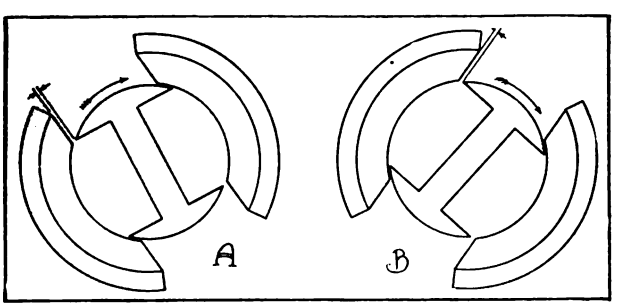


Fig. 6—Mea Magneto (Bell Shaped Magnet Type). Relative Position of Magnets and Armature at the Moment of Sparking in Advance Positions (A), and in Retard Positions (B).

This construction of the magnets of the Mea magneto is the basis of one of the claims for its superiority —that the spark is equally intense at all positions of retard and advance. It is maintained that with the horseshoe magnet type of magneto, with the magnets stationary, the relative positions of the magnet shoes and the armature must vary as the spark is advanced or retarded. With the Mea bell shaped magnet, carrying with it the timing mechanism, any movement about the armature preserves the relation and as no variation is possible the spark is always produced in the strongest part of the magnetic field. It is claimed for the Mea magneto that this construction affords greater flexibility of the motor, because the hot spark throughout the large range of timing (70 degrees) insures the ignition of the gas in the combustion chamber of the engine at both low and high speeds, and for this reason changing gears is often unnecessary.

That there shall be no erroneous impression created by the mistake in the article this explanation and these illustrations are published.



COMING EVENTS.

May.

May 12—Track events, Salt Lake City, Utah.
May 14-17—Commercial vehicle test, Chicago, Ill.
May 17-18—Track events, Denver, Col.
May 25—Road race, Barcelona, Spain.
May 30—500-mile race, Indianapolis, Ind.
May 30—Track events, Salem, N. H.

June.

June 6—Reliability run, Washington, D. C.
June 8—Track events, Narberth, Penn.
June 20—Algonquin hill climb, Chicago, Ill.
June 20-22—Reliability run, Portland, Me.
June 25-26—Grand Prix, Dieppe, France.

July.

July 3-5—Track events, Belle Fourche, S. D.
July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach events, Old Orchard, Me.
July 5-6—Road race, Tacoma, Wash.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Stock car races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.
Sept. 9—International aviation race, Chicago, Ill.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.
Oct. 12—Track events, Salem, N. H.

ST. LOUIS ASSOCIATION OFFICERS.

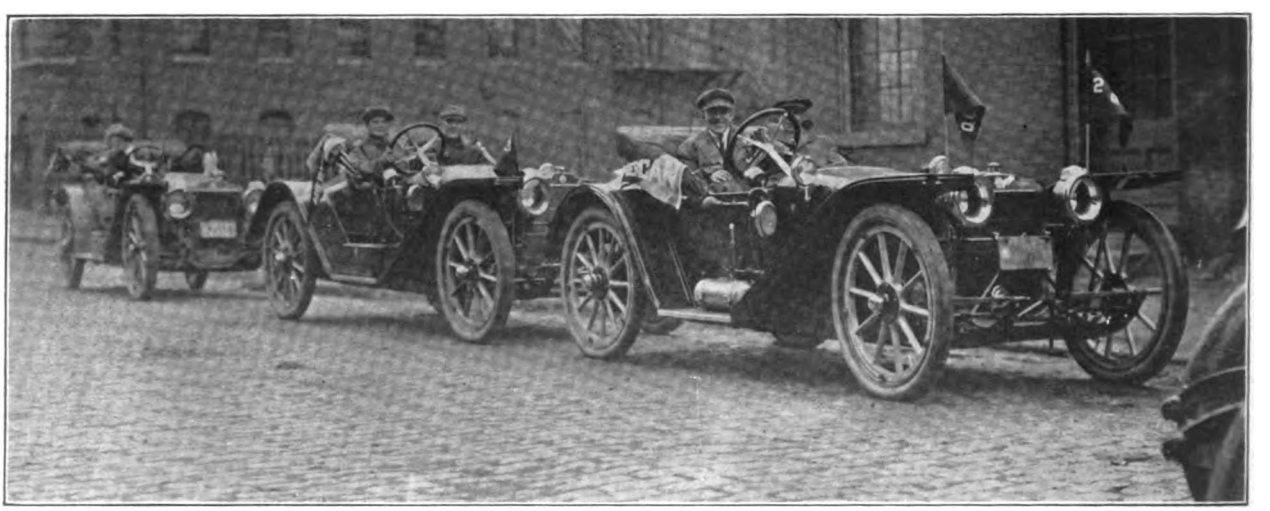
The annual election of officers of the St. Louis Automobile Manufacturers & Dealers' Association was held recently and the following officers elected: President, Frank R. Tate; vice president, W. C. Anderson; treasurer, Samuel Breadon; secretary, Robert E. Lee. Directors were elected as follows: H. B. Krenning, John H. Phillips E. P. Rhodes, O. L. Halsey, C. Gratiot Cabanne and T. L. Houseman.

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NATIONAL CONTEST AND RACING NEWS.

Plans for Vanderbilt Cup and Grand Prize Races---Quaker Motor Club's Annual Sociability and Gasoline Economy Run---Reo Wins 200 Mile Event on Pacific Coast---Notes Concerning Contests in Other Sections.

Although announcement has been made that 15 conditional entries for the Vanderbilt and Grand Prize races have been received by the Milwaukee Automobile Club, it is learned that no sanction has been issued as yet by the contest board of the American Automobile Association. The club has been assured that it may have the races, in case it is able to provide the necessary police protection, etc. The contest board has asked for an additional assurance that at least three days shall elapse between the running of the Vanderbilt and the Grand Prize, and that the races shall be held sometime between Sept. 2 and Oct. 5. Thus far no official reply has been received from Milwaukee, although it is anticipated that these conditions will be met.



Three American Cars Which Took Part in Quaker Motor Club's Gasoline Economy Test.

TWO-DAY MEET IN TACOMA.

The Tacoma Automobile Club, Tacoma, Wash., is planning a two-day automobile race meet on the prairies south of the city, July 5-6. The events will be held in connection with Monta-Mara Feste, and it is expected that the programme will provide for three long distance contests, of 150, 250 and 300 miles, respectively.

NO FAIRMOUNT PARK RACE.

According to a dispatch from Philadelphia, dated May 8, the Fairmount Park Commission has refused permission to hold the fifth Fairmount Park race over the course which has been utilized heretofore by the Quaker Motor Club. As there is no other suitable course in Philadelphia, it would appear that the annual event would not be held this year.

WARREN'S NON-STOP RECORD.

The contest board of the American Automobile Association has accepted as official the non-stop record of 12,404.9 miles made by a Warren car, the product of the Warren Motor Car Company, Detroit, at Oakland, Cal., during 49 days previous to April 24. This mileage is remarkable when considered from the viewpoint of the car, but it should be added that the tires utilized were of the Fisk make, produced by the Fisk Rubber Company, Chicopee Falls, Mass. Throughout the entire distance but seven casings were used, and at the conclusion of the test six of these were utilized on an agency tour in northern California.

TEXAS FARMERS TO TOUR.

What is announced as a unique tour in the history of automobiling is to be conducted in Texas some time in the near future. The participants will be farmer motorists exclusively, and will be conducted by several of the state automobile clubs, with the sanction of the American Automobile Association. Frank P. Holland, the editor of the Farm & Ranch, a Texas

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agricultural paper, has planned the tour, and a Kissel-Kar recently went out to lay out the route. It is expected that great interest will be aroused among the Texas farmers.

DISBROW'S RECORDS CONFIRMED.

The new world's records recently made by Louis Disbrow in a Simplex car on the one-mile circular dirt track at San Jose, Cal., have been accepted by the contest board of the American Automobile Association, as follows: Fifteen miles, 13:30; 20 miles, 17:54.4; 25 miles, 22:26.6.

QUAKER CLUB'S RUN.

The American 13, driven by W. L. W. Jones of Coatesville, Penn., won the first prize in the gasoline economy test of the Quaker City Motor Club, Philadelphia, from the latter city to Atlantic City, N. J., April 27. Despite the heavy downpour of rain 35 cars took part in the event, nine of them being entered for the economy test and the remainder for the sociability feature. A one-ton Wilcox truck also covered the distance with the baggage of the party.

The sociability feature resolved itself into a mere averaging of the time taken by the various contestants, the driver coming nearest to this being awarded the prize. Otto C. Fell in a Packard was declared victor. C. J. Swain in a Winton second and M. E. Grigham in a Lozier was third. Mrs. D. W. Harper in a Case, the only woman to drive in the event, was awarded a special prize.

In the gasoline economy test, the winning American, equipped with a Rayfield carburetor, covered the 61.3 miles with a total consumption of two gallons and 28 ounces of fuel, which figures out at 22.07 miles to the gallon. The awards were based upon the weight of the machine, the possible points being 10. The following table shows the official result:

Car	Driver	M. P. G.	Per Cent
American,	W. L. W. Jones	22.07	9.51
Lenox,	William Fowler	13.00	6.62
Columbia,	H. O. Krause	13.38	6.53
American,	R. D. Earle	9.94	6.40
Flanders,	H. De Grout	18.55	6.26
Moon,	E. A. Edwards	11.48	5.99
Michigan,	T. De Quelta	12.33	5.70
American,	Nelson Shaw	13.33	5.12
K-R-I-T,	Albert Rich	14.71	4.98

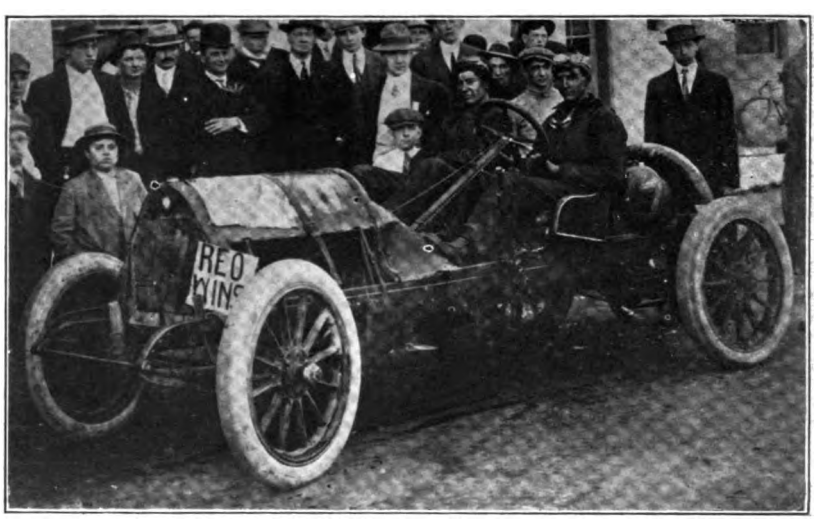
REO WINS ON COAST.

Eight contestants took part in the so-called 200-mile road race at Fresno, Cal., April 21, under the auspices of the Fresno Republican. The distance covered really was but 197.4 miles, over a course of 14.1 miles, replete with sharp curves and bad places. Of the eight starters but three finished, as follows:

Car	Driver	Time
Reo,	Earl Jackson	3:49:00
Overland,	Thomas McKelvey	4:03:16
Elmore,	Bruce Arent	4:30:53

SPECIFIES MOTZ TIRES.

A specification of particular significance was made by Dr. Charles H. Mayo, a well known surgeon in Rochester, Minn., in ordering an Argo electric car, made by the Argo Electric Vehicle Company, Saginaw, Mich., recently. Having satisfied himself respecting the car itself, he made but one stipulation and that was that it should be equipped with Motz cushion tires, made by the Motz Tire & Rubber Company, Akron, O. These tires are designed particularly for electric machines, although they are being used with success on hundreds of gasoline vehicles. They are claimed to be as easy riding as any properly inflated pneumatic, and in addition the time saving and puncture proof features make a direct appeal to busy men, physicians and others. They are guaranteed for 10,000 miles, or approximately two years' service.



Earl Jackson at Wheel of Reo Car, Pacific Coast Winner.

DENVER-NEW YORK TOUR.

The proposed Denver-New York tour, which was projected last fall and abandoned later, has been revived by the Denver Chamber of Commerce. According to the latest information, 10 entries already have been filed and at least 20 others are expected. It is hoped to make the start, under sanction from the American Automobile Association, shortly after June 1.

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NEW BOSCH MAGNETOS.

Magnetos known as types 29 and 30 of the true high-tension type and designed for slow speed stationary single-cylinder motors of compressions up to eight and 12 atmospheres have been brought out by the Bosch Magneto Company, New York City. They are constructed in two forms, one having two horizontal springs and the other one vertical. That known as the 29 type is constructed with two magnets while the 30 is fitted with three.

Current is produced by the oscillation of an armature having a primary and secondary winding between the pole shoes of permanent steel magnets by means of a tripping device operated against the trip lever by the motor. This lever is mounted upon the tapering end of the armature shaft and is held in a normal position by the tension of the springs, as outlined in



Type 29 Bosch High-Tension Magneto for Slow Speed One-Cylinder Motors, Also New Spark Plug for Heavy Duty Motors.

the accompanying illustration. When it is moved from its normal position by the operating mechanism, the springs are extended. When released it returns with the armature, this movement resulting in the production of a sparking current in the winding of the armature.

The tension of the current is augmented by closing the primary circuit at a certain position in its movement, then breaking it by means of an interrupter, at which point an arc like spark is produced at the gap of the spark plug. The movement of the armature from its natural position is 30 degrees. Magnetos of this type do not permit the variation of the ignition point, although an advance or retard of the spark may be accomplished, if desired, when the requirements of starting, or engine conditions need variation.

These instruments require the use of the new Bosch heavy duty spark plug illustrated herein and constructed especially for service with heavy gas engines. The central electrodes project slightly beyond the body of the plug, and its flat end is level with the crescent shaped end of the side electrode. The design is such that heat is conducted rapidly from the exposed portions, preventing overheating or fusing of the electrodes.

The insulator is of steatite or artificial stone, and copper gaskets are utilized, assuring a gas tight plug. The terminal connection is screwed to the central electrode and retains the rubber covered cable terminal. The plug is also designed for service on motors of high compression.

MOTORISTS MUST USE HORSES.

Motorists in Stamford, Conn., have just discovered that they must hitch horses to their machines if they wish to avoid violating an ordinance passed in 1909. Section 218 reads: "No person shall leave any cart, car, dray, truck or other vehicle in any street unless same is in use and attached to a horse or other animal."

GOOD ROADS MEETING.

The Butler County Good Roads Association held its second annual meting at Butler, Penn., recently, with 88 of the 99 road supervisors of the district and more than 300 members present. The proposed $50,000,000 bond issue for road improvement was indorsed and speeches were made by H. O. Eldridge, superintendent of road construction for the government; Dr. Donald McCaskey, and Judge James M. Galbreath. The officers for the coming year were elected as follows: President, O. W. Stoughton; vice president, A. J. Portman; secretary, J. Norman Glenn; treasurer, Edward Ohl.

GERMAN PRINCE BUYS AMERICAN CAR.

The invasion of the German automobile market by the lower priced American car seems to be causing considerable dismay among the German firms. The fact that the Crown Prince recently bought an American car is held to be the reason for a general demand for higher tariff rates. Newspapers already have published statements from the leading manufacturers calling attention to the peril and urging the necessity for this step.

The Empire Automobile Company, now operating a factory in Greenville, Penn., is to have three factories in as many cities, according to the plan announced recently. A second factory will be built in Indiana, in either Knightstown or Indianapolis, and Missouri will get the third factory, in either Kansas City or St. Joseph.

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HENDERSON COMPANY ORGANIZED.

The organization of the Henderson Motor Car Company, Indianapolis, Ind., which was incorporated recently for $100,000, was completed in that city May 6. The officers are: President, L. Carter of Jessup, Ga.; vice president, R. P. Henderson; secretary and advertising director, L. S. French; treasurer, C. K. Share; directors, L. Carter, R. P. Henderson, C. P. Henderson, Chester Ricker and E. E. Rogers. The concern will produce the Henderson car.

Mr. Carter formerly was president of the Henderson Motor Sales Company and is a large stockholder in the Cole Motor Car Company. R. P. Henderson was vice president of the Henderson Motor Sales Company at one time, and before that was sales manager with the Parry Manufacturing Company. Mr. French was connected with the Henderson company as advertising manager.

Mr. Ricker becomes chief engineer of the new concern. The factory management will be in charge of Charles A. Trask, formerly with the General Motors Company. Mr. Share was at one time assistant secretary and treasurer of the Willys-Overland Company. F. E. Wilson, formerly sales manager of the Marion Sales Company, and previously identified with the sales department of the Willys-Overland Company, will be sales manager. C. P. Henderson will not be active in the new concern, devoting all of his time to the direction of sales with the Cole Motor Car Company.

USED HARRIS OILS.

Nothing can be more gratifying to the maker of any product than a generous supply of unsolicited testimonials. The A. W. Harris Oil Company, Providence, R. I., maker of Harris oils, has been the recipient of a large number of these, and some of them contain so much food for thought that the company has decided to make a neat little portfolio of them for general distribution. They cover nearly every make of car and speak highly of the superior results obtained through the use of Harris oils. The portfolio is enclosed in an artistic envelope printed in colors and is free to all who make request.

WHEEL TAX FOR CHICAGO.

Chicago motorists were much surprised recently, when it was announced that the city council had passed on March 4 an ordinance imposing a wheel tax on automobiles based on the horsepower, and revoking the old system of taxing according to seating capacity. The ordinance was kept very quiet, until April 30, the day before it was to go into effect, when it was announced, to the great astonishment of motoring organizations and others who had been keeping a watch for automobile legislation. The new ordinance places a tax of $10 on cars of less than 35 horsepower, $20 on all cars above that figure, $10 on pleasure electrics, $15 on trucks of one-ton or less, and $30 on trucks of more than one ton.

WITH OLDSMOBILE IN BOSTON.

Among the factory branch managers in Boston there is none better known than William B. Fewell, who is in charge of the New England division of the business of the Olds Motor Works, located at Massachusetts avenue and Newbury street. Mr. Fewell has been identified with the motor vehicle industry for years and is regarded as one of the "old timers" so far as length of service is concerned. He is a native of Springfield, Mass., and gained his motor knowledge with the Locomobile Company of America, being connected with that concern for a number of years. He then went to the Olds Motor Works and was located in St. Louis Mo., as manager of the branch of the company, being transferred to Boston to succeed George Houck. With the Locomobile Company Mr. Fewell was a travelling representative and as such was brought in contact with thousands engaged in the trade and industry, and as a branch manager he has become known to an exceedingly wide circle of friends. The Olds Motor Works branch will later on be housed in a fine service station now building in Commonwealth avenue, to which, when completed, the present service station at Cambridge will be moved.



William B. Fewell, Manager Boston Oldsmobile Branch.

TO ENRICH GASOLINE.

Acetrol is shortly to be placed on the market by the Acetrol Company, which was recently formed in Milwaukee, Wis., by P. C. Avery of the Avery Portable Lighting Company, maker of the Electrobola lamp. Acetrol is a chemical compound which is to enrich gasoline by producing acetylene, it is said.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

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COES

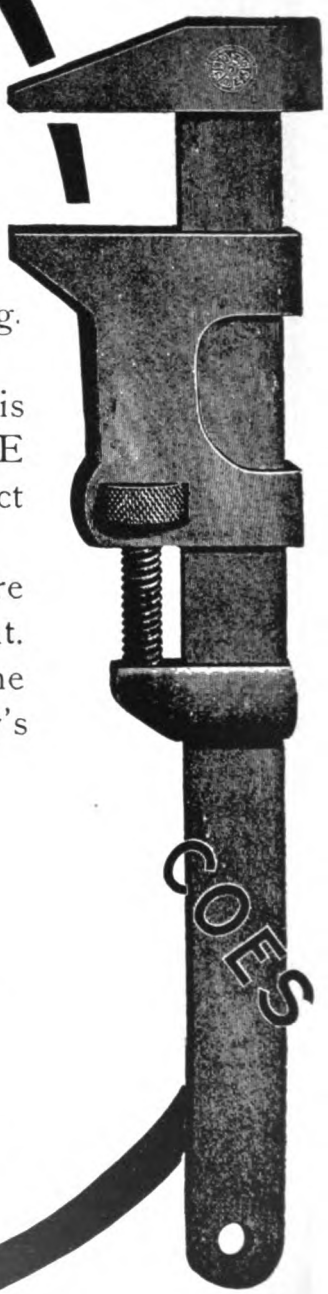
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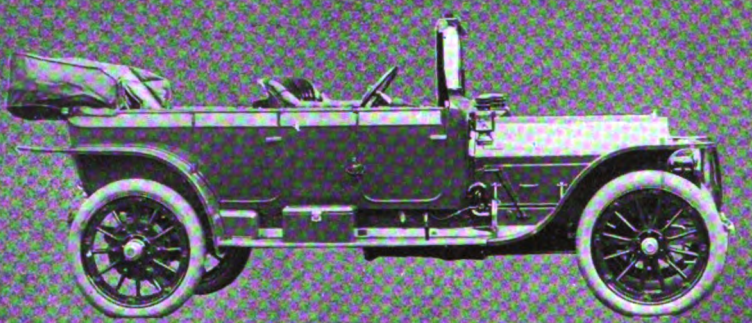
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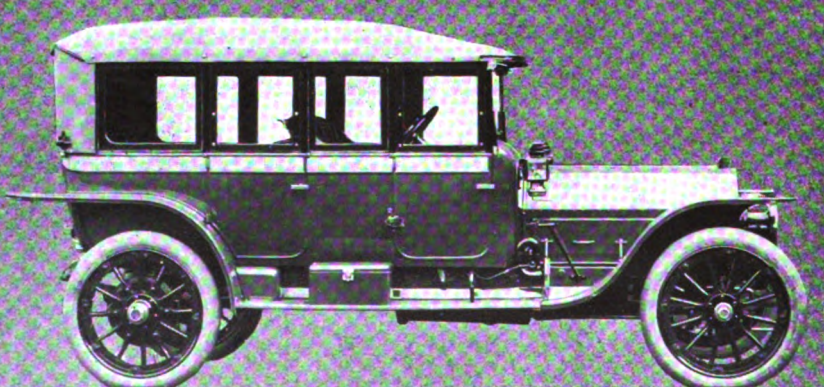
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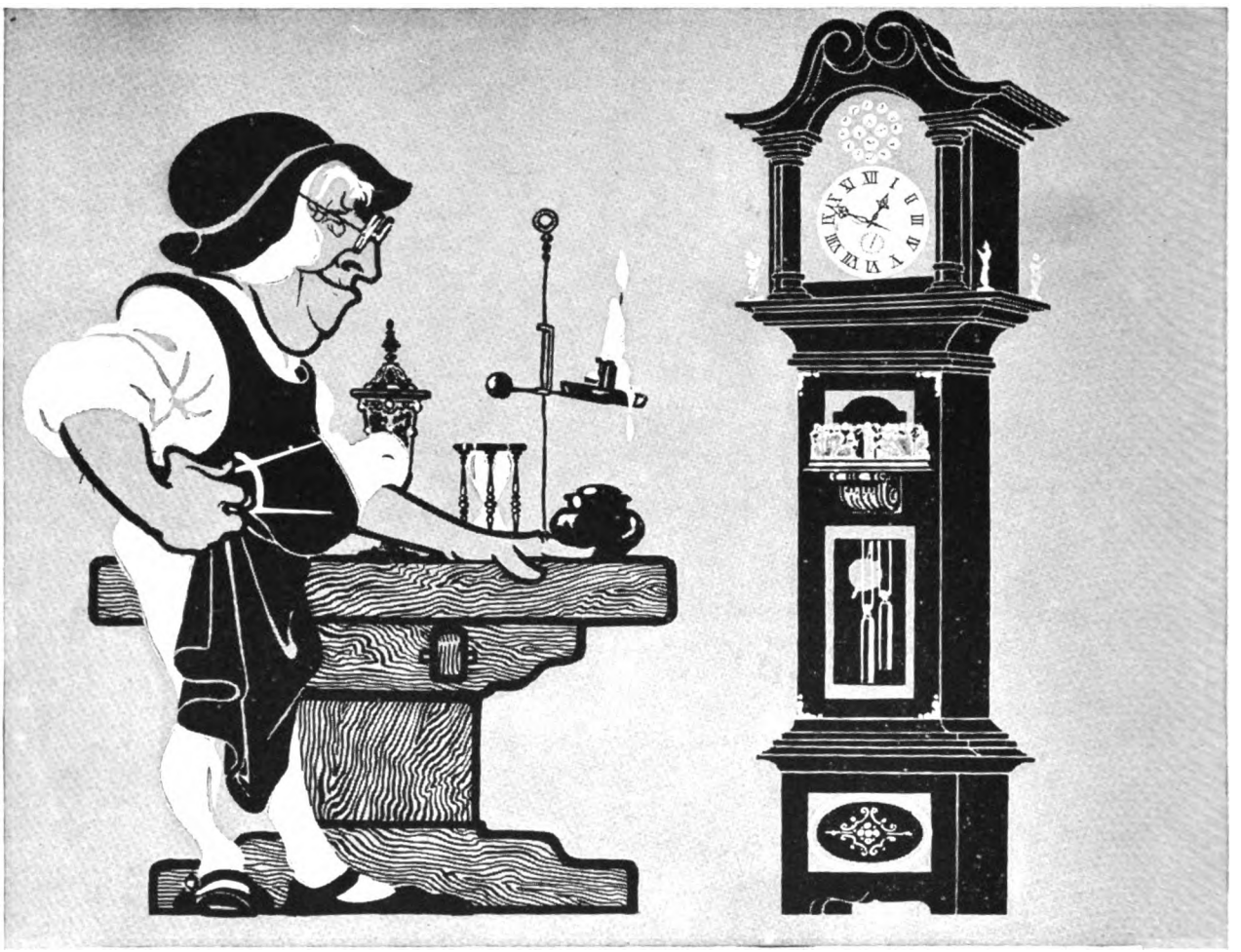
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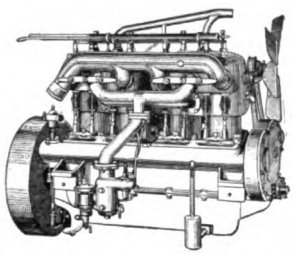
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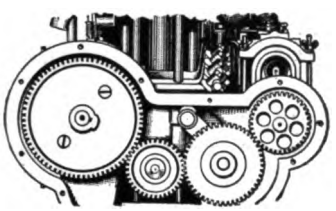
Where to Look for Loss in Power and How to Prevent it

These five parts of the motor car mechanism are the source of ninety per cent. of the friction developed.



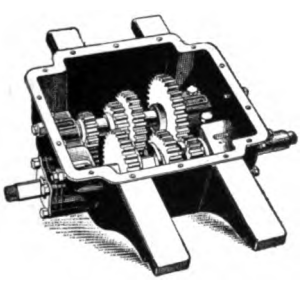
The Engine

The engine has a multiplicity of moving parts, all subject to great frictional resistance, if the oil employed is not, first and above all, high in lubricating properties. An oil which *seems* unusually good because it doesn't carbonize, may be *really* exceedingly bad, because it doesn't lubricate.



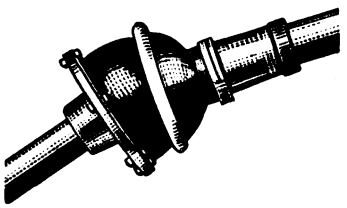
Timing Gears

Gears are greedy in devouring power. Timing gears are no exception. They need the cushioning effect of a good lubricant—one which will not thin out and will not carbonize if it should by chance work into the combustion chamber.



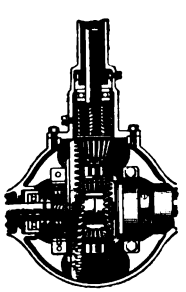
Transmission

The transmission may be the source of a ten per cent. friction loss—two horsepower out of twenty. It depends upon the lubricant you use. Stiff grease puts a tremendous overload on the driving shaft. Oil leaks out, does not cushion the teeth, and gears soon wear out. The ideal lubricant is soft in body, does not retard and does envelop and cushion the teeth.



Universal Joints

These "elbows" in the driving shaft work so hard that they destroy any kind of a low melting point grease, cause it to escape and and then they get hot from high friction. When you study the make-up of a universal joint and think of its work, you can see why a good lubricant is essential.

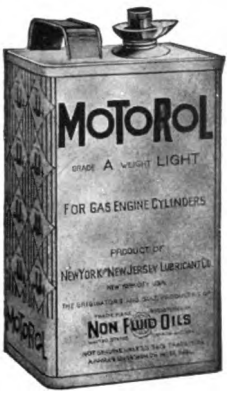


Differential

Here is where the driving power turns a corner and where the relative motions of the rear wheels are compensated. Such a mechanism is a hot-bed of friction when the lubricant fails. Bevel gears and ball and roller bearings must be unfailingly lubricated.

MoToRoL

will not carbonize any more than other oils which have not one third of its lubricating properties. MoToRoL is incomparable in economy.



"K-Forty" Grade Non-Fluid Oil

insures a low coefficient of friction, quiets the gears, does not thin out and will positively not carbonize under heat.



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has that ideal consistency which some motorists try to get by mixing oil and grease. This lubricant does not melt or congeal. It is exceedingly adhesive, hence the teeth are always thoroughly coated. Gears run quietly, shift easily and do not absorb power.



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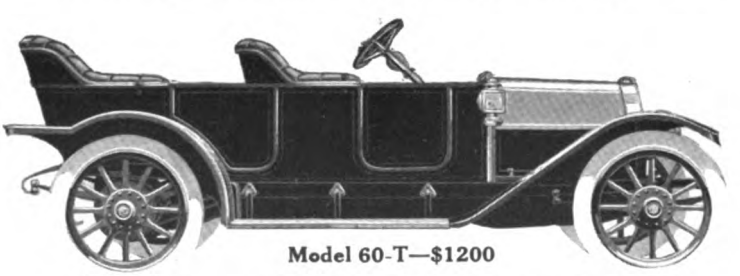
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Model 60-T—$1200

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KisselKar service is supplied through a national organization with service centers, maintained by the manufacturers, at principal points, to give owners the full service that lowers maintenance, and retards depreciation. This partial list of service centers, and especially equipped sales agencies, show the scope of KisselKar service:

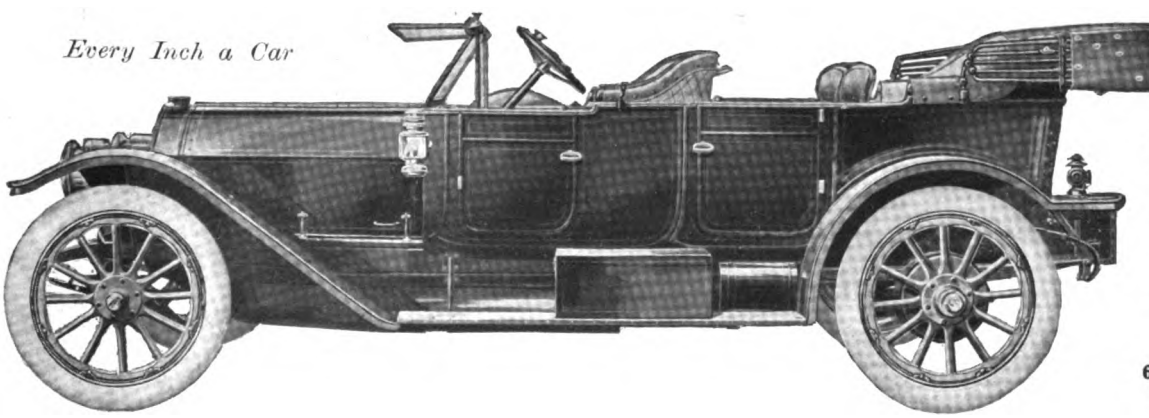
Boston, New York, Philadelphia, Cleveland, Detroit, St. Louis, Dallas El Paso, San Antonio, New Orleans, Baltimore, Chicago, Milwaukee, Kansas City, Omaha, Butte, Denver, San Francisco, Los Angeles, Seattle, Portland, Minneapolis, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and other principal points throughout the United States.

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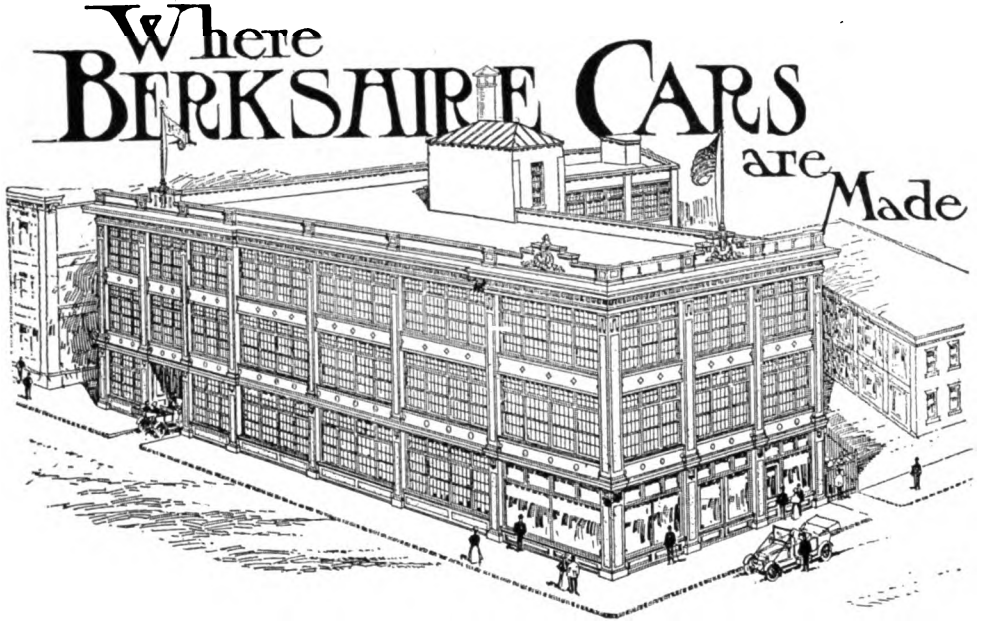
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Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
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Equipment—Complete.
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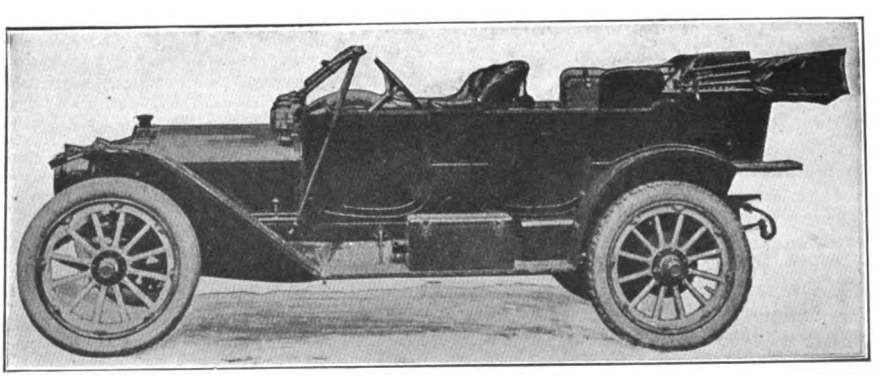
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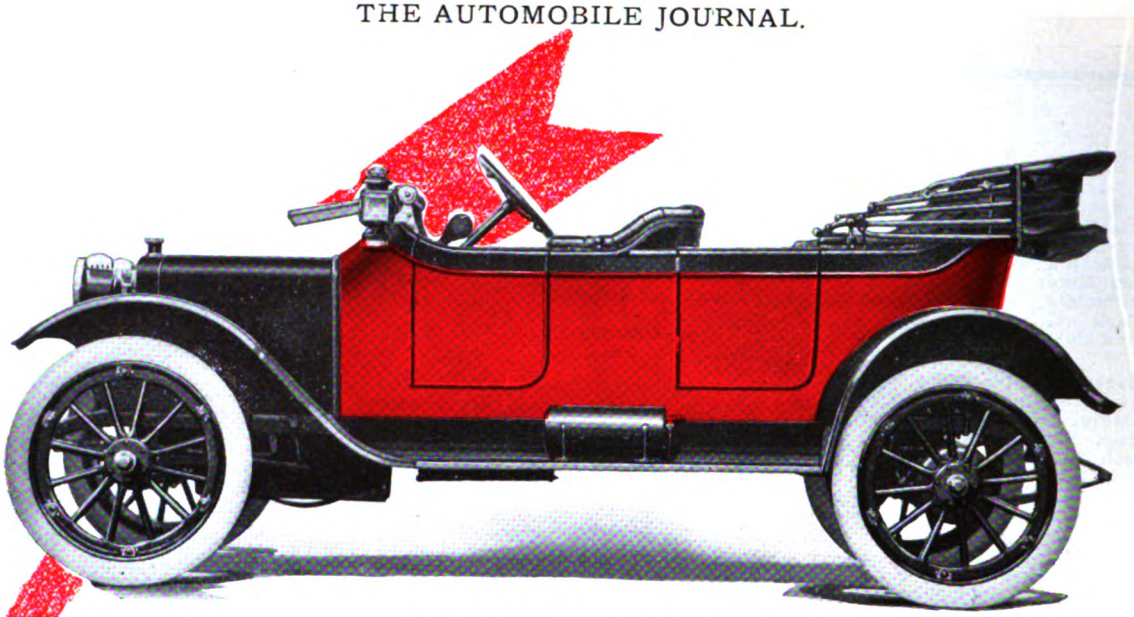
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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

We Want the Best Dealer in 2000 More Towns!

WE'RE building 10,000 R-C-H cars this season—we shall build 30,000 for next year. We want additional dealers to handle the increased output. This year demand ran away with production, and our entire output was contracted for, with much of the best sales territory in the country unsupplied.

But we don't want merely men who will agree to sell the R-C-H cars. We don't want the one-season man, the doubtful man, the unstable man. We want dealers who will take up the R-C-H line, because, after thorough investigation, they have convinced themselves that in no other way can they give their customers so much value for the money, and for just that reason the R-C-H is the easiest car to sell.

There is hardly a post-office from the smallest cross-roads hamlet to the largest city, from which we have not received inquiries regarding the R-C-H in response to our extensive advertising. And there is no section where the R-C-H, in the hands of enthusiastic owners, is not living fully up to the advance notices. So we ask that dealers everywhere who appreciate the right car at the right price; who appreciate the utmost degree of factory co-operation; who desire a **permanent** connection; growing better and better as the years go by—write us at once.

To such dealers we have much of interest to say.

GENERAL R-C-H SPECIFICATIONS—Motor—4 cylinders, cast en bloc—3 1-4 inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-Side.** Irreversible worm gear, 16-inch wheel. **Control—Center Lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above

YOU CONVINCE US, AND WE'LL CONVINCE YOU

R-C-H CORPORATION, 107 LYCASTE STREET Detroit, Michigan

BRANCHES:

Atlanta, 548 Peachtree St.
Boston, 563 Boylston St.
Buffalo, 1225 Main St.
Chicago, 2021 Michigan Ave.
Cleveland, 2122 Euclid Ave.
Denver, 1520 Broadway.
Minneapolis, 1206 Hennepin Ave.
New York, 1989 Broadway.
Philadelphia, 330 No. Broad St.
Walkerville, Ontario, Canada.
Detroit, Woodward and Warren Aves.
Kansas City, 3501 Main St.
Los Angeles, 1242 So. Flower St.

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32x3½ tires, demountable and quick detachable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy curtains, adjusted in an instant, and make the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

Standard Model

$850 F. O. B. DETROIT

Top, Jiffy curtains, windshield, generator, 5 lamps, horn, tools, and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

R-C-H

"Twenty-Five"

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches

Standard Model

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

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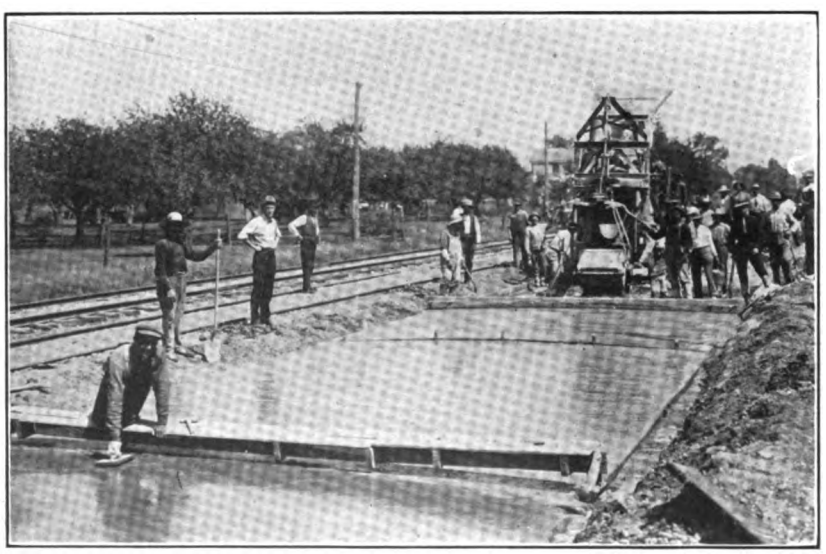
THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 8 MAY 25, 1912 Price $1.00 the Year

ADVANTAGES OF CONCRETE PAVEMENT.

Problem of Highway Construction and Maintenance of Decided Importance to Motorists--Success That Has Accompanied the Use of This Particular Method--Specific Instances Indicate Cost and Results Obtained.

SOMETHING like $4,000,000 was paid by the motorists of America in registration fees during 1911, according to the best information available, and a large proportion of this money was placed at the disposal of state highway commissions and others upon whom devolved the duty of expending it for the construction and maintenance of public roads. It follows that the owners of automobiles, commercial motor vehicles and motorcycles have a direct personal interest in the subject of highway improvement.

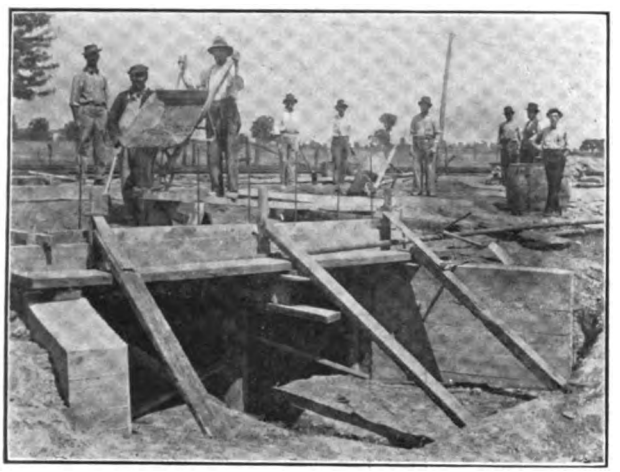


Mechanical Batch Mixer Which Replaces Eight or Ten Men in Work of Laying Concrete Roadbed.

Divided according to states this $4,000,000 was contributed about as follows: New York, $883,000; Massachusetts, $460,000; Pennsylvania, $419,000; New Jersey, $375,000; Illinois, $350,000; Ohio, $255,000; Connecticut, $207,000; Iowa, $148,000; Michigan, $96,000; Texas, $78,000; Rhode Island, $73,000; Maryland, $63,000; Vermont, $60,000; Missouri, $56,000; New Hampshire, $53,000; Colorado, $47,000; California, $38,000; Virginia, $36,000; South Carolina, $35,000; Minnesota, $32,000; Oregon, $26,000; Louisiana, $24,000; North Dakota, $22,000; West Virginia, $20,000; Kentucky, $20,000; Wisconsin, $18,000; Oklahoma, $17,000; Washington, $16,000; Alabama, $14,000; Delaware, $13,000; Indiana, $12,000; Georgia, $11,000; Maine, $11,000; District of Columbia, $10,000; Wyoming, $9000; Arkansas, $8000; Nebraska, $8000; Arizona, $7000; North Carolina, $7000; Mississippi, $6000; Tennessee, $4000; South Dakota, $3000; Florida, $3000; Utah, $1000.

Some of these had no state registration in 1911,

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Permanent Reinforced Concrete Culverts Make Concrete Roads of One Unbroken Surface.

the fees being collected by counties or municipalities. This practise will be continued in 1912 with some, while others have adopted new laws. In many other instances steps have been taken to increase the registration fee, the action being based upon the claim that automobiles cause undue wear upon the highways. This claim will be denied by motorists, but their denial will have insufficient weight. Other means must be taken to convince state authorities that it is possible to so build roads that they will withstand automobile, and all other vehicular traffic, and that the money expended for this purpose can be made to yield a larger return than has been true in the past.

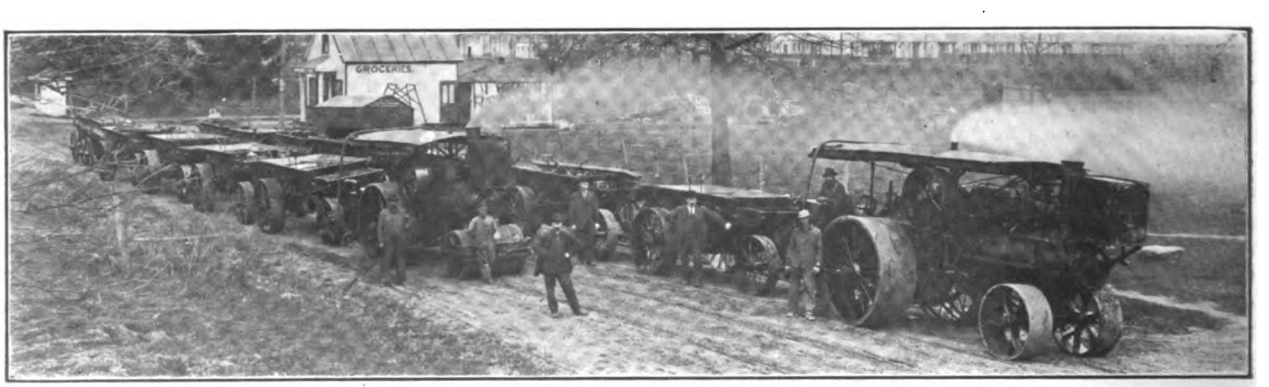
Believing this subject to be of the utmost importance to motorists, The Automobile Journal, from time to time, has discussed various methods of road construction and maintenance with an idea of placing before the motoring public, at least, full information as to what has been accomplished along these lines, and what may be expected in the future. Engineers agree that perhaps no one type of pavement is adapted to all classes of traffic or suitable to all conditions. They will unite in the opinion that the ideal pavement is that which will be sanitary, smooth but not slippery, easy to repair and clean, noiseless, durable, and most important of all, capable of being constructed at a cost that will appeal to the taxpayers.

This last feature has a somewhat difficult bearing upon the case, since, while much of the money expended for this purpose is collected from the motorists in registration fees, the question as to its disposition rests in no small measure with the whole people. However, the growing use of automobiles among all classes, and particularly in farming communities, has led the very interests who were at one time violently opposed to expenditures for permanent ways to become equally enthusiastic with other motor car owners in demanding bettered conditions.

For the purpose of affording opportunity for comparison of costs and advantages with other types of construction which have been considered in these columns, this discussion will cite several instances where concrete pavements have been laid with excellent results. Specific information will be given as to the cost of construction and maintenance.

About 1890, wide concrete gutters were laid on the main street in Bellefontaine, O. These gutters really served as a pavement next to the curb, and after several years of exceptionally hard usage they showed so little wear and gave such general satisfaction that the city engineer decided to try this form of construction for street pavements. The streets selected for this purpose were those surrounding the court house block, two of them being quite narrow and the other two being full width. The two narrow strips were laid in the summer of 1893 and the remainder in October and November, 1894.

The pavement proper consists of a four-inch Portland cement concrete base and a two-inch wearing surface, the base being a 1:4 machine mixed gravel concrete and the top of a 1:1 mixture of Portland cement and clean, coarse sand. The materials were mixed in a screw or worm mixer 14 feet long, on either side of which was a long rectangular box for measuring the ingredients. The sand or gravel, as



Part of the Road Outfit Operated by the Wayne County Board of Supervisors in the Construction and Maintenance of Highways.

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Tearing Up Old Roadway with Scarifier Preparatory to Making a Proper Grade.

the case might be,, was placed in the bottom of the box, the proper amount of cement spread over it evenly, and the mass shoveled from the box into the mixer. The concrete was mixed quite dry and well tamped into place, the men laying the top following closely behind those laying the base.

Starting at one curb, the concrete was laid in long strips five feet wide, extending the full length of the area to be paved. These strips afterward were cut into blocks five feet square. After thoroughly tamping the top it was sprinkled with water and given a smooth surface with a trowel. To afford a footing for horses, the surface on the two narrow streets was marked into blocks four inches square by V shaped grooves about .25 inch wide and .5 inch deep. On the other streets, the surface was pitted with a toothed roller. The work was done by contract and cost the city $2.25 a square yard, including drains and curb. In 1900, the population of Bellefontaine was 6550, which gives some idea of the amount of traffic to which the pavement has been subjected. After 18 years of service, the only wear discernible was along the longitudinal joints. The cost of maintenance had been practically nothing.

The next city to experiment with concrete pavements was Richmond, Ind., in which a short alley was paved in much the same manner as that at Bellefontaine, in 1896. With the exception of a slight unevenness in the surface of the blocks, due to a settlement in the foundation, practically no wear is discernible. In 1901, three additional alleys were paved with the same material, and every year since that time a small amount of concrete pavement has been laid in Richmond. The contract price has varied from $1.62 for the work done in 1896 to $1.06 in 1908.

Since 1900 a large amount of concrete pavement has been laid throughout the country, and there are at present five distinct types in use, the details of construction as compared one with another being radically different. Each will be described briefly herewith.

What might be termed single-coat work has been laid to a rather limited extent in a few places. This consists of a pavement made up for its entire thickness of the same grade of concrete, and having no specially prepared and separately laid wearing surface. The city of Panama laid over two miles of streets 13 to 20 feet wide with this type of pavement in 1906 and 1907, at a cost of about $2 a square yard as compared with $4 for brick.

This pavement was laid in alternate sections about 10 feet long to the entire or half-width of the street, depending upon circumstances. It consists of five inches of a 1:2.5:5 concrete mixed rather wet and tamped until the mortar flushed to the top and then finished with a trowel to a smooth but not slippery surface. For the coarse aggregate the old cobble stones which formerly paved the street were crushed in a portable crusher. Owing to the method of construction and the uniform tropical temperature, expansion joints were not considered necessary. The grades varied to as high as eight per cent., and the concrete surface was found to be less slippery than the brick.

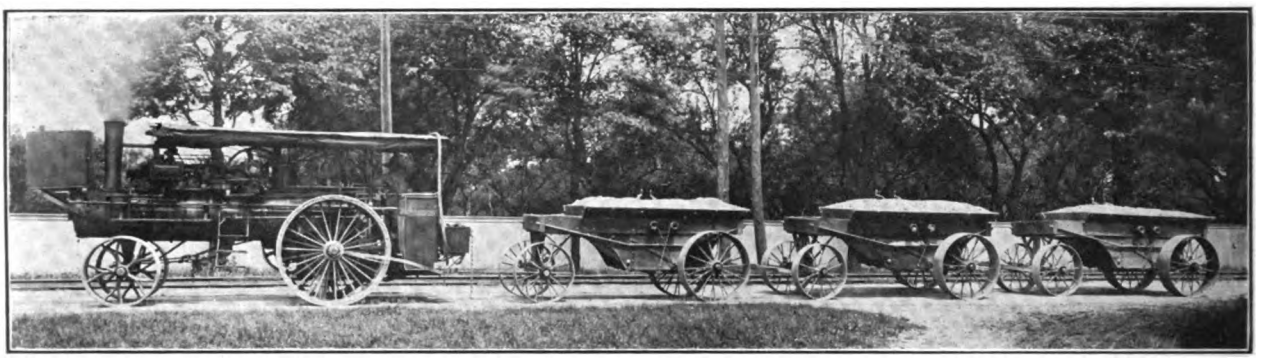
What is known as the Hassam pavement has been laid during the past few years in many sections of the United States and Canada. A description of that laid in Somerville, Mass., will suffice. The cost was $1.65 a square yard as compared with $2.35 for granite block, $3.80 for asphalt, and $2.75 for vitrified brick.

The street was excavated to a depth of six inches below the grade line and rolled to the proper section. Upon this sub-grade was placed a layer of 1.25 to 2.5-inch crushed stone, which after thoroughly rolling to a surface two inches below the finished grade of the street was treated with a grout composed of one part cement and three parts fine sand. The grouting and rolling were continued until the voids in the stone were well filled. The wearing surface consisted of a two-inch layer of crushed trap rock. This was first



Grader Behind Steam Engine Eliminates Entirely Work with Pick and Shovel.

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Hauling Materials for Road Construction, Each of the Wagons Holding Seven Tons and Replacing 3.5 Horse Teams.

rolled and then grouted with a thin grout consisting of one part cement and two parts sand. For a finish a thick grout of one part cement, one part sand and one part pea sized trap rock was poured on and brushed over the surface, allowed to harden for six days and thrown open to traffic. Expansion joints one inch wide, filled with tar were provided at the curbs and placed across the street every 10 feet.

So-called concrete cube pavement was laid near Rochester, N. Y., in 1909, some 1600 feet of 16-foot roadway being resurfaced with two-inch concrete cubes. The original surface of the macadam had worn off, leaving exposed a good lower course of broken Medina stone. The existing surface was rather rough and uneven and over this was placed a thin layer of screened gravel compacted with a 12-ton roller. On the gravel was placed the wearing surface of concrete cubes upon which a small amount of fine gravel was spread and well rolled in. Additional gravel was spread, broomed and flushed in, after which the entire surface was rolled again.

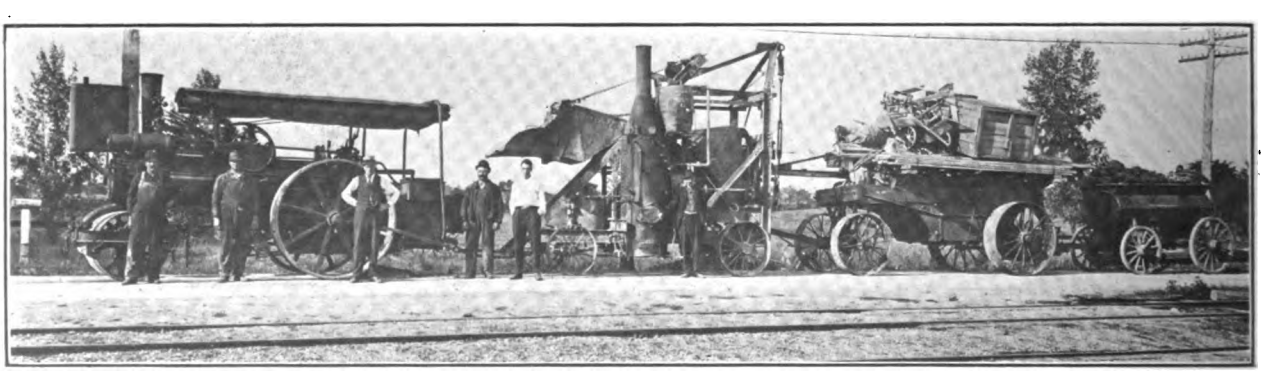
The cubes were made in a machine making 68 at one operation, and a day's work for a foreman and seven men was about 26,000 cubes. Experience showed that the concrete which contained about 2.2 barrels of cement to a cubic yard had to be mixed rather dry and that .5-inch gravel gave a product that could best be handled in the machine. The cost of the gravel-concrete cubes in place on the road was 51.2 cents a square yard. After two years' service the pavement showed no appreciable wear and no work whatever had been done upon it since it was first laid.

During the summer of 1909, the city of Ann Arbor, Mich., paved one block on a residential street with concrete having a coal tar and sand wearing surface. The following year approximately 18,000 square yards of this pavement were laid. The work was done by the city, which has its own equipment, buys the materials and hires the labor, at a cost varying from 71 to 88 cents a square yard.

Ann Arbor has a well drained, somewhat sandy sub-soil and the concrete pavement is laid directly upon the sub-grade without using a sub-base, which would be necessary were a heavy, wet, poorly drained sub-soil to be considered. The concrete consists of a 4.5-inch gravel base and a 1.5-inch wearing surface, mixed one part cement to two parts clean, coarse sand. It is laid in strips one-half the width of the street and 25 feet long, an expansion joint from .75 to one inch in width being placed every 25 feet across the street and at each curb.

The surface of this concrete is given a wood float finish and slightly roughened by brushing with an ordinary hand street broom. After finishing a section as described the form at the centre or crown of the street is removed, and the pavement for the other half of the street laid against that which had been laid previously, so that there is a joint at the crown of the street that is hardly perceptible.

After the concrete has hardened the surface is covered with hot bitumen applied with a sprinkler wagon designed for the purpose, having a fire box under the



Concrete Road Making Outfit, Owned by Wayne County Board of Supervisors, on the Way to the Next Job.

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Grand River Road Before Improvement, One of the Worst Highways in Michigan.

tank to heat the material. This bitumen is distributed immediately, evenly over the surface of the concrete with an ordinary street sweeper broom, and the whole covered with sand. Approximately one-half gallon of bitumen is applied to a square yard of surface, and a cubic yard of sand will cover about 230 square yards, making the wearing surface .25 to .375 inch in thickness. For the first pavement laid ordinary coal tar was utilized, but since that time Tarvia has been substituted.

The fifth type consists of an ordinary concrete base which is covered with a specially prepared and independently laid concrete wearing surface. This is of particular interest because it not only has been given a thorough trial for city use but on country roads as well. The experience of the board of supervisors in Wayne county, Mich., in this respect is especially worthy of note. Accompanying photographs set forth this situation in a comprehensive manner.

The citations are from the fifth annual report of the board, dated Sept. 30, 1911, and cover the work accomplished since Oct. 1, 1910. To quote the supervisors: "We are pleased to report that our decision to adopt the concrete road as a standard of construction for Wayne county has been amply justified by the results. Woodward and Grand River roads, built of concrete and now in their third year, are wearing remarkably well; in fact, our concrete construction has cost practically nothing for maintenance."

This latter statement has a direct bearing on the situation inasmuch as the macadam roads which were constructed when the board began operations in this county, practically needed resurfacing during the year and at considerable expense. The whole aim of the supervisors has been to provide the people of Wayne county with a durable, permanent road at cost. In summing up the situation the report states:

"We believe that the concrete road as devised and built by us has accomplished this purpose and that it is the coming roadway. It is low in ultimate cost, pleasing to the eye, smooth, dustless, and affords excellent traction for all types of vehicles. Our concrete roads are attracting the attention of county commissioners, engineers and other public officials and private citizens throughout the country. Strict attention to detail, care in the selection of good, clean stone and sand, and the proper proportion of a standard brand of cement are requisites, however, to the accomplishment of satisfactory results."

An accompanying illustration shows the complete equipment of the board engaged in the construction and maintenance of the roads under its care. The patrol repair crew was in the field all summer, equipped with road roller, street sweeper, tar kettles and other necessary small tools, together with a camp outfit, travelling from one road to another, resurfac-



Grand River Road Three Months After Above Picture Was Taken, Presenting One of the Best Surfaces in Country.

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Before the Wayne County Board of Supervisors Began Operations.

ing where necessary, patching holes and ruts that had developed under traffic, shaping, filling and rolling the shoulders, cleaning out ditches, tile drains, manholes, culverts, cleaning off the accumulated dirt and refuse, painting and repairing guard rails and bridges, repairing the sides where any washing away had taken place, and maintaining the roads in a state of high efficiency generally. The macadam roads needed the principal repairs, the cost of resurfacing and maintenance totalling $14,554.11. Of this sum approximately $200 was expended on the concrete roads, and this amount was almost entirely used on the ditches and shoulders.

The method of constructing the concrete road as employed by the Wayne county board of supervisors is illustrated herewith. First, the old roadway is torn up with a scarifier or gang point plow hauled by a steam engine. Three of these machines are owned and they are considered highly efficient and economical. As soon as this work is completed the grader is put on behind the steam engine and the grade is placed in such shape that little or no work with pick and shovel is required. An outfit like that shown will do more and better work than four teams, according to the report of the board.

After the grade is prepared the material is hauled on the road, largely by the steam road engines referred to above. Each wagon shown herewith contains seven tons of material and on an average haul will make as many trips a day as a good team. This outfit, aside from the interest on the investment, depreciation and repairs, cost $9.50 a day to operate, which includes wages of engineer and fireman, as opposed to $5 a day for a team. Two tons a trip is a good load for a team over an ordinary unimproved road.

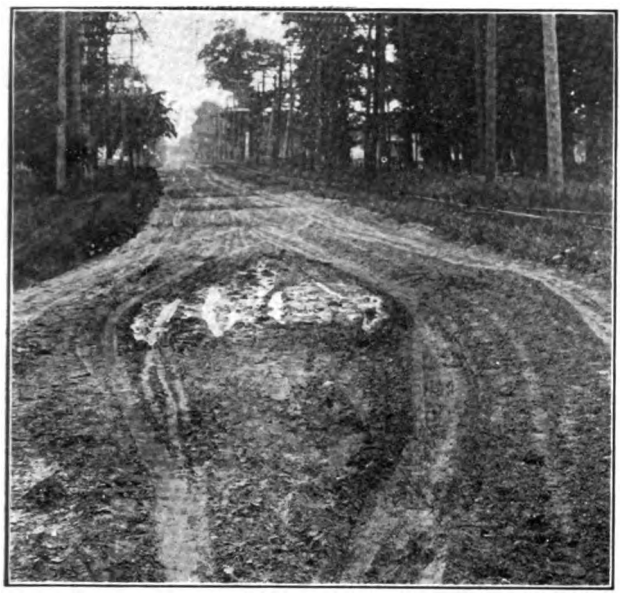
Water in sufficient quantities to meet the requirements is not often available in the country districts without some means for carrying it. Hauling by teams at $5 a day each would prove an expensive proposition, especially when it is remembered that a single crew when in operation utilizes about 15,000 gallons a day. To meet this situation pipe lines are laid to the nearly supply, these being tapped every 300 feet along the right of way, so that the water may be available at any point. A three horsepower engine is used to force it to the work. This has pumped water out of the River Rouge a distance of six miles. It would require eight teams to do the same work.

Concrete is mixed in a mechanical batch mixer which travels under its own power as shown herewith. A boom, capable of being swung at any angle, carries the mixture in a bucket and is dumped where wanted by two men, eliminating the work of eight or 10 men with wheelbarrow. Portland cement, pro-



Same Stretch of Road as Shown After Concrete Pavement Was Laid, Indicating Ideal Condition of the Surface.

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Sticky Clay, Almost Impassable in the Spring and Fall.

duced by the Universal Portland Cement Company, Chicago, with offices in Minneapolis and Pittsburg, is used exclusively. The gravel is secured wherever available in sufficient quantities and of the required quality, although plans are under way for securing a county gravel pit.

Some of the pictures presented show the great improvement made under this plan. Grand River road marks the passing of the old plank toll road. Over half a century ago Wayne county attempted to solve the problem by granting 50 and 60-year franchises or charters to companies which built roads out of Detroit, and one of the first of these was the old Grand River road, laid out by Congress in 1832. The Grand River Company utilized planks and retained them until the franchise expired a few years ago. The result was one of the worse roads in the State of Michigan.

The present concrete road extends 2.51 miles and is built of a 1:1.5:3 mix of Portland cement, washed sand and washed pebbles, 16 feet of metal, 24 feet over all at its narrowest point, with a minimum thickness of seven inches. The work will be completed to the county line next year. The total cost to the date of the report is shown in tabulated form below:

Paid in 1910.

Final payment on contract	$938.75
Blue prints	2.50
Express, messenger and auto	14.27
Liability insurance	20.73
Miscellaneous	10.00
Tile	79.00
Culvert at Monnier road	807.09
	$1,872.34

Paid in 1911.

Teams	$3,223.20
Other labor	11,271.39
Pebbles, 5730 tons	8,719.85
Sand, 3619 tons	4,581.74
Cement, 7033 barrels	10,316.97
Coal, 49 tons	125.45
Expansion joints	1,160.05
Lumber and engineers' stakes	73.24
Express, messenger and auto	20.00
Water supply	325.05
Blue prints, advertising and photos	42.46
Lubrication, waste, etc	150.54
Board of men	648.11
Yard and siding	100.00
Hardware and repairs	245.15
Miscellaneous	96.71
Open ditch	196.27
Tile drains	138.46
Culverts	1,515.50
	$42,950.14
Total cost	$44,822.48

Gratoit road is one of the main trunk lines, and is constructed of concrete to the county line, a distance of 3.236 miles. It is built 16 feet wide with gravel shoulders, having a total width at its narrow-



Concrete Pavement Replaces Sticky Clay, Making a Surface Fit for All Classes of Traffic Any Day in the Year.

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est point of 24 feet. The minimum thickness of the concrete is seven inches, of a 1:1.5:3 mix of Portland cement, screened sand and screened gravel. On one mile steel joints were used between the 25-foot sections, and from the results obtained it was decided to employ this type exclusively. The total cost was $43,558.49.

Fort road, one of the secondary roads, one-half mile in length, was built by contract of concrete with a 1:2:4 mix, six inches deep, in one course, with 12 feet of metal, 23 feet over all. The cost was $5296.37. Eureka road is one of the principal ways leading into Wyandotte. It is built of a 1:2:4 mix with 12 feet of metal, 23 feet over all at its narrowest point. Its length is exactly one mile and the cost $9354.92.

Wayne road south, one-half mile in length, connects the villages of Wayne and Romulus. It is built of concrete of a 2:3:6 mix, using Portland cement, washed sand and washed pebbles, 15 feet of metal, 23 feet over all. It formerly was a deep, heavy sand road. Its cost was $5056.06. Van Dyke road is also of concrete, a 1:1.5:3 mix, Portland cement, screened sand and screened pebbles, seven inches deep, 15 feet of metal, 23 feet over all. It is 1.052 miles in length and cost $15,219.76.

The longest piece of work is 7.563 miles on the Michigan avenue road, the longest trunk line in Wayne county. This road is built of the 2:3:6 mix of Portland cement, washed sand and washed pebbles, of a minimum thickness of seven inches. The width varies from 16 to 24 feet. The work included the construction of a retaining wall along the River Rouge and the building of two reinforced concrete culverts. The total cost was $130,058.88.

This last example indicates at least one point of superiority in the use of concrete for road construction. An accompanying illustration shows the Wayne county workmen engaged upon the building of a concrete culvert, and it will be noted that wood and other materials susceptible to decay or deterioration are strictly eliminated. This culvert is not only satisfactory for present but for future traffic needs, and costs nothing to maintain. Another feature of prime importance lies in the fact that there is no possibility of jolts or jars where it joins the highway. From beginning to end the 7.563 miles of concrete on the Michigan avenue road is without a break, giving what may be termed an ideal riding surface for all types of vehicles, more particularly those mechanically propelled.

For the purpose of comparison it may be stated that one mile of gravel was laid on the Plymouth road at a cost of $4516.13, as compared with $9354.92 for the mile of concrete on the Eureka road. Unfortunately there does not appear to be anything in the report indicating the cost of macadam in Wayne county. But when the cost of maintenance—$200 for 30 miles of concrete as against $14,354.11 for the macadam roads in the county—is considered, it would seem that the board was amply justified in its decision to abandon that type of construction.

The roads mentioned herein are not all of the concrete surfaces in Wayne county. They serve as examples only. It may be added that similar construction has been tried out in Washington, D. C., at an average cost of $2 a square yard; Windsor, Ont., at a cost varying from 99 cents to $1.15; Jackson, Mich., $1.70; Toronto, Can., $1.74 to $1.92; Denver, Col., $1.08 to $1.27, as compared with $3.47 for asphalt; Allentown, Penn., $1.40; Bozeman, Mont., $2.28; Gary, Ind., $1.70; Fond du Lac, Wis., $1.25 to $1.37; De Pere, Wis., $1.31; Mason City, Ia., $1.26. The experiences in each of these instances coincide with that of Wayne county, in that the cost of maintenance, covering periods extending back to 1904 and 1905, has practically been nothing. The chief signs of wear appear to be along the edges of the expansion joints.

INVENTOR VISITS REMY PLANT.

The inventor of Bakelite, Dr. L. H. Baekeland, of New York, recently visited the plant of the Remy Electric Company, Anderson, Ind., in order to inspect the department for making the insulating material used in Remy magnetos. Bakelite is a chemical synthetic substance, known to the scientists as "Oxybenzylmethylenglycolanhydrid" and which may be separated for pronunciation as follows: Oxy-benzyl-methylenglycol-anhydrid. It may be made in two forms, liquid and solid. The liquid is used to impregnate armatures and coils, while distributer lids, inserts and covers are made from the solid material. The latter when first made melts at a moderate temperature, but if highly heated and then cooled it becomes infusible and insoluble, resisting temperatures of 600 degrees Fahrenheit, and above that charring without melting or burning.

TRAVELLING MOTOR CAR LIBRARY.

The latest use for the automobile is to furnish a conveyance for a travelling library, the public library of Hagerstown, Md., using an International Harvester wagon for the purpose of delivering books from door to door in the rural districts of Maryland. The car has a van body which holds nearly 1000 volumes, some in special cases to be left at the 70 sub-stations of the library, and some on shelves for the selection of the farmers along the route where the population is too scattered to maintain sub-stations. The machine is fitted with a 20 horsepower motor and is especially fitted to travel on mountain roads.

CARTERCAR CLIMBS HEAVY GRADE.

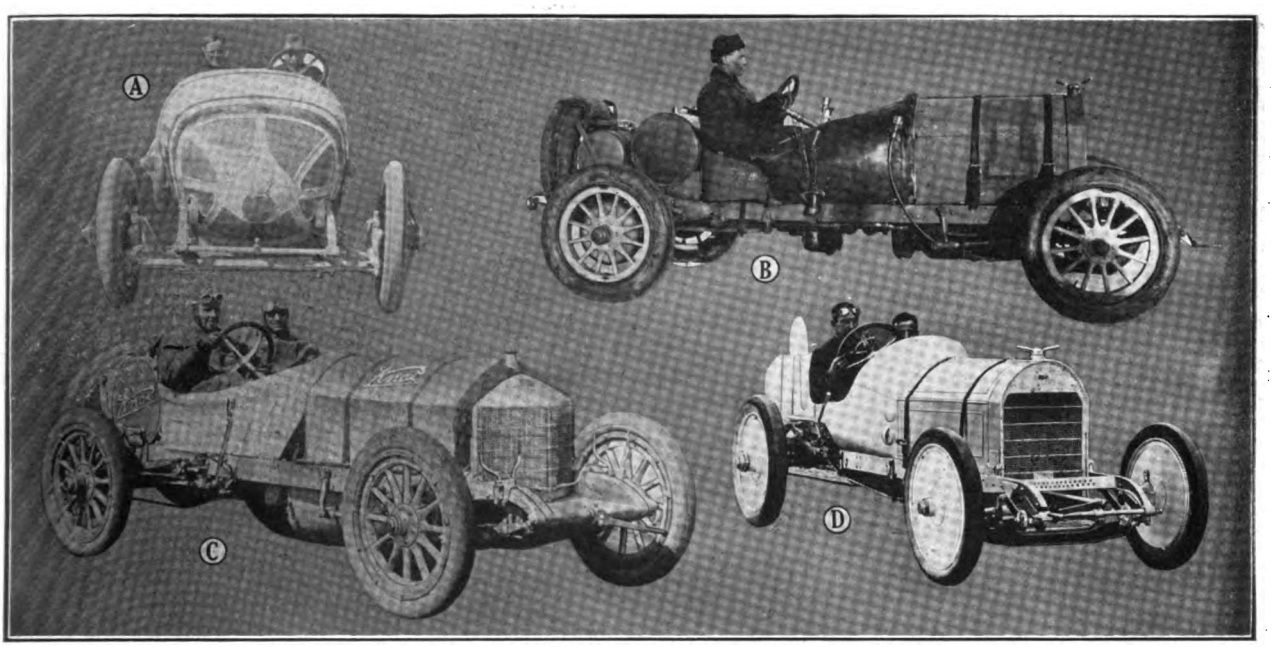
In a recent attempt at hill climbing, a Cartercar, made by the Cartercar Company, Pontiac, Mich., ascended an incline of 58.33 per cent. at Forest Grove, Ore. The incline had been built specially and was 30 feet long, with a rise of 17.5 feet.

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READY FOR MEMORIAL DAY CONTEST.

Cars and Drivers in Indianapolis' Second 500-Mile Race Prepared to Exceed Previous Records---Something Concerning Machines and Equipment.

WITH the second annual Memorial Day 500-mile race on the Indianapolis motor speedway less than a week away, several changes are to be noted in the personnel of the drivers, indicating that the various entrants are seeking the best material possible. Some of these changes have occasioned no little surprise among those who have been following the racing side of motoring, and perhaps none is of more interest than the announcement that David L. Bruce-Brown, twice a winner of the American Grand Prize



Entered for Indianapolis 500-Mile Race: A, Edward Hearne, Relief Driver in Case 5; B, Howard Wilcox in National 9; C, Ralph Mulford in Knox 19; D, Robert Burman in Cutting 15.

and always a driver of foreign made cars heretofore, will be seen at the wheel of a National. John Jenkins has left the Continental machine and will pilot the White, although Winfred Barndollar took the case into the courts in an effort to retain his position at the wheel of this entry. This leaves the Continental without a driver at the present writing.

The management of the speedway has expended a large sum in an effort to remove every possible danger to contestants and spectators. A tunnel has been substituted for the old foot bridge just north of the pits. Concrete walls have replaced the old wooden partitions in the pits. An elaborate signal system has been arranged for use in case of emergency. As was the case last year, the timing device will be a Warner recording instrument, made by the Warner Instrument Company, Beloit, Wis., and in charge of C. H. Warner.

The drivers will be instructed Monday evening at 8, at a meeting of American Automobile Association officials in the Claypool hotel. They will be cautioned to be vigilant at all times. During the day the cars will begin their qualifying trials, the entry blanks stipulating that each must show a speed of 75 miles an hour over two laps of the track. The cars will be weighed in at 1:30 Tuesday afternoon. All steering knuckles, front axles, frame hangers and steering mechanism, including tierods, will be subject to the approval of Howard E. Coffin of the Hudson Motor Car Company, and the mechanical engineer of the speedway.

So far as it is possible to determine at this time a description of the cars and their equipment may be set forth as follows:

Stutz 1, entered by the Ideal Motor Car Company, Indianapolis, Ind., will be driven by Gilbert Anderson with William Knipper as relief. The four-cylinder motor has a bore of 4.75 inches and stroke of 5.5, giving a piston displacement of 389.9 cubic inches. Michelin tires and rims, Splitdorf magneto and Bosch plugs will be utilized in the equipment. This is the make of machine which made its first appearance in

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the 500-mile race of last year, and completed the distance without a stop.

Stutz 2 is entered by the same party and will be driven by Leonard Zengel, formerly of the National racing team. Knipper has been assigned as his relief driver as well. The motor is of the same dimension as that of number one, and the equipment is also the same.

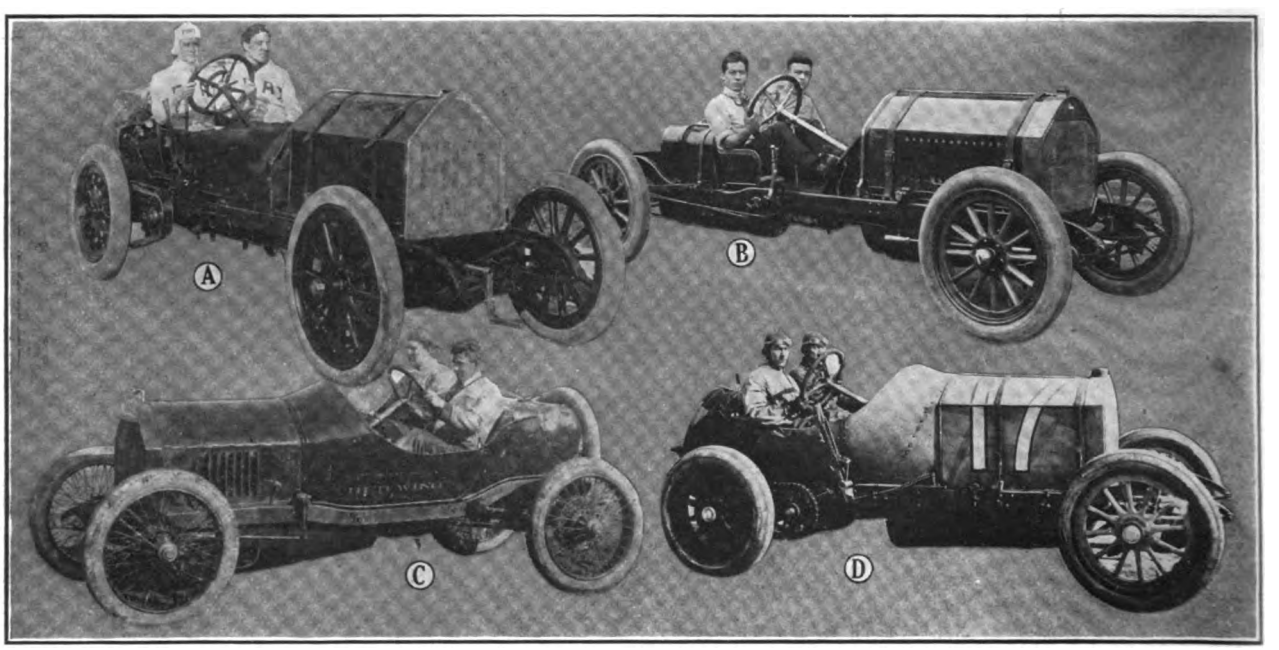
Fiat 3 is the car driven by Teddy Tetzlaff to win the Santa Monica road race of May 4, in which he created a new world's road race record of 78.5 miles an hour. Tetzlaff will be at the wheel again, with Caleb Bragg as relief. The four-cylinder motor has a bore of five inches and a stroke of 7.5, giving a piston displacement of 589 cubic inches, and being rated by the entrant, E. E. Hewlitt, at 70 horsepower. Michelin tires and rims, Bosch magneto and plugs, and Fiat carburetor will be utilized, with two sets of plugs.

Mercedes 4, entered and driven by Ralph De Palma, has a four-cylinder motor, with bore of 131.5 mm and stroke of 180 mm, giving a piston displacement of 588 cubic inches. Rupert Jeffkins will act as relief driver. Tires and rims will be of the Michelin make, magneto and plugs of the Bosch, and the carburetor, a Mercedes. Monogram oil will be employed.

Case 5, entered by the J. I. Case Threshing Machine Company, Racine, Wis., is a six-cylinder machine, with bore 4.375 inches and stroke of five, giving a piston displacement of 447.8 cubic inches. The horsepower rating of the maker is 100. Louis Disbrow will drive with Edward Hearne as relief. Wire wheels will be employed, as well as Remy magneto, two sets of Bosch plugs and Rayfield carburetor. Monogram oil will be utilized for lubrication purposes.

Case 6, also is entered by the maker, and will be driven by Harvey Herrick, formerly of the National team, and the man who created a world's road race record on the Santa Monica course with a car of that make last October. The equipment will be the same as that of Case 5.

Mercedes 7 is entered and will be driven by Spencer E. Wishart, who has named no relief driver. It is a four-cylinder car with bore of 5.12 inches and stroke of 7.09, giving a piston displacement of 583, and a horsepower rating under the S. A. E. formula of 42, although rated by the factory at from 37 to 90. Wishart has not decided whether to replace the Mercedes carburetor with a Rayfield, but probably will do so. Michelin tires and rims, Bosch magneto and two sets of Bosch plugs conclude the details of equipment available. Monogram oil will be employed for lubrication.

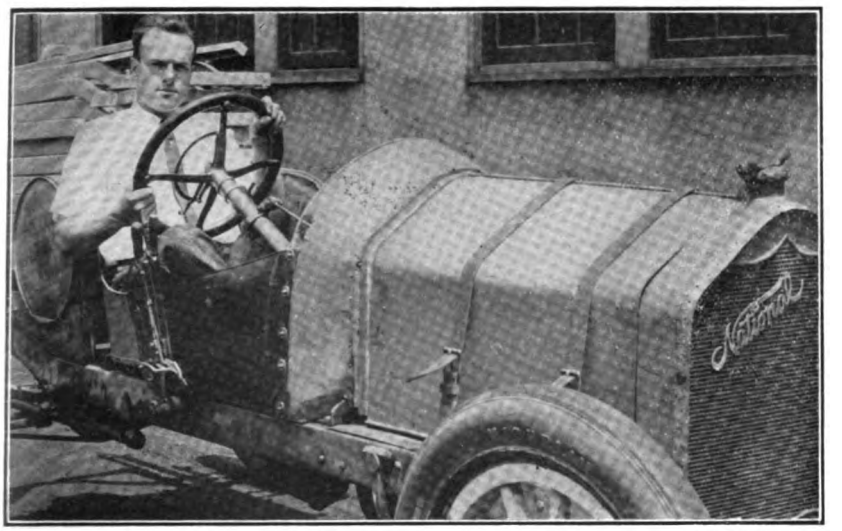


Additional Entrants in Memorial Day Event: A, Caleb Bragg, Relief for Fiat 3; B, Harry Knight in Lexington 16; C, Lee Frayer with Firestone-Columbus 16; D, Spencer Wishart in Mercedes 7.

National 8 is entered by the National Motor Vehicle Company, Indianapolis, Ind., and will be driven by Joseph Dawson, formerly well known as a driver of Marmon cars. His relief will be Donald Herr, who has been at the wheel of National cars in a number of events, and was at one time slated to drive one of these machines in this race. The motor has four cylinders with bore of five inches and stroke of 6.25, giving a displacement of 490.8.

National 9 will be in charge of Howard Wilcox, the only member of the well known National team of 1911 to pilot a car in this event. His relief will be Rader. The car has a larger motor than the National 8, although a four-cylinder unit, the bore being five inches and the stroke 7.5, giving a displacement

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David L. Bruce-Brown at the Wheel of the National 29, His First American Machine.

of 589. In other respects it is fitted the same.

Lexington 10 is entered by the Lexington Motor Car Company, Connersville, Ind., and this will be the first time a machine of this make has been seen in a long distance race. The driver will be Harry Knight, with Johnson as relief. The motor has six cylinders, with bore of 4.125 inches and stroke of 5.25, giving a displacement of 421. Michelin tires and rims, Remy magneto, two sets of Rajah plugs, and Schebler carburetor comprise the equipment. Polarine oil will be employed.

Simplex 12 has been entered and will be driven by Bert Dingley, with Swanson as relief. The four-cylinder motor has a bore and stroke of 5.75 inches, and displacement of 597. The only detail of equipment available is the make of magneto, which will be a Bosch.

White 14 marks the return of cars of that make to long distance racing. The machine is entered by the White Indianapolis Company and will be driven by John Jenkins with Fuller as relief. It is a six-cylinder car with bore of 4.25 inches and stroke of 5.75, the displacement being 489.

Cutting 15 will be in charge of Robert Burman, who holds the world's speed record, having driven the "Blitzen Benz" over the sands at Daytona, Fla., faster than any other man. He designed the car, which is entered by the Clarke-Carter Automobile Company, Jackson, Mich., and will have no relief driver. The motor is of four cylinders, 5.218-inch bore and seven-inch stroke, and displacement of 597.9. Firestone tires, Booth rims and Remy magneto will be fitted, as well as two sets of plugs.

Firestone-Columbus 16, known as the "Red Wing," will be driven by Lee Frayer, with Rickenbacker as relief. It is entered by the Columbus Buggy Company, Columbus, O. The four-cylinder motor has bore of five inches and stroke of 5.5, giving a piston displacement of 432. Firestone tires on McCue wire wheels and rims will be utilized. The magneto will be a Connecticut, the two sets of plugs will be Bosch, the carburetor, a Schebler, and the oil, Valvoline.

Marquette-Buick 17 will be driven by William Liesaw with Farr as relief. The Buick Motor Company, Flint, Mich., maker of the car, has withdrawn from racing, and the machine is entered by Will Thomson. It has a four-cylinder motor with 4.5-inch bore, five-inch stroke and a piston displacement of 318.

Schacht 18 is entered by the Schacht Motor Car



John Jenkins at the Wheel of the Continental 27, Before He Decided to Become Pilot of the White 14.

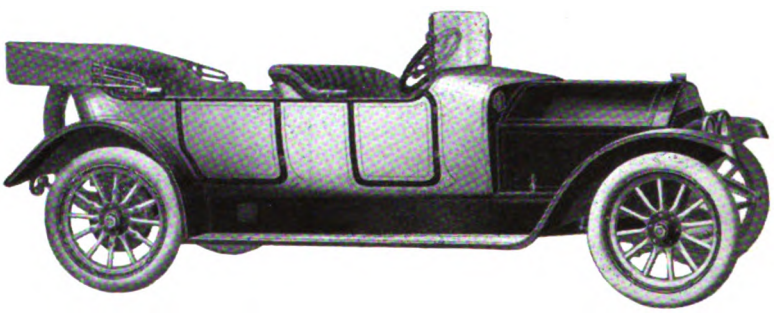
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a popular car at a popular price

Henderson Roadster $1285



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A Real Self-Starting Car

The "Henderson" will take rank immediately with the best advertised cars—the demand is being created by running a series of attractive advertisements in all the leading newspapers—and best of all, here at last is a car that will sell *on sight* and *stay sold.* We are now open for exclusive connections with live, red-blooded dealers who desire to get a strangle-hold on the automobile sales in their territory.

At least investigate—don't decide now, but remember while you are hesitating, while you are considering the matter, some dealer in your city may apply for the exclusive sale of the "Henderson" and you will be *too late.* As a dealer you are now face to face with the biggest opportunity you will ever be offered to sell a car with which you can surely meet, beat and defeat any and all price competition.

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—Five Passenger $1385

Read These Specifications

The Hendersons of Indianapolis now offer you a real Self-Starting, Five Passenger Touring Car, with Luxury-equipment for $1385—116-inch Wheel Base—Ward Leonard Dynamo Electric Lighting System—34x4 tires, Demountable Rims—Long Stroke $4\frac{1}{8}$x$5\frac{1}{4}$ Silent Motor, with 3-point suspension—famous Stutz Rear Axle Transmission—silent Gears—left hand Drive—Single Lever Center Control—Gasoline Tank under cowl of dash, Gasoline Gauge on dash—Nickel mountings throughout.

Dynamo Electric Lighting System

The Hendersons of Indianapolis vouch for every claim made here—you know their high reputation in the past—and by applying for the exclusive agency of the Henderson now you will sell more cars and make more money in the next six months than you have in the last two years. The Henderson is in reply to the persistent demand for a Luxury-equipment automobile that will make driving a real pleasure—and can be sold at a reasonable popular price. Just sell one or two Hendersons to your trade and the trick is done—every one sold means an order for more.

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New models of the "Henderson" will be ready for your inspection during the week of the 500-mile race at the Indianapolis Speedway, May 30.

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Without any obligation on my part, send me at once, Advance Proof Sheets of your book, "Your Dreams Come True"—also your "Henderson" Car Exclusive Agency proposition to Dealers, with prices and terms.

I have been selling the _____ car.

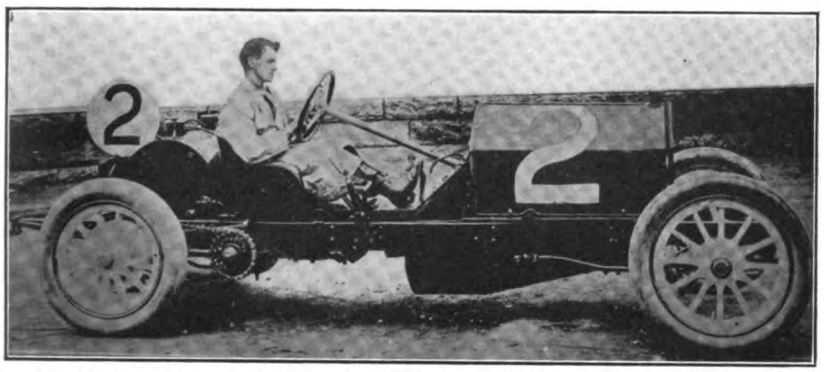
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Company, Cincinnati, O., and will be driven by William Endicott, with his brother, Harry Endicott, who has been at the wheel of cars of this make in several



Bert Dingley and His Simplex 12, as the Car Was Equipped for the Recent Santa Monica Race.

events, as a relief. The four-cylinder motor has bore of 4.75 inches and stroke of 5.5, with displacement of 389.9.

Knox 19 will be driven by Ralph Mulford, who owns and has entered the machine. It is made by the Knox Automobile Company, Springfield, Mass., and it is a source of considerable pride to this concern that Mulford should decide upon this make, after driving Lozier cars throughout his entire racing career previously. It is a six-cylinder car, with bore of 4.8 inches, stroke of 5.5 inches and displacement of 597. Michelin tires and rims, Bosch magneto, Rayfield carburetor and Oilzum oil will be employed. Mulford will have no relief driver.

Mercer 21 is entered by the Mercer Automobile Company, Trenton, N. J., and will be driven by Hugh Hughes, with Kittrell as relief. The four-cylinder motor has bore of 4.375 inches, stroke of five, and displacement of 300. Rudge-Whitworth demountable wire wheels will be employed with Michelin tires. A Bosch two-point magneto and two sets of Bosch plugs will supply ignition. Carburetion will be by the Rayfield. Monogram oil will be used as a lubricant.

Lozier 22 is another car entered without the consent of the maker. The Lozier Motor Company, Detroit, has strongly advised against the action, but Dr. W. H. Chambers owns the machine and has seen fit to enter it, with Joseph Horan, long known as a Lozier driver, at the wheel. Ainslie will act as relief. The four-cylinder motor has bore of 5.375 inches, stroke of six, and displacement of 544.

McFarlan 23 will be driven by Melvin Marquette, with Fowler as relief. It is entered by the Speed Motors Company. The six-cylinder motor has a 4.25-inch bore, five-inch stroke and displacement of 425. Michelin tires, Baker rims, Splitdorf magneto, two sets of Red Head plugs, Schebler carburetor and Polarine oil will be employed.

Opel has been entered by Irving C. Stern and Burr B. Noble. Leonard Ormsby has been selected as driver with no relief. The four-cylinder motor has bore of 4.5 inches, stroke of 6.875 inches and displacement of 437.

Lozier 25 will be driven by Joseph Matson. The entrant is O. Applegate. The dimensions of the motor are the same as that of Lozier 22.

Shambaugh 26 is the so-called "mystery" car, inasmuch as when the entry list closed May 1, no information was available as to the make, driver, or entrant. It is a special machine built, entered and driven by Charles Shambaugh, and has a four-cylinder motor. The bore is 4.5 inches, the stroke and the displacement 318.

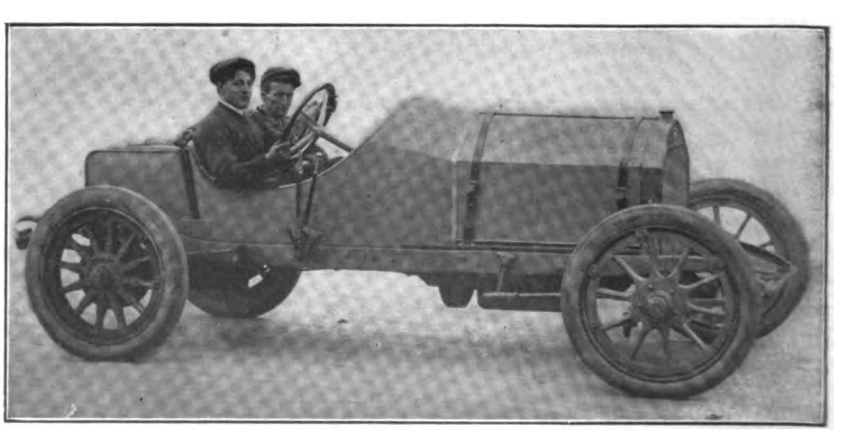
Continental 27 is known as the "Shark", and was to have been driven by John Jenkins. The machine is entered by F. N. Martindale, and has a four-cylinder motor. The bore is 4.25 inches; the stroke, 4.5, and the displacement, 255.

Stutz 28 is the same in every particular as the Stutz 1 and 2 and is entered by the maker. The driver will be Charles Merz, still another recruit from the National team of 1911.

National 29 has a motor the same size as that of the National 9, and will be driven by David L. Bruce-Brown.

Mason 31 is entered by the Mason Motor Company, Waterloo, Ia., and will be driven by H. J. Kilpatrick. The four-cylinder motor has a bore of 3.937 inches, stroke of five inches, and displacement of 243.5.

It will be seen that there are six six-cylinder cars and 21 with four-cylinder motors. Practically all of the machines are designed for speed, although some



Gilbert Anderson and the Stutz 1, a Combination Which Completed Last Year's Race Without Stop.

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of them may be regarded as regular stock models. Last year's race was won by Ray Harroun in a Marmon, made by the Nordyke & Marmon Company, Indianapolis, Ind., his time being 6:42:08, and his average speed 74.61 miles an hour. The largest entrant this year, taking into consideration the matter of piston displacement, is Burman's Cutting 15, with 597.9, while Kilpatrick's Mason 31 is the smallest, with 243.5. It would prove a difficult matter to select a winner, however.

The prize list offered by the management totals $50,000, divided as follows: First, $20,000; second, $10,000; third, $5000; fourth, $3500; fifth, $2500; sixth, $2000; seventh, $1500; eighth, $1400; ninth, $1300; 10th, $1200; 11th, $1100; 12th, $1000. Several special prizes are offered by the makers of various accessories, among which may be noted the following:

Bosch Magneto Company, New York City, conditioned on the use of Bosch ignition—First, $500; second, $300; third, $200.

Findeisen & Kropf Manufacturing Company, Chicago, conditioned on the use of Rayfield carburetor—Special prize of $1000.

Hartford Suspension Company, Jersey City, N. J., conditioned on use of Truffault-Hartford shock absorbers—First, $250; second, $150; third, $100.

Emil Grossman Company, New York City, conditioned on the use of Red Head spark plugs—First, $1000; second, $250; third, $100.

The principal officials of the race are as follows: Honorary referee, R. P. Hooper, president of the American Automobile Association, Philadelphia; referee, A. R. Pardington, New York City; starter, F. J. Wagner, New York City; assistant starters, Ray Harroun, Indianapolis and E. J. McShane, New York; board of timers, C. H. Warner, Beloit, Wis.; O. C. Foster, Cleveland, O.; Harry Knepper, New York, and William Knight, Indianapolis; director of scorers, John A. Cox, Terre Haute, Ind.; board of judges, Will H. Brown, Indianapolis; Thomas Hay, Chicago; J. J. Cole, Indianapolis; H. O. Smith, Indianapolis; J. W. Hayden; Indianapolis; J. M. Ward, Jr., Indianapolis, and Howard Marmon, Indianapolis; clerks of course, Charles P. Root, Chicago, and C. H. Wallerich, Indianapolis; technical committee, F. E. Edwards, Chicago; chairman contest board, William Schimpf, New York; racing board representative, C. W. Sedwick, Indianapolis; chairman of press reception committee, P. P. Willis, Indianapolis.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

COMING EVENTS.

May.

May 30—500-mile race, Indianapolis, Ind.
May 30—Track events, Salem, N. H.

June.

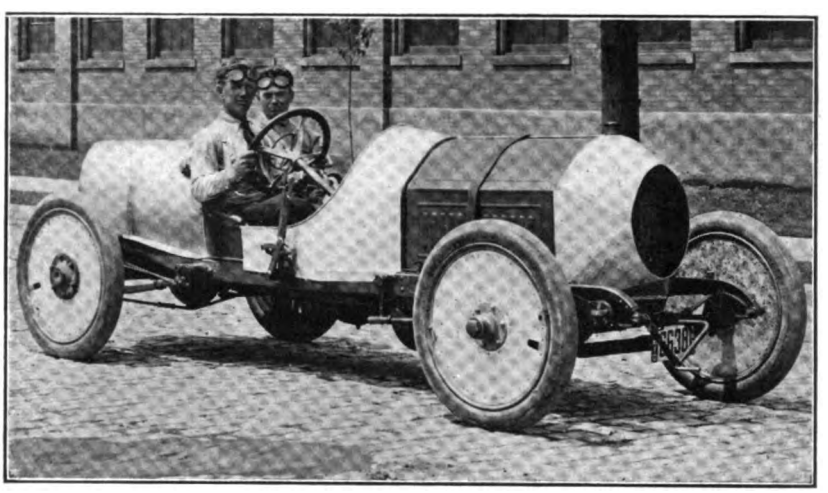
June 6—Reliability run, Washington, D. C.
June 8—Track events, Narberth, Penn.
June 20—Algonquin hill climb, Chicago, Ill.
June 20-22—Reliability run, Portland, Me.
June 25-26—Grand Prix, Dieppe, France.

July.

July 3-5—Track events, Belle Fourche, S. D.
July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach events, Old Orchard, Me.
July 5-6—Road race, Tacoma, Wash.
July 15—Reliability run, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.



William Endicott and the Schacht 18, as Taken at the Factory in Cincinnati.

Aug. 23-24—Stock car races, Elgin, Ill.

September.

Sept. 2—Speedway meet, Indianapolis, Ind.
Sept. 9—International aviation race, Chicago, Ill.

October.

Oct. 5—Fairmount Park race, Philadelphia, Penn.
Oct. 7-11—Reliability run, Chicago, Ill.
Oct. 12—Track events, Salem, N. H.

MARBURG BROS. TO MOVE.

Marburg Bros., Inc., will be one of the first firms to move into the new United States Rubber building which has recently been completed at 58th street and Broadway, New York City, near Columbus Circle and the automobile district. The company will be located in rooms 811-817, where the well known imported specialties which are handled, the Mea magneto, S. R. O. ball bearings, and Marburg-Hagen springs, will find a new home.

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ROCKINGHAM PARK RACES.

The programme of races at Rockingham park, Salem, N. H., Memorial Day, will include 10 events, some of which will be open to amateurs only. However, the list of professional drivers and famous racing cars will prove of sufficient interest to attract a large crowd. Lincoln Beachey and other aviators will aid in this respect. The park is within easy reach of Boston, and it is anticipated that inasmuch as this will prove one of the most important meets in the East this year, the attendance will be in keeping.

The chief event on the programme is a three-cornered race for 50 miles, between Harry Grant, Charles Basle and Joseph Downey. Grant, who was twice a winner of the Vanderbilt cup in an Alco car, announced his intention of retiring from racing last fall. His interest in this meet has led him to retract that announcement, however, and he will be seen at the wheel of a Berkshire car, made by the Berkshire Motors Company, Cambridge, Mass.

Basle will drive a National, made by the National Motor Vehicle Company, Indianapolis, and owned by Paul Moulton of Boston. Downey is scheduled to take charge of the Jackson machine, made by the Jackson Automobile Company, Jackson, Mich., which was driven by Harry Cobe in the 500-mile race on the Indianapolis speedway, Memorial Day of last year.

Among the other entries are noted the following: Stutz, made by the Ideal Motor Car Company, Indianapolis, and entered by M. F. Chase of the Stutz agency in Boston; Chadwick, made by the Chadwick Engineering Works, Pottstown, Penn., and entered by Fred Collins of Dorchester, Mass., and Fiat, made by the Fiat Automobile Company, New York, and entered by R. R. Ross of the Boston branch of the company.

NATIONAL WINS ATLANTA CLIMB.

B. McKerrall in a National car, made by the National Motor Vehicle Company, Indianapolis, Ind., won the free-for-all in the annual hill climb of the Atlanta Automobile Club, Atlanta, Ga., May 10, covering the 4716 feet of macadam surface, well oiled, in 0:53.6. The summary of the meet follows:

Free-for-All.

Car	Driver	Time
National,	McKerrall	0:53.6
Pope-Hartford,	Crane	0:54.0
Buick,	Norman	0:55.2

301-450 Inches.

Pope-Hartford,	Crane	0:51.4
National,	McKerrall	0:54.6
Buick,	Norman	0:55.4

231-300 Inches.

Pope-Hartford,	Bennett	1:20.0

161-230 Inches.

E-M-F,	Odum	1:00.4
Ford,	Abbott	1:04.0
Ford,	Teasley	1:11.0

Under 161 Inches.

Flanders,	Lundgren	1:00.8

WARWICK AUTOMOBILE SCHOOL.

The demand for instruction in the proper care and maintenance of the automobile by owners and prospective owners has grown to such proportions as to warrant the establishment of schools devoting their attention to specialized endeavor. It is fast becoming recognized that the more one knows concerning the internal workings of the car, the less the liability of accident and the consequent saving in expense.

The Warwick School of Automobile Instruction at 1926 Broadway, between 64th and 65th streets, New York City, was established for this very purpose, and the success that has been accorded it is such as to indicate that its methods are meeting with approval on the part of owners, both men and women. Particular attention has been paid to the method of instruction, the course being divided into parts or systems, each lesson covering a distinctive portion of the car. The scheme followed is what is termed a "building-up" process, the main units being studied individually, so that, step by step, each section of the car is mastered separately until the whole assembly is complete.

The instructors are technically trained men, who have had years of experience in various automobile manufacturing institutions, and have served a number of years as instructors in some of the best known schools throughout the country. They are automobile engineers in every sense of the word, and the plan of giving specialized instruction gives each student the individual benefit of each man's experience.

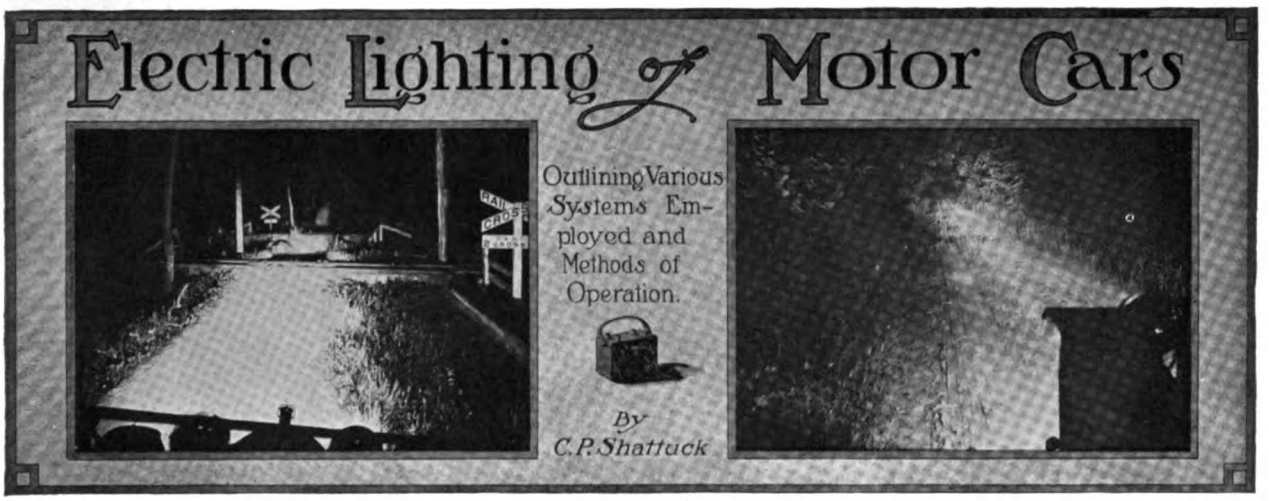
The location of the school is in the heart of the automobile district. The rooms are especially well adapted for automobile instruction and are fitted up to give the student the most thorough and practical training possible. Whenever it is found that the class hours are not convenient, the student can make arrangements for special instruction. This has been found particularly beneficial to those living outside of New York City.

NEW JERSEY CLUB ELECTION.

The annual meeting of the New Jersey Automobile & Motor Club, Newark, N. J., was held recently and officers for the coming year elected as follows: President, Robertson S. Ward; vice president, David Oaks; treasurer, Herman B. Good; secretary, A. B. Le Marsena. There were chosen as a board of trustees: Ira A. Kip, Jr., Richard C. Jenkinson and George Blakslee. The report of the past year showed that the membership has dropped 113, there being now 2210 members as against 2323 the year previous. The treasurer reported a balance of $309.63. The question of a new clubhouse at Lake Apshawa, near Butler, N. J., was discussed, and the selection will be left to the vote of the entire membership.

Advocate the use of lights on all vehicles using the public ways during the hours of darkness.

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Part VIII—The Delco Lighting System.

HAVING dealt with lighting equipments of the straight storage battery type and those employing a mechanical generator with the battery floated on the line or utilized as an auxiliary, the next logical step in sequence is a system providing for ignition, lighting and starting, a combination that will appeal to many motorists who maintain their own cars. Although several systems include ignition in addition to lighting, few incorporate a self-starter. The Delco equipment, manufactured by the Dayton Engineering Laboratories Company, Dayton, O., embraces all of these desirable features as a unit. Its practicability is evidenced by the fact that it was adopted by a well known maker of pleasure cars as standard equipment for 1912 models.

Motor-Generator.

The Delco device is what is termed a motor-generator; that is there are two windings in the fields, a series and a shunt. When the device is being operated as a motor for starting the engine of the automobile, the series windings are in series with the armature. When running as a generator both windings are in use, and the shunt winding excites the fields, all current generated flowing through the series winding as it is in series with the armature. The series is wound opposite to that of the shunt and the magnetism produced by the former opposes that of the latter and produces energy similar to that of a constant current system, although the maker states no special effort was made in the design to obtain this result.

Starting System.

The Delco storage battery comprises 12 two-volt cells arranged in four groups, each set aggregating six volts. These groups are connected alternately in parallel and series, which varies the voltage or amperage as required for charging or starting the engine of the motor car. The change from parallel to series is brought about automatically by a controller which when in a certain position connects four sections of the battery in parallel, providing six volts and 80 amperes. In another position the controller connects the sections in series increasing the voltage to 24 with amperage at 20, this arrangement being necessary for starting purposes. This shifting of voltage, however, does not affect the lighting system as the leads from the battery to the ignition and lighting systems are practically separate and distinct.

Although the Delco device combines the functions of a generator and motor it operates at the same speed as the automobile engine when utilized as a generator of current, and 20 times motor speed when employed for starting. Two positive type roller clutches, one on the main shaft in front of the generator, and the other in the idle gear, provides for this

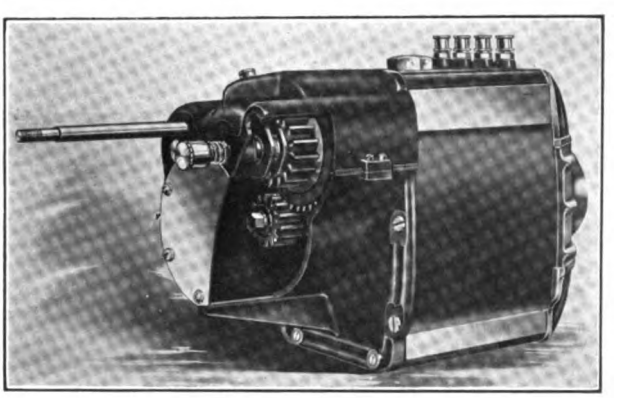


Fig. 52—Delco Motor-Generator Which Is Utilized for Starting and Lighting, as Well as for Ignition.

variable speed. The flywheel of the automobile engine is provided with gear teeth which mesh with other gears made to engage with a pinion on the motor-generator by depressing the clutch pedal of the car and by pressing a switch button. The latter operation allows current to flow from the battery through a magnetic clutch actuating the starting mechanism including the motor. As soon as the motor car engine starts under its own power the clutch pedal is released, the movement automatically discon-

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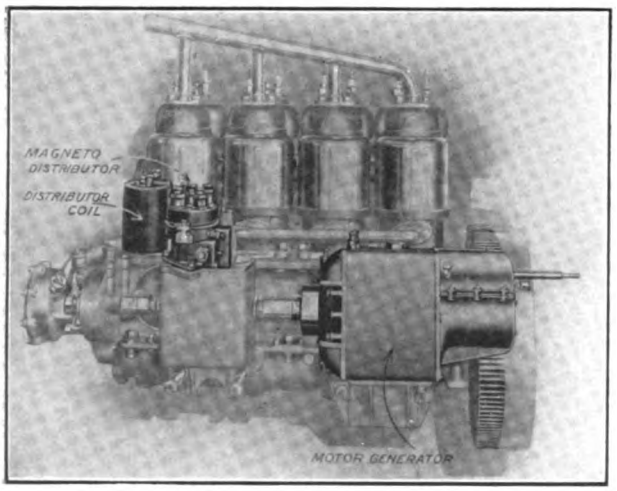


Fig. 53—Depicting Location of Delco Motor-Generator on Power Plant of an Automobile.

necting the starting apparatus, after which the clutch is utilized in the usual manner. This self-starting feature was explained fully in a recent issue of The Automobile Journal.

Ignition System.

With the Delco ignition system, as is depicted at Fig. 53, which also shows the location of the motor-generator and its relation to the flywheel of the internal combustion engine, it is claimed that the same quality of spark is obtained as with a magneto. The high-tension current is distributed to the proper plugs by a brush device actuated by a cam, the principle being similar to that of the usual magneto. Another brush is incorporated, its function being to ground the cylinder next in firing order, to prevent premature ignition of the mixture in that member, which might be caused by induction between the high-tension wires carried in metal tubes.

When the automobile engine is operating at a speed of less than 300 revolutions a minute, current is furnished for ignition by the storage battery, but above this speed energy is supplied by the generator. In either case, the low-tension current is converted into high by a distributor coil, whence it flows to the centre terminal of the distributor proper, being diverted to the correct cylinder by the brush and cam device. It is stated by the maker that the shifting from storage battery to generator is automatic and positive, requiring no attention whatsoever.

Lighting System.

The Delco motor-generator, which is shown at Fig. 52, weighs about 65 pounds and the maker holds that this weight is necessary to produce a quiet running machine at engine speed. The armature shaft is one inch in diameter, assuring alignment under the severest operating conditions, a size which also permits of carrying the armature close to the pole pieces, the space being .015 inch, and an arrangement making for efficiency in the generation of current. Large sized, high grade ball bearings support the armature shaft, the commutator of which is fitted with 72 copper segments separated by a special mica, making for durability and efficiency. The brushes which collect the current, are made of a very low resistance carbon and contain their own lubricant. It is claimed by the maker that being mounted on arms instead of the box type holder that they will operate successfully with only a wear of .0625 inch for each 10,000 miles, requiring no attention, as well as being free from arcing or sticking.

Utilization of Current.

Current for starting, ignition and lighting is supplied by the storage battery when the power plant is idle as well as when operating below 300 revolutions a minute. Above this the battery assists the generator when required. It is pointed out that the ignition system operates at maximum efficiency at one ampere which is supplied at 300 revolutions a minute of the generator and that with the headlights and tail lamp seven amperes are consumed, which amount is furnished when the motor of the automobile is turning at 410 revolutions a minute.

The Delco generator was designed to produce current at low speeds and consequently has a large output at higher ratios of the motor. It supplies the system when developing six volts or slightly in excess of this amount, and furnishes about 10 amperes to the battery when operating at 750 revolutions a minute.

Cut-Out Relay.

As with all systems utilizing a mechanical generator of electricity for charging a battery, a control of

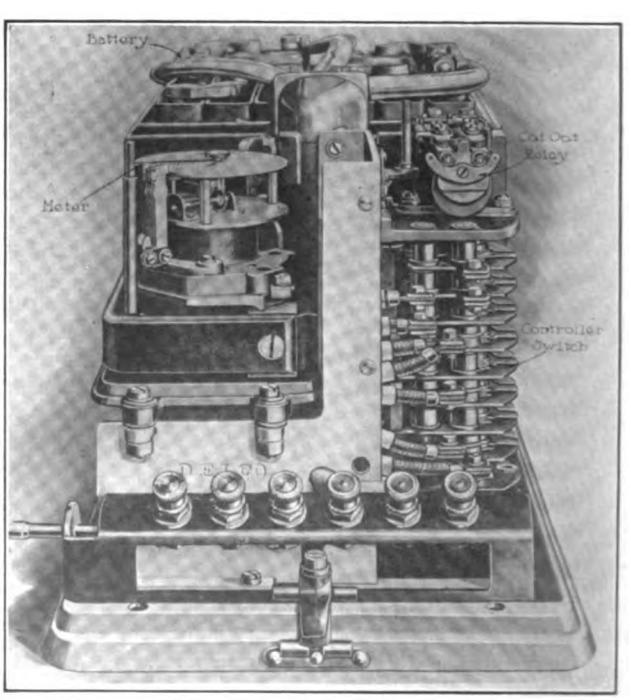


Fig. 54—Delco Battery Box Assembly, Showing Ampere-Hour Meter, Controller Switch for Changing Voltage, Cut-Out Relay and Storage Battery in the Rear.

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the current is essential. That is, when the strength of the current of the battery is in excess of that being generated by the motor it will flow back to the generator unless means are incorporated to prevent this discharging of the battery. The Delco system makes use of a cut-out relay, which is depicted at Fig. 54, a device similar to those employed in telephone and telegraph exchanges. When the generator develops a current in excess of that of the battery the relay closes, permitting the electricity to flow to the container, and opens, breaking the circuit, when the voltage of the battery exceeds that developed by the generator. The relay is simple, operates automatically and requires no attention whatsoever.

The principle may be understood readily by a study of the diagrams outlined at Fig. 56 which present an analogy between a reservoir of water supplied by a power pump and the Delco system. That at A depicts the reservoir equipped with a float regulator utilized to indicate the amount of fluid, also to shut off the power pump when a predetermined level is reached.

In the main line, between the pump and the tank is located a check valve which prevents the water from flowing out through the pump when the pressure of the fluid in the container exceeds that of the pump or when the latter is inactive. If one of the outlets be opened and water allowed to flow, the level of the fluid in the reservoir will fall, until a certain point is reached when the float will fall, causing the closing of the switch and consequent operation of pump and renewal of supply.

If all outlets be opened and the water utilized equal to that supplied by the pump, the level will remain constant, but when the quantity drawn off is in excess of that supplied by the pump, the deficiency will be taken care of by the reservoir until its supply is exhausted. If a rheostat were placed in the circuit and adapted to regulate the speed of the pump with relation to the quantity of water being drawn from the reservoir, the level practically would be maintained.

The Delco system at B is similar in its operation to that of the water system, the pump being analogous to the generator, the check valve to the cut-out relay, the reservoir to the storage battery, and the outlets to the leads from the battery to lamps, ignition, etc. With the electric system it is essential to supply the battery properly but not overcharge it, a condition which might easily exist if the automobile were utilized largely during the day and but very little at night.

It is pointed out by the maker that to fully charge a storage battery of normal six-volt rating, the voltage must rise to 7.5, and if the battery should become discharged or the plates sulphated, it is necessary to raise the voltage beyond this point to obtain a proper charge. It is obvious, therefore, that to charge a battery properly the flow of electricity should be regulated, or the amount supplied measured. This is obtained in the Delco system by a specially designed ampere-hour meter which is connected in the main circuit of the generator and which is depicted at Fig. 54. The device is so regulated that it measures an amount of current slightly in excess of the actual capacity of

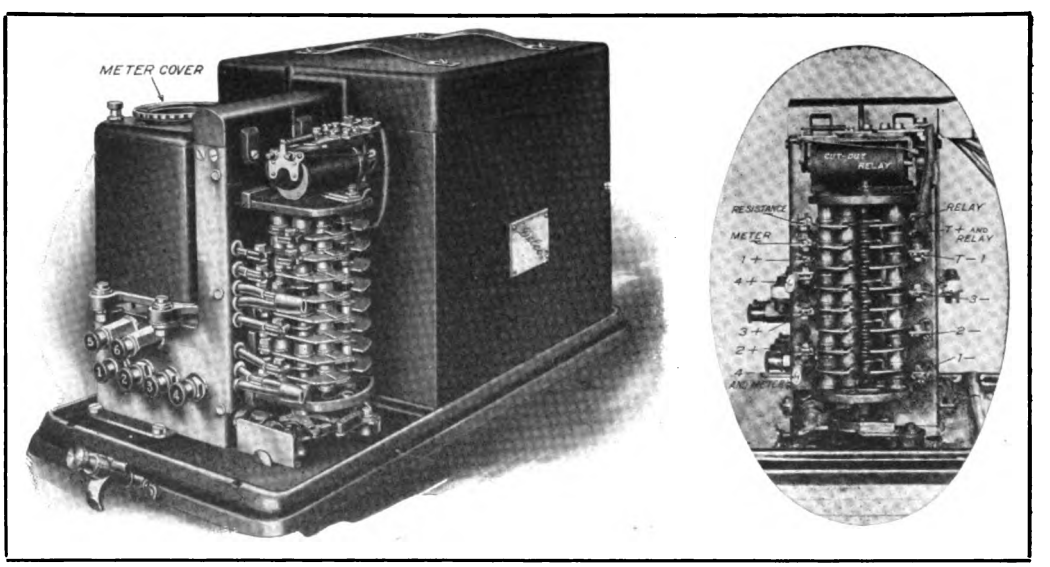


Fig. 55—Outlining Compact Arrangement and Accessibility of Delco System.

the battery, shuts off the flow of current, or reduces the charging rate as the conditions require.

Operation of Ampere-Hour Meter.

The electricity flowing into the battery causes an arm of the device to approach a point at which, when the battery is fully charged, resistance is introduced into the circuit, finally cutting it out entirely. Current flowing out of the battery causes the hand to move away from the stated point and a distance in proportion to the amount of energy utilized.

This hand or indicator denotes the number of ampere-hours in the battery, as well as those consumed, and moving over a calibrated dial, readily accessible, it is an easy matter for the operator of the motor car to note the condition of the battery at all times. The device is adjustable; that is, provision is made for automatically giving the battery a slight overcharge. This is accomplished easily by setting the hand back

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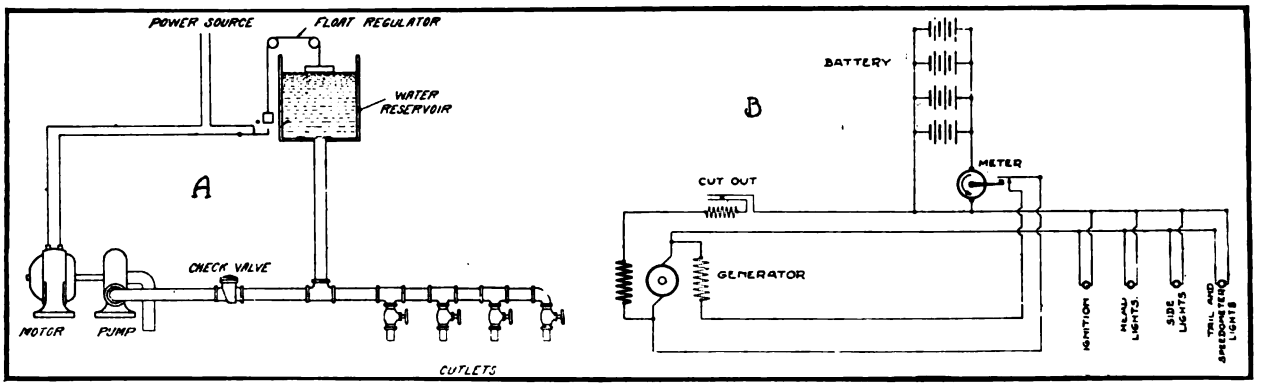


Fig. 56—Theory of the Delco System, Illustrated by an Analogy of Power Driven Water Pump, Depicted at A, and Electric System at B.

to a "70" mark once in two weeks. This with the addition of a little distilled water in the cells, constitutes the sum total of attention required of the Delco system.

Storage Battery.

The storage battery utilized in connection with this system was designed especially for the company, and consists of 12 cells in groups of three, these being numbered 1, 2, 3, 4, respectively. The leads also are marked making for easy identification when replacing the battery. The connections to the meter, cut-out relay and controller are easily distinguished, as will be noted at Fig. 55, and it is claimed by the maker that by a little study of the contents of the instruction book, anyone can properly wire the system.

Lamps.

The voltage is 6.5 and the lamps are constructed accordingly, being of the reverse spiral design, a form which the company maintains is very efficient because the lamp may be focussed for extreme penetration and at the same time provide maximum side rays. The tungsten filament is mounted by a special process, one that reduces loss by breakage to a minimum. The output of the system is such that a group of lamps consisting of two head, two side, a tail and a speedometer, as well as an electric horn, are supplied with a steady current at all times. As with other lighting systems, provision is made for utilizing any group of lamps desired. The battery alone, when fully charged, will maintain the entire group from 10 to 12 hours, and side, tail and speedometer members for about 36 hours.

By referring again to Fig. 55 it will be noted that the battery, controller and ampere-hour meter are compactly arranged, and being fitted with substantial covers, preclude moisture and foreign elements. The unit may be located on the running board or any convenient place and it is held by the maker that the weight of the entire system is but slightly in excess of the usual gas tank and auxiliary ignition batteries. The workmanship and material throughout are of the highest quality, making for durability and efficiency under all operating conditions.

(To Be Continued.)

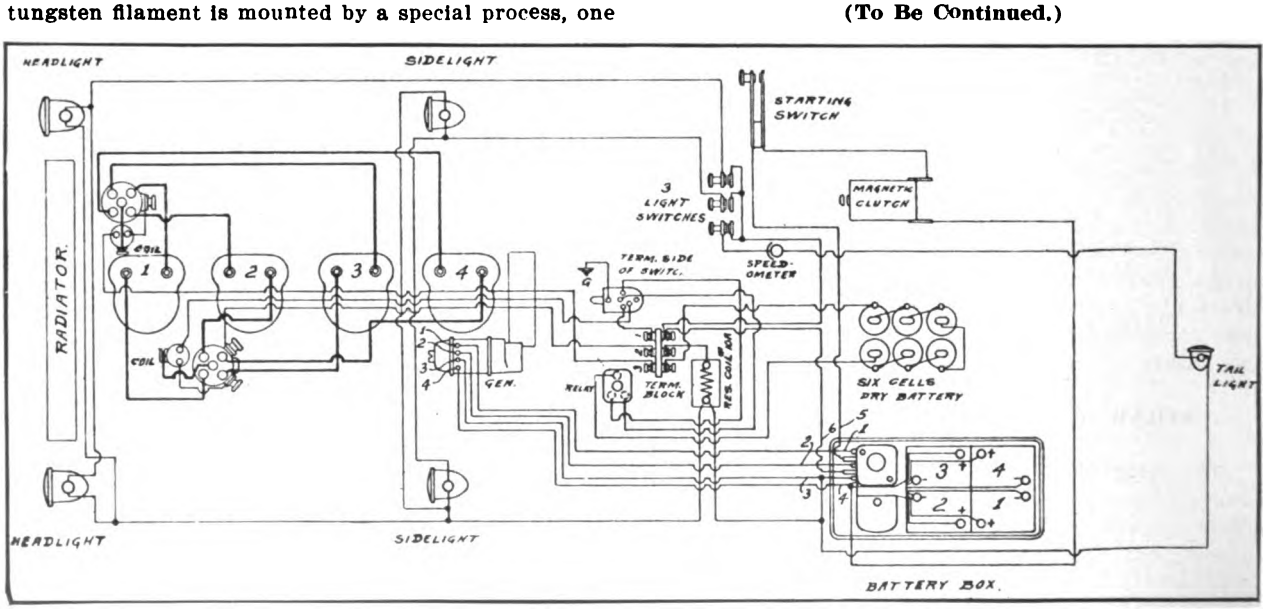


Fig. 57—Wiring Diagram of Delco Ignition, Battery and Lighting System, Showing Method Employed and Location of Components.

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ORIGINAL KNIGHT MOTOR.

The original silent Knight motor, built in Chicago in 1907 by Knight & Kilbourne, is to be placed in a car and used for touring by L. B. Kilbourne, in order to ascertain just how long it will stand up. It already has run 150,000 miles in this country and on the testing tracks of the prominent automobile factories of Europe, being used by the inventor, Charles Y. Knight, when he was trying to interest the automobile manufacturers in his invention.

BLANCHE BATES IN DETROIT ELECTRIC.

Perhaps no one class of people has grown to depend more largely upon the automobile for recreation purposes than those whose working hours are devoted to furnishing amusement for others on the stage. Numerous actors and actresses have purchased cars with which to occupy their attention when not at work, and not a few of these have elected to utilize their machines in travelling from city to city, thus avoiding the unpleasantness attendant upon frequent use of the railroad.

One of the most recent accessions to the list of automobile owners among well known stage people is Miss Blanche Bates, who has selected a Detroit shaft driven electric coupe, made by the Anderson Electric Car Company, Detroit. As will be noted from the accompanying illustration, a reproduction from a snapshot photograph of Miss Bates in Golden Gate park, San Francisco, Cal., soon after taking delivery of her car, it will be noted that the appointments are most complete in every respect.



Miss Blanche Bates in Detroit Electric Coupe at Golden Gate Park, San Francisco.

Miss Bates declares that her decision in favor of an electric was due to the fact that she wanted to be perfectly certain that she would not be dependent upon a mechanic for any care which the machine might need. Her use of the car has been such as to indicate that she made no mistake in this particular, since she has found that it meets her every requirement and that she has not been compelled to call upon anyone for assistance of any nature.

STRAW BALLOT FOR IMPROVEMENTS.

The King Motor Car Company, Detroit, recently conducted a straw ballot on the shortcomings of the motor car, asking a list of owners all over the country to point out possible improvements. As might have been suspected, left side steering with centre control had a large number of advocates, and the long stroke motor came in for a goodly number of votes. About the only unusual feature of the ballot was the complaint concerning the springs, which many said were hard riding, needing effective shock absorbers. Many seemed to think that there was room for improvement in the springs and their suspension, and that they should be so designed that shock absorbers would not be necessary.

SALES MANAGERS' CONVENTION.

The Automobile Board of Trade is working out the details of the convention of sales managers which is to be held in the near future. The dates have not been decided upon definitely, but the idea is to hold the meeting when it will be most convenient to all, and will probably take place late in June or early in July. Papers are to be presented upon subjects peculiar to the sales department of the automobile manufacturers. The committee of arrangements is composed of the following: H. O. Smith, Premier; E. R. Benson, Cadillac; W. E. Metzger, Everitt; C. W. Churchill, Winton; W. T. White, White.

COLE TO MAKE MEDIUM PRICED CAR.

From Indianapolis comes the announcement that the Cole Motor Car Company, of that city, is to shortly launch a new medium priced car for the 1913 season. The car, it is stated, will embrace all the well known Cole qualities, but will be smaller in details such as cylinder dimensions and wheelbase. The Cole Junior, as it will be called, is to sell for a medium price and will be made in one wing of the new Cole factory which was recently built, the regular 40 horsepower car being manufactured in the other wing.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

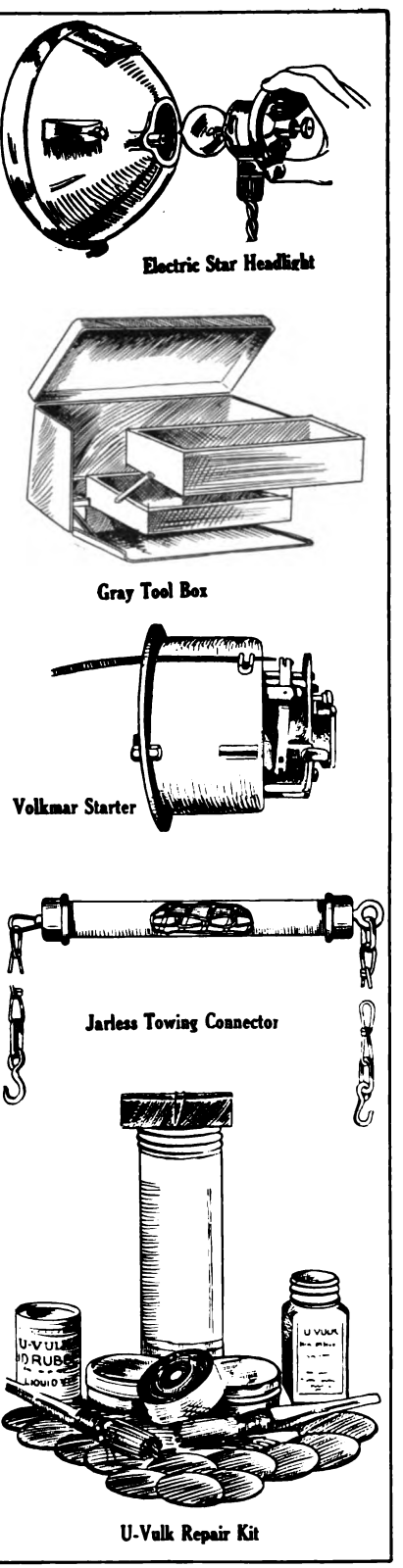
Electric Star Headlights are made by the Milwaukee Bronze Casting Company, 119 Clinton street, Milwaukee, Wis., and are designed to throw a powerful white light straight ahead and at the same time diffuse a less brilliant illumination to the side, lighting up the curves and passing vehicles so as to reduce the risk of collisions. This double ray effect is secured by the design of the reflectors, which are of modified parabolic form. The lamp is cast of non-corrosive silver aluminum about .1875 inch thick, without any rivets to jar loose or solder to crack because of the vibration to which automobile lamps are subjected. The interior is brought to a high polish which is unaffected by the weather or gases, due to the composition of the metal. The lamp is equipped with Ediswan bayonet lock base, which will not allow the bulb to become loose. A feature of the member is a focussing device which enables the bulb to be focussed in a position which will give the illumination desired. This is controlled by means of a screw and lock nut on the outside of the hub which carries the bulb.

★

The Gray Tool Box is constructed with the trays on movable arms so that they may be pulled out and held in such position that all the contents are in view at once, an obvious convenience in searching for tools. The front is hinged and may be used as a shelf with the box bolted on the running board. The device is provided with a brass trunk lock and is made by the Gray Specialty Company, 148 Avon avenue, Newark, N. J.

★

The Volkmar Starter is made by the Volkmar Auto Starter Company, 203 Broadway, New York City, and is of the spring type, the motor being turned over by means of two steel springs. It is simple in construction there being but 28 parts, all exposed to view by removing the brass cover, as shown in the illustration. The starter is attached in place of the starting crank and needs no alteration of the car before it can be installed. It is eight inches in diameter and seven inches long, and is operated by a pedal connected to which is a flexible cable. Depressing the pedal releases the springs, which turn over the motor. When the motor starts, it rewinds the springs to the original tension, when they are disconnected from the crankshaft and held tightly until the next time it is desired to start the car. Two types of the starter are made, A for cars with motors of up to 30 horsepower, and B for cars of up to 60 horsepower, weighing 35 and 45 pounds, respectively.



★

The Jarless Towing Connector will be appreciated by those who have towed a car or have been towed, and have experienced the jars and jolts to which the machines are subjected in starting. A heavy spring takes up and absorbs the jerk, acting as a shock absorber and turning the quick pull into a slower and easier one. It takes up a space of four by 14 inches in the tool box, so that it is convenient to carry. It is made by the Jarless Auto Towing Device Company, Cleveland, O.

★

U-Vulk is a vulcanizing outfit which is complete in itself, containing patches, brushes, rubber in strips and in solution, and a liquid vulcanizing agent which chemically vulcanizes the raw rubber to the tire or tube. It renders tire repairs possible without heat, and comes in a compact form, fitting in a pasteboard screw top carton. It is made by the Gem City Liquid Vulcanizer Company, Dayton, O.

★

The Brown Impulse Tire Pump is made by the Brown Company, Syracuse, N. Y., and is a power

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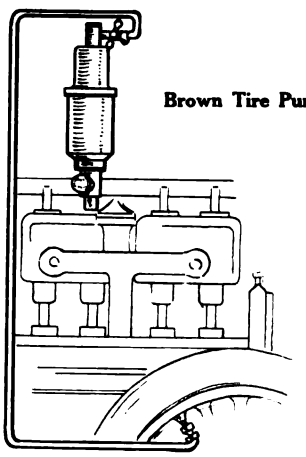
tire pump operated by the compression of the motor. It may be used either as a permanent fixture on the motor or attached only when it is desired to use it. When fitted permanently, a hole is tapped into the cylinder head in which the pump is screwed, operating horizontally instead of vertically as seen in the illustration, which depicts the temporary installation, with the pump screwed in the spark plug hole. In use, the cylinder to which the pump is attached is cut out from the ignition circuit, the compression of the cylinder being used to operate the piston which forces the air to the tire. Only fresh air is pumped. The outfit consists of the pump, 12 feet of hose and pressure gauge. The pump is made like a motor, with two cast iron piston rings and a connecting rod of high grade steel between the larger piston on which the compression acts and the smaller one which forces the air to the tire. The cylinders are made of gray iron, bored and reamed to exact size.

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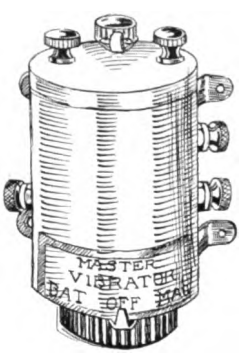
The B. & S. Master Vibrator is made by the Briggs & Stratton Company, Milwaukee, Wis., and was designed with the idea of correcting the timing of a multiple-cylinder motor and increasing its power by substituting one vibrator for three or four. It takes the place of the usual box coil with its several vibrators, each responding to the current at different speeds, held to result in uneven firing. The B. & S. device is small and compact, being 5 25 inches high and 2.5 inches in diameter, and is water and dust proof with an adjustment which is proof against accident or carelessness and yet is sensitive.

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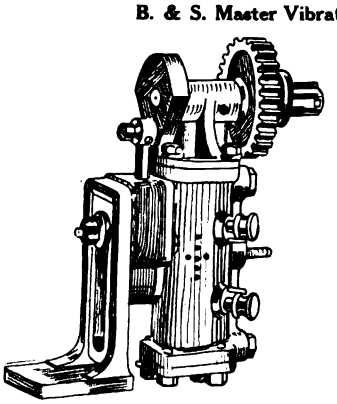
The Hartford Tire Pump is a double acting single-cylinder pump of great power and capacity. It will pump 1.5 cubic feet of air a minute at a speed of 500 revolutions. That illustrated is designed to be driven from the magneto or pump shaft through a split gear meshing with the gear on pump crankshaft, but one also may be had with a friction wheel, to be driven by contact with the engine flywheel. The gear driven pump is attached to the frame of a car in such position that its gear may be slid in and out of engagement with the gear on the pump shaft. The pump is strongly constructed, the cylinder, piston and piston rings being of cast iron. The piston is of the double type, hollow, and with two valves, one in each head. The pump may be attached where convenient, and is 9.5 inches in height, 3.5 inches in width and 8.5 inches long. It weighs 13 pounds and is tested to 150 pounds pressure. The cylinder bore and stroke are 1.5 inch. The outfit consists of the pump, gears, hose and pressure gauge. To use the gear pump, the motor is stopped, pump gear slid into engagement with gear on magneto shaft and engine started. It is made by the Hartford Pump & Manufacturing Company, 7 Arch street, Boston.



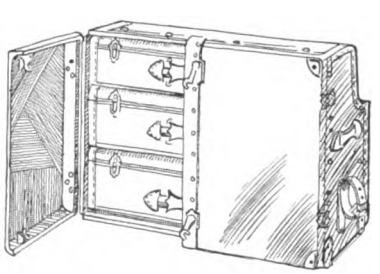
Brown Tire Pump



B. & S. Master Vibrator



Hartford Tire Pump



Ajax Trunk

★

Ajax Trunks are made by the Ajax Trunk & Sample Case Company, 91 Mercer street, New York City, and are well known. The No. 406 suit case trunk, made especially for automobile use, is illustrated. This carries three suit cases, and is so shaped that it will fit on the trunk rack in the rear of a car, the top portion being cut in for about 10 inches to allow the lower part to go under the overhang of the car body. The doors swing outward like wardrobe doors, and each case is placed on an independent shelf which it fits exactly, so that one may be removed without disturbing the others. It is made throughout of the best materials, and is lined with green felt. It may be had in three lengths, 28, 30 and 32 inches, the width and height being 16 and 24.5 inches.

★

The Vixen Horn is in external appearance similar to an ordinary bulb horn, but the sound it makes is that of a siren. It is manufac-

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tured by the Motor Car Equipment Company, 55 Warren street, New York City. The device is quite unique in combining in a bulb horn the siren quality. Instead of the customary reed there is a small mechanical siren of considerable power which emits the characteristic note which attracts attention even in the traffic roar of a large city. It is stated that the sound is not too loud for city use, and possesses sufficient penetrative ability for use in the country.

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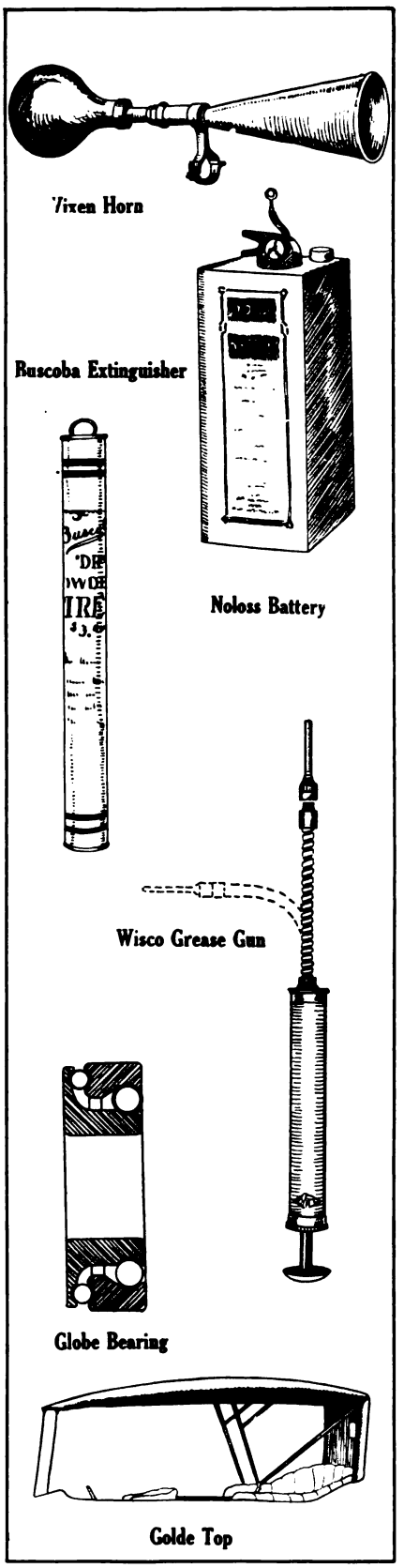
The Noloss Battery is an innovation in ignition batteries, being a wet battery in dry battery form, thus possessing the advantages of both. It is made by the Burn-Boston Battery & Manufacturing Works, 9 Doane street, Boston, and consists of a wet battery in a can so sealed that it cannot leak, spill, or appreciably evaporate. It thus combines the long life of the wet battery with the portability of the dry cell. The cell is the same size as the regular dry member, and gives the same voltage and amperage.

★

The Buscoba Dry Fire Extinguisher is, as its name indicates, a fire extinguisher of the dry powder variety. It is made by the Bush-Scott Company, 31 Woodward avenue, Detroit, and consists of a tin tube filled with a dry chemical which when thrown at the base of a fire generates a gas. This gas does not support combustion, as it does not contain oxygen, and thus puts the fire out. The extinguisher will be appreciated by the motorist, as it is not bulky to carry, being 22 by two inches, and gives effective protection against gasoline and oil fires.

★

The Wisco Grease Gun is made by the Wilson Instrument & Specialty Company, Passaic, N. J., the No. 5 gun of this company being illustrated. It may be used for either oil or grease and is fitted with a flexible spout which enables the contents to be shot into the most inaccessible places.



The spout may be turned through any angle from zero to 90 degrees, and is provided with a thread to screw into a grease cup, facilitating loading a bearing. The gun will be appreciated by motorists who have tried to load grease or oil into a bearing on a car while on the road, only to have most of the lubricant escape to the ground on account of the awkward position of the gun. The flexible spout enables the contents to be delivered where desired when held in any position.

★

The Globe Ball Bearing is a new type of combined ball radial and thrust bearing, being placed upon the American market by the Globe Ball Bearing Company, 50 Church street, New York City. It is made by the Societe de Mecanique de Precision of Clichy, France. The construction is easily seen in the drawing. There are two ball races, one of which bears the radial load, while the other takes care of the thrust. The bearings will be found of especial advantage in axles, where there is considerable thrust as well as radial load to be taken care of.

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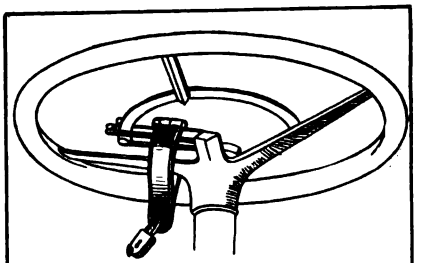
The Golde Top is made by the Golde Patent Manufacturing Company, Inc., 509 West 56th street, New York City, and contains several new features. As may be seen in the illustration, it has no bow irons for the front seat, there being but a single bow socket on each side. In front of this the top is supported by hinged rods. This construction is such that it may be adjusted nearly as quickly as the old horse buggy top, there being no bows to fit in sockets, etc. No springs are used, and the whole is quite durable. Two styles are offered, one with tapering oval steel rods finished in black enamel, and the other with wooden bows and steel and wrought iron trimmings, the metal being finished in black and the wood in the natural color. The cloth material may be water proof canvas, mohair, or Pantasote.

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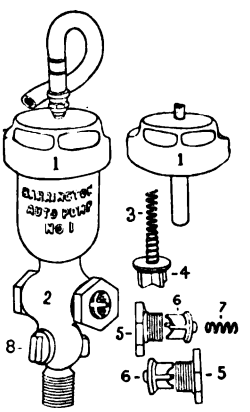
The Watch Dog Lock is one of the newer automobile locking devices on the market, and will no doubt be quite popular. It is simple in construction, consisting of a pair of hinged arms adapted to go around the steering wheel spider and the throttle and spark levers. It is made by S. Breakstone, 1712 Michigan avenue, Chicago, and may be had with or without the padlock, that which is sold with the device being of Corbin make. The advantage of locking the spark and throttle levers lies in the fact that while the car can be moved about the garage, it cannot be run under its own power, so that while protection from theives is made, the car is not immovable. This is a decided advantage in public garages, where the car must be moved by the employees to make way for other machines, or for washing.

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The Barrington Automatic Pump is made by the Barrington Automatic Automobile Pump Company, Short and South street, Harrisburg, Penn., and is of the compression power variety. The pump is designed to be attached permanently to the engine, being screwed into a hole tapped in the cylinder head. It is only 6.5 inches high, allowing the hood to be closed when not in use. It is simple in construction, with few wearing parts, as may be seen in the illustration. While it may be used as a detachable pump and screwed into a spark plug hole, only when it is desired to use it, trouble may be saved by having the pump attached permanently. In the illustration 1 is the cap forming the top of the compression chamber; 2, the body of the pump; 3 and 4, check valve and spring located in the bottom of the chamber; 5, 6, 7, intake check valves and spring; 8, stop cock to throw the pump out of action when not in use. The pump operates with the engine throttled low as follows: The motor piston on its downward stroke draws air through the two intake valves 5 and 6; the next upstroke of the motor piston forces this air up through the neck of the pump, past the check valve 4 and into the pump compression chamber, from which it goes to the tire.



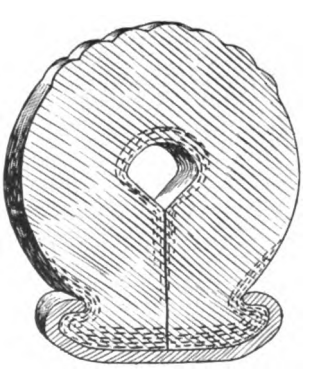
Watch Dog Lock



Barrington Tire Pump



Treadmend



Cleveland Tire

★

Treadmend is being placed upon the market by the Liberty Rubber Company, Orange, N. J., and consists of a preparation especially made to fill up holes in the tread of a tire and sealing up cuts. In the care of a casing one of the essentials upon which the tire manufacturers insist most strenuously is the quick attention to small holes and cuts. Through a small hole which might be thought harmless an astonishing quantity of sand will pass, resulting in the familiar sand blister which may remove a considerable section of the tread and need the services of a professional vulcanizer. To prevent such blisters, all holes should be filled up as soon as seen with some such preparation as Treadmend.

★

The Cleveland Air Cushion Tire is made by the Cleveland Puncture Proof Tire Company, Columbus, O., and has been designed to derive some resiliency from air, at the same time combining with it the non-puncturing qualities of the solid tire. The construction is seen in the illustration. The tire is solid save for a central air chamber, which communicates with the outer air through a slit in the base, which is lined with friction cloth. The result of this construction is claimed to be that when the tire strikes an obstruction the pressure on the rubber closes the slit and compresses the air, which then lends its resiliency to that of the rubber. This effect is obtained without the use of inner tubes, valves or inflation, so that there is no danger of blowouts, punctures or leaks. The tire is made in standard sizes to fit the standard clincher rims, and is provided at the base with a rubber covered layer of friction cloth to provide against cracking. The tread is beaded to prevent skidding and afford a wearing surface.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



THIRTY SAURERS FOR PORTO RICO.

After thoroughly investigating the possibilities, the Porto Rico Motor Company has been organized with headquarters in San Juan and Ponce, Porto Rico, for the purpose of establishing a freight service between several of the larger cities and towns on the island. The type of vehicle selected for this work is the five-ton Saurer, made by the International Motor Company at its plant in Plainfield, N. J., the initial order being for 30 cars.

The business of the island is increasing at a rate varying from 16 to 20 per cent. annually, as shown by the reports of the customs service. Railroad transportation is limited practically to one line which keeps near the coast, running from Carolina across the north coast to Aguadilla, down the west end and along the southern to Guayama. Coffee, tobacco and a portion of the sugar is raised in the interior, and the problem is that of carrying merchandise and provisions to these plantations and bringing out the produce. The truck lines will run across the island from north to south, starting from San Juan and Ponce.

In these vehicles, the first installment of which is shown herewith, the motor is of the four-cylinder, four-cycle, water-cooled type with T head cylinders cast in pairs. The inlet and exhaust valves are made interchangeable, of nickel steel, and operated by separate camshafts. All shafts are of chrome nickel steel and are mounted on high grade annular ball bearings of very large diameter.

The cooling system consists of a honeycomb type radiator of very efficient design, through which the water is circulated by a centrifugal pump. A large fan placed directly behind the radiator supplements its action, and the cone clutch is provided with fan shaped arms which assist in removing the heat. Lubrication is by force feed, operated by a pressure pump. Ignition is by high-tension magneto.

The selective sliding gear transmission affords four speeds forward and reverse. Gears are made of nickel steel and all shafts are carried on large ball bearings, thrust bearings also being fitted wherever necessary. Drive is by shaft. Three sets of brakes are provided, one located on the differential, one on the rear wheel sprockets, and the third the special patented Saurer motor air brake. Tires are single in front and dual in the rear.

G. V. ELECTRIC BREWERY WAGONS.

Jacob Ruppert, the well known brewer, New York City, apparently is a decided convert to the practical utility of the electric vehicle for quick delivery purposes. This is not an isolated instance, for several of the brewing companies in the metropolis maintain



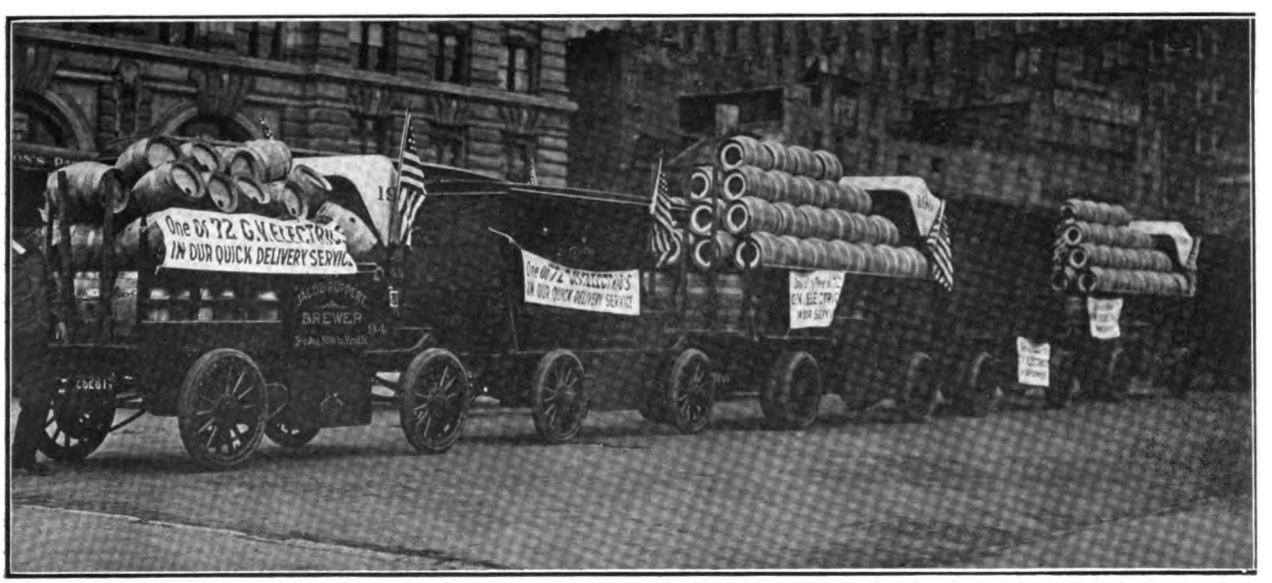
First Installment of Saurer Cars Recently Shipped by International Motor Company for Freight Work in Porto Rico.

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large fleets of this type of car. The Ruppert equipment consists largely of G. V. machines, made by the General Vehicle Company, Long Island City, N. Y., although it should not be understood that the entire transportation system of the concern is limited to these, several horses and a few gasoline trucks being included as well.

The accompanying photograph was taken near the Battery, during the progress of the recent commercial vehicle parade, and while the signs on the sides of the wagons announce that they are a part of a fleet of 72 G. V. electrics, this statement is slightly misleading. As a matter of fact, Jacob Ruppert now has four two-ton, three 3.5-ton, two one-ton and 39 five-ton cars in actual service, making a total of 48, while repeat orders have been filed for four two-ton, two 3.5-ton and 29 five-ton vehicles, which will bring the aggregate to 83, when these have been delivered.

The electrics are utilized in the so-called quick delivery system. It will be noted that the five-ton machines predominate, and the rated mileage for these is 35 miles, carrying a load half of the time. The actual experience has been such as to exceed this very materially, and provision is made for rapid exchange of batteries, so that some of the vehicles are often required to be in continuous service for 23 hours at a time. That the result has been satisfactory in every way would appear to follow from the fact that so many repeat orders have been filed.



Portion of Jacob Ruppert's Fleet of 72 G. V. Electric Vehicles in Brewery Service in New York City.

FIVE G. M. C.'S REPLACE 20 HORSES.

A lumber firm in St. Louis, Mo., has experienced splendid success with G. M. C. cars, made by the General Motors Truck Company, having had one of these vehicles in service for the past two years. Recently it purchased four machines of the same make, and the five now replace 20 horses, all of the animals having been sold. One of the cars is of 2.5 tons capacity and the others carry loads of five tons each.

When the horses were sold the wagons were retained, and the company finds them decidedly available for use in making up loads. The men in the yard pile the lumber on these bodies while the trucks are making deliveries, and upon their return the load is transferred without delay. The same plan has been adopted by a number of similar concerns throughout the country.

THE STEEL SHOD ARIES.

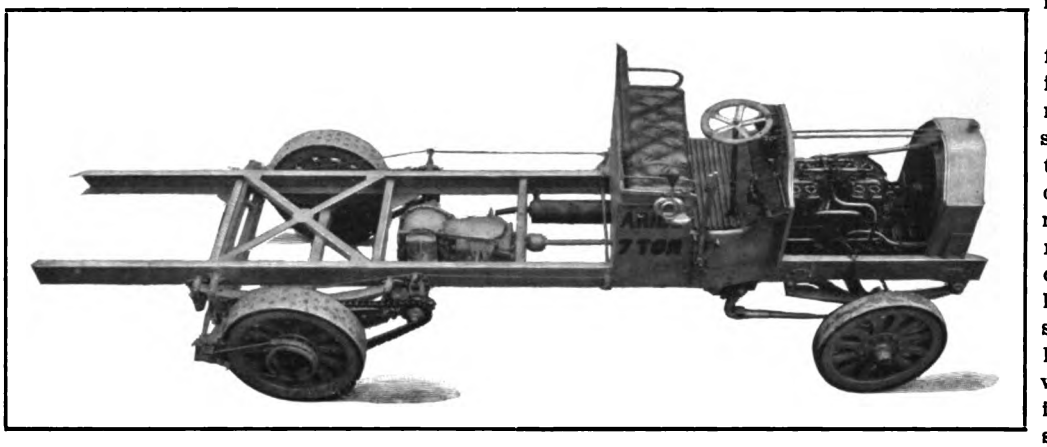
Considerable interest attaches to the seven-ton Aries truck, made by the Aries Manufacturing Company, Villeneuve-la-Garonne, France, and represented in this country by J. Jaccard & Co., 213 West 69th street, New York City. While there are a number of distinctive features in this product, perhaps none stands forth so prominently as the steel shod wheels. In fact, is may be said that the entire design is built around this factor.

The motor is a four-cylinder, four-cycle, water-cooled unit, rated by the maker at 40 horsepower. The bore is five inches and the stroke 5.75. The location is in front of a hood, although an option is offered for those who desire it placed under the floor. In either case, full accessibility is afforded, the mounting being on a special steel sub-frame, bolted against hard wood members which are in turn bolted to the side frame proper. In addition, it should be mentioned that this form of suspension is calculated to present a cushioning effect and completely to eliminate all minor vibrations.

Ignition is by Bosch high-tension magneto. The carburetor is of special design, and so constructed as

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to operate successfully with gasoline, benzol, naphtha or alcohol. The lubrication system is automatic, a pump being employed to force the oil through the crankshaft to all working parts of the motor. A sight feed on the dash informs the operator as to the condition of the supply at all times. An extra large radiator of the tubular type is mounted forward of the engine, a gear driven pump keeping the cooling water in circulation. A six-bladed fan, directly behind the radiator, further aids in this function.



Semi-Plan View of Aries Chassis, Showing Also Construction of Steel Tired Wheels.

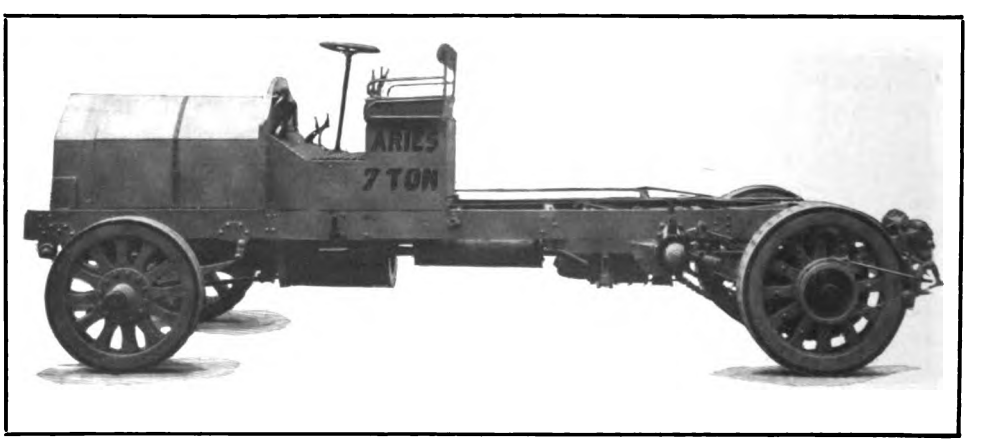
The clutch is of the dry disc type, employing 39 discs, alternating with bronze and steel. The transmission is of the selective sliding gear type, affording three speeds forward and reverse. Final drive is by side chains. Two sets of brakes are provided, one acting on the differential and the other on the rear wheels. Springs are semi-elliptic all around.

The wheels are of the artillery wood type, but with the hubs supplied with unusually deep flanges, thus considerably increasing the sturdiness of the assembly. The spokes are made of a hard and fibrous wood, air dried by a natural process. Absolutely no kiln dried wood is used. The spokes are cut in conformity with the grain of the wood, so that the grain follows the straight line of the strains in them with accuracy. The whole is bound together by a specially constructed rim or felloe.

This latter is built up of small pieces of French elm, and each section is subjected to a thorough examination before being assembled. It is understood that the wood from which these are constructed is of such close grain, hard fibre and solid structure that it is one of the few woods which will not float in water. It is pointed out that this characteristic should convey some idea of the strength and strain-resisting qualities inherent in it.

The Aries tires, for which so much is claimed, are made of Creuzot steel, which is held to possess the quality of being neither too hard nor too soft, and of being sufficiently tough to withstand constant hammering in service without cracking, and without stretching or expanding. It is held that when these are once placed on a wheel, they need no further attention.

Inasmuch as this particular brand of steel cannot be welded, the tires are cut from a solid billet, which has been brought to a predetermined heat, and a mandrill forced through the centre, thus leaving the billet in the form of a heavy washer. This is next placed in a special machine, and tapering mandrills are driven through the centre, expanding the whole and compressing the fibre of the metal which eventually is to form the tire. This operation is repeated, with heating between each operation, until the billet roughly assumes the shape desired, after which it is placed between two rollers and held under constant pressure. These proceed to roll the tire flatter and flatter, and at the same time still further compress the fibre, driving the molecules into closer relation with each other, until they are ready for the special hydraulic press. This consists of many hydraulic pistons placed radially around the rim of the wheel. These work in perfect unison and subject the rim to



Side View of Aries Seven-Ton Chassis, Ready for the Body Installation.

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pressure uniformly throughout its entire circumference, and knead the steel tire into the wooden felloe. This operation is repeated 14 times, thus tightening the tire on the wheel, and each time with a new setting of the wheel in the machine, until wood and metal form one compact mass.



Mail Wagon Fitted with Motz Cushion Tires.

After the tire is firmly seated, binding the wheel under great pressure, the entire assembly is trued up on a lathe thus insuring that both wheel and rim are absolutely concentric and perfectly centred. A conical hub is then inserted in the centre of the wheel, also by hydraulic pressure, insuring uniform radial strain on the spokes. This central hub tends to force the spokes outward against the inward pressure of the specially applied rims, and at all times the compression under which the spokes are held maintains the wheel absolutely true, circular, and free from warp or twist.

It is claimed that no Aries tires have ever been worn out in service, although many of them have covered great mileage, in some cases as high as 80,000 miles. The Aries company guarantees them for no less than 100,000 kilometers (60,000 miles). The company is prepared to furnish an extra rim fitted with rubber block tires for winter service, if desired.

MOTZ TIRES IN MAIL SERVICE.

The United States government has decided that the success demonstrated in other fields of endeavor has been sufficient to warrant the use of an automobile for the collection of mails in Washington, D. C. The car shown in an accompanying illustration has covered a distance of 105 miles a day, making on an average of 998 stops, for several months, and it is conservatively estimated that it is doing the work of at least four horse wagons.

Service is expected regardless of weather and road conditions, and in this respect much depends upon the nature of the tire equipment. In fact, it may be stated that one of the factors which has delayed the adoption of the mechanical conveyance in this work has been the cost of maintenance, in which tires play a decidedly prominent part.

This car is shod with Motz high efficiency cushion tires, made by the Motz Tire & Rubber Company, Akron, O. The company maintains that these are puncture proof and as resilient as properly inflated pneumatics, the latter quality being due to the double treads, under-cut sides and slantwise bridges that characterize this make. The equipment has given exceptionally good service in this instance.

KNICKERBOCKER FOR PIANO MOVING.

Many piano houses throughout the country have come to realize the importance of the motor vehicle in solving some of the problems which confront the transportation of these instruments. An accompanying illustration presents a Knickerbocker truck, made by the Knickerbocker Motor Truck Manufacturing Company, New York City, and in service with W. L. Burnes in that city. It ought to be stated that the uniformed driver does not wear this outfit in the usual performance of his duties, the vehicle and operator being on dress parade when the photograph was taken.

These cars are made in two sizes, with carrying capacity of 3.5 and five tons, respectively. The design is essentially the same with each. The motor is a four-cylinder, four-cycle, water-cooled unit, rated at 35-40 horsepower in the smaller, and 40-45 in the larger. The bore and stroke is 4.5 by five, and 4.75 by five, respectively.

Cylinders are of the L head type, cast separately and arranged vertically under the floor. Complete accessibility is afforded in an interesting and novel manner. The honeycomb radiator is suspended on springs which are attached to the bumper. This latter is hinged so as to swing open, carrying with it the radiator, when the motor may be withdrawn with its hickory sub-frame, much the same as a drawer is withdrawn from a desk.



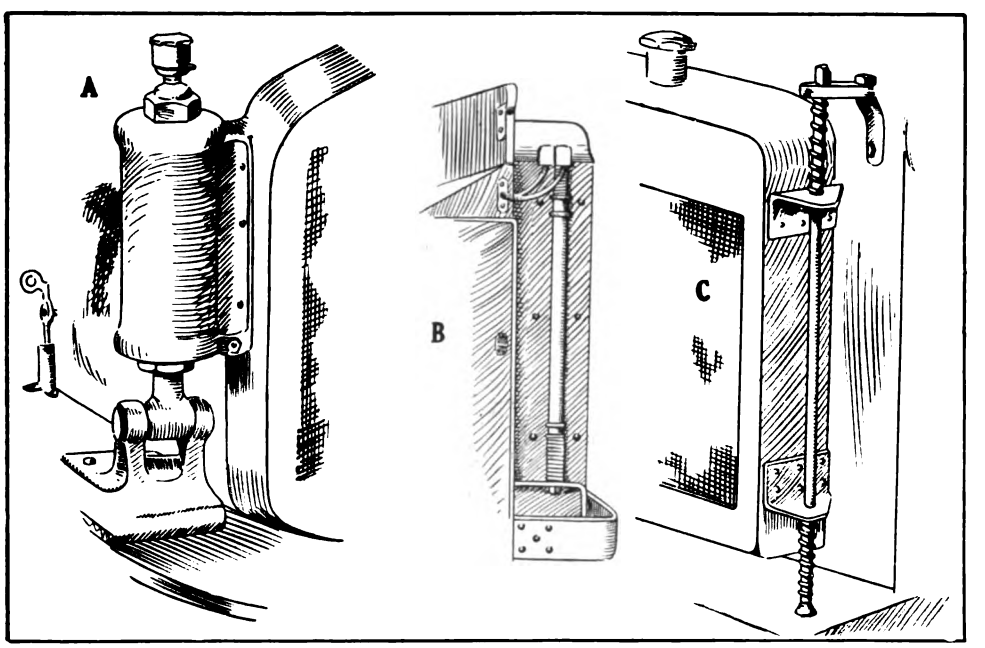
Knickerbocker Truck in Piano Moving Work with W. L. Burnes, New York City.

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Lubrication is by means of a positive gear driven pump located at the bottom of the commutator shaft and contained within the lower half of the crankcase. Ignition is by Bosch magneto.

The clutch is a large leather faced cone member, which sets in a cone shaped metal ring bolted to the flywheel, instead of in the flywheel proper. The transmission is of the selective type, affording three speeds forward and reverse. This is of the constant mesh design, the sliding members being hub clutches which engage freely.

Two sets of brakes are fitted, one on the jackshaft and the other on the rear wheel. Springs are semi-elliptic, with auxiliary coil springs at the rear. Wheels are 36 inches in diameter, with five-inch single tires in front and four-inch dual members in the rear on the 3.5-ton, and six-inch single front, and six-inch dual rear, on the five-ton. Any type of body will be fitted by the company at extra charge.



Some Methods of Radiator Suspension: A, White; B, Pope-Hartford; C, Sanford.

METHODS OF RADIATOR MOUNTING.

There is a growing tendency upon the part of truck manufacturers to install the radiator upon springs which are intended to absorb the strains due to chassis distortion and to eliminate the vibration. However, in carrying out this feature of construction there is more or less difference of opinion among designers. In the Sandusky machines, for instance, the radiator is on springs carried on brackets and guides, and these in turn carry other brackets and guides supporting the gasoline tank.

The White suspension, which is shown at A in the accompanying sketch, utilizes shock absorbers, which are cylinders of large diameter enclosing helical springs above pistons. The lower ends of these plunger rods are attached to bolts set transversely in brackets on the chassis frame. The radiator is so hung that it may be moved slightly in any direction without any stress whatever upon it.

The Victor trucks have a bracket at either side, in which a hole receives a bolt anchored in the chassis frame, this bolt forming the guide for a short helical spring that resists all action. To prevent the heavy curved cross member on the frame in front of the radiator from reducing the radiation the member is perforated with three rows of holes.

Into the reinforced sides of the radiator frames on the Federal and carried on stout steel rods, are two short helical springs of large diameter, separated by a substantial lug. This arrangement gives a decidedly neat and finished appearance.

The Pope-Hartford suspension is with rods fixed to the chassis frame on a bracket and to the radiator at the top, as indicated at B. The helical springs at the top and bottom of the rods are provided with collars to retain them in position.

The Sanford mounting at C is somewhat similar, rods being anchored in the chassis frame and held in brackets on the dash at the top. At both the upper and lower ends of these rods are the helical springs that are slightly compressed between brackets on the radiator frame and effectually resist any distortional action on the part of the chassis.

ELECTRICS IN EXPRESS SERVICE.

Express companies throughout the country are finding that electric cars meet their needs in every particular. One of the most recent orders received by the Baker Motor Vehicle Company, Cleveland, O., was a repeat for 28 two-ton Baker electrics for use by one of these concerns in Washington, Baltimore, New York and Chicago. The Westcott Express Company of New York has placed a repeat order for 12 vehicles of the same make and type.

The Adams Express Company of New York City, which already has in service a fleet of nearly 100 G. V. electrics of two tons capacity, made by the General Vehicle Company, Long Island City, has ordered 37 more of the same type, and the American Express, 58.

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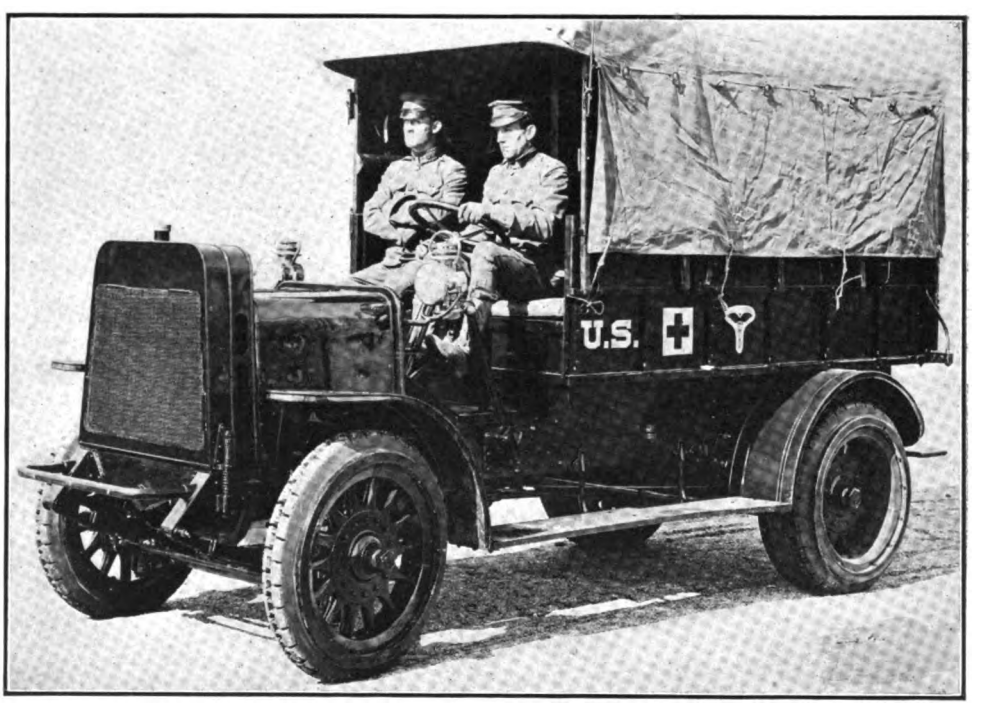
ARMY FIELD WAGONS.

In a recent issue of the Infantry Journal, Capt. Alexander E. Williams, 19th Infantry, U. S. A., writes interestingly concerning the experiments of the American army with automobile transportation. According to Capt. Williams, the United States has gone much further in this regard than any foreign country, in that it is now working upon a plan to secure a suitable motor field wagon, something which other nations have decided cannot be found. Not only has the American army made its plans, but has designed and is having built a machine which, it is expected, will prove suitable for field service.

Along this line, it is understood that the War Department will continue its experimentation with trucks in connection with the various militia manoeuvres throughout the country this coming summer. Details have not been worked out, but the plans call for an even more thorough test than was accomplished during the summer of 1911, in which vehicles of several makes conducted themselves with great success.

Capt. Williams is authority for the statement that the government is now considering the advisability of offering a subsidy, similar to that now in vogue in other countries, notably France, Germany and Austria. Steps have been taken to obtain from motor truck manufacturer reports of the sale of each machine, with the address of the purchaser, and the size and power of the vehicle. It is felt that this scheme will prove less costly than the purchase of a large number of cars outright, although it is admitted that considerable money must be available for this purpose, once the plan is put into active operation.

The results of the recent road test, from Washington, down through the South and back to Fort Benjamin Harrison, Indiana, in which five cars were entered, have not been made public as yet. The participants were: Autocar, Autocar Company, Ardmore, Penn.; Four Wheel Drive, Four Wheel Drive Auto Company, Clintonville, Wis.; Mais, Mais Motor Truck Company, Indianapolis, Ind.; Sampson, Alden Sampson Manufacturing Company, Detroit, and White, White Company, Cleveland, O. The route covered 1509 miles, over some of the worst roads in the country, and the detailed report of the army officials will be awaited with interest.



Mais Army Field Wagon Which Recently Was Subjected to Governmental Test.

TRUFFAULT-HARTFORDS WIN.

Manufacturers of accessories are beginning to appreciate the value of long distance racing events in indicating the merit possessed by their product. This has applied for some time in the matter of tires, carburetor, magneto, etc., but it is more or less true that special attention was not paid to other fittings until recently.

It is of interest to note, in this connection, that the Fiat car driven by Teddy Tetzlaff to win the recent Santa Monica road race of 303 miles and thus establish a new world's record, almost four miles an hour in excess of all previous marks for road work, was equipped with Truffault-Hartford shock absorbers, made by the Hartford Suspension Company, Jersey City, N. J. Ralph De Palma, driving a Mercer, also utilizing Truffault-Hartfords, won the medium car event, covering 151 miles at a speed averaging 69.54 miles an hour.

CZAR BUYS STODDARD-DAYTON.

The Czar of Russia recently gave foreign car makers further cause for anxiety over the American "invasion" by purchasing an American car, a Stoddard-Dayton landaulet, made by the Dayton Motor Car Company, Dayton, O., a constituent of the United States Motor Company, New York City.

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FORD IGNITION AND ADJUSTMENT.

It is surprising to note the large number of owners of the model T Ford who fail to obtain the maximum efficiency from the motor because of a lack of practical working knowledge of the ignition system and an inability to adjust the coil properly. The writer has noted from time to time, that many new operators, and even some with experience, rely upon the agent or salesman to tune up the coil, a task that may be performed by the owner if he understands its principle and application in practise. Frequently the failure of the car to operate smoothly is due to one or more of the coil units not being synchronized with the others, or to causes which will be outlined herein. In order to overcome ignition troubles the driver should understand the operation of the system which will be explained in non-technical language for the benefit of the novice.

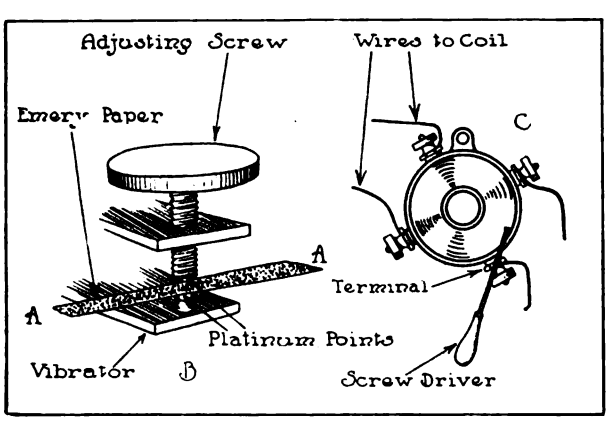


Fig. 1—Ignition Hints: B, Cleaning and Truing Coil Points with Emery Paper; C, Method of Testing Primary or Secondary Current with Screw Driver.

Operation of Motor.

The explosive mixture is introduced into the cylinder by the suction of the piston when the latter is moving downward, a movement known as the intake stroke. The next half-turn of the crankshaft carries the piston upward, compressing the gas. This is the compression stroke. The remaining two strokes are firing, a downward movement, and exhaust, an upward stroke of the piston. Those strokes should be borne in mind as they are important in timing the ignition should it be necessary to remove the commutator.

Two valves are fitted to each cylinder, an intake and an exhaust. The former is located easily, being that member in line with the spark plug. The intake valve begins to lift when the piston is moving downward on the intake stroke, and remains open until the movement is nearly completed, and is closed during the succeeding, or compression stroke. The exhaust begins to open slightly before the power stroke is completed.

The cylinders fire 1, 2, 4, 3, and when the piston of the No. 1 cylinder is at the top of its stroke, those of the Nos. 2 and 3 are at the bottom while the No. 4 is at the top. In order to facilitate resetting the timer, the firing order and opening of the valves will have to be considered; that is, if the ignition is not timed by the piston, and the following table, giving the strokes of each cylinder in their respective order, will be of value:

Order of Firing.

Cylinder 1	Cylinder 2	Cylinder 3	Cylinder 4
1—Firing	Compressing	Exhausting	Intaking
2—Exhausting	Firing	Intaking	Compressing
3—Intaking	Exhausting	Compressing	Firing
4—Compressing	Intaking	Firing	Exhausting

When the piston of the No. 1 cylinder is at or near the top of the compression stroke, a spark is supposed to take place at the gap of the spark plug, igniting the mixture, producing a pressure against the piston and driving it downward. At the same time the piston of the No. 2 cylinder moves upward on its compression stroke. No. 4 cylinder is drawing in a charge, while the No. 3 is exhausting, as will be noted by the table.

A separate and distinct spark takes place in each cylinder in the following order, 1, 2, 4, 3. This is accomplished by a device known as the timer or commutator which is attached to the shaft operating the valves. This timer has four insulated terminals, each corresponding to the same numbered cylinder. The interior of the timer is fitted with a fibre ring, a nonconductor of electricity. Inserted in the fibre, 90 de-

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grees apart, are metal blocks, the surfaces of which are flush with the fibre.

Attached to the camshaft is an arm carrying a roller, and both of these members rotate at camshaft speed, which is one-half that of the crankshaft. The timer proper is loosely mounted and may be moved in either direction for advancing or retarding the spark. It may be compared to a switch in an electric bell system. When the metal roller comes in contact with a metal block in the fibre, the primary circuit is closed and current will flow, but the connection will be broken when the roller comes in contact with the fibre. The roller rotates to the left, when facing the radiator, and makes contact with blocks, 1, 2, 4, 3, respectively, the firing order of the cylinders.

Function of Coil.

The magneto develops a low-tension current, and this electricity is built up or strengthened to force the current to jump across the gap of the spark plug. This is accomplished by the windings in the coil, a primary and a secondary, of coarse and fine wire, respectively. On the top of each unit of the coil is a flat strip of metal carrying a platinum point and directly over a core of iron wires. An adjusting screw is also fitted with a platinum point in contact with the other member. The coil also carries a switch which closes the magneto or battery circuit. It is explained that for electricity to flow a path must be provided for it to leave its source of supply, as well as one for returning. With the motor car but one wire is necessary as the metal of the frame, etc., is utilized as one lead and is known as the ground.

Direction of Current.

When the lever of the switch coil is thrown to "magneto," and the latter is operating, current is being developed, and a circuit is completed when a contact is made at the timer by the roller. The electricity then flows through the No. 1 wire, for example, on the timer. This wire is insulated and the current travels to the No. 1 unit of the coil where it is built up into a high-tension.

The vibrator is drawn down by the iron core or magnet, breaking the circuit, and for each contact of the platinum points a spark is produced at the gap of the plug. This secondary or built-up current is led from the coil by a heavy insulated wire to prevent leakage, and in reaching the plug passes down the metal electrode, which is insulated from the base of the plug and jumps across the gap to the shell. The latter being of metal and in contact with the cylinder, a return path is provided for the current by the way of ground or metal back to the generator or battery. Thus it will be noted that there are two circuits, a primary and a secondary.

Wiring Diagram.

The arrangement of the components of the ignition system is depicted at Fig. 2 A, which also outlines the timer. The sketch shows the connections of the coil on the back of the dash and it will be noted that these are numbered 1, 2, 3, 4, both for the primary and secondary wires. The leads to the plugs are similarly marked. It will be seen that the 1, 2 and 3 wires from the timer lead to the corresponding terminals of the coil, but that the third contact to be made at the timer is connected to the No. 4 terminal of the coil, this arrangement being necessary to bring about the firing order, 1, 2, 4, 3, as previously explained. The fact that No. 4 cylinder fires ahead of the No. 3 is confusing to the amateur in locating troubles and when rewiring the timer.

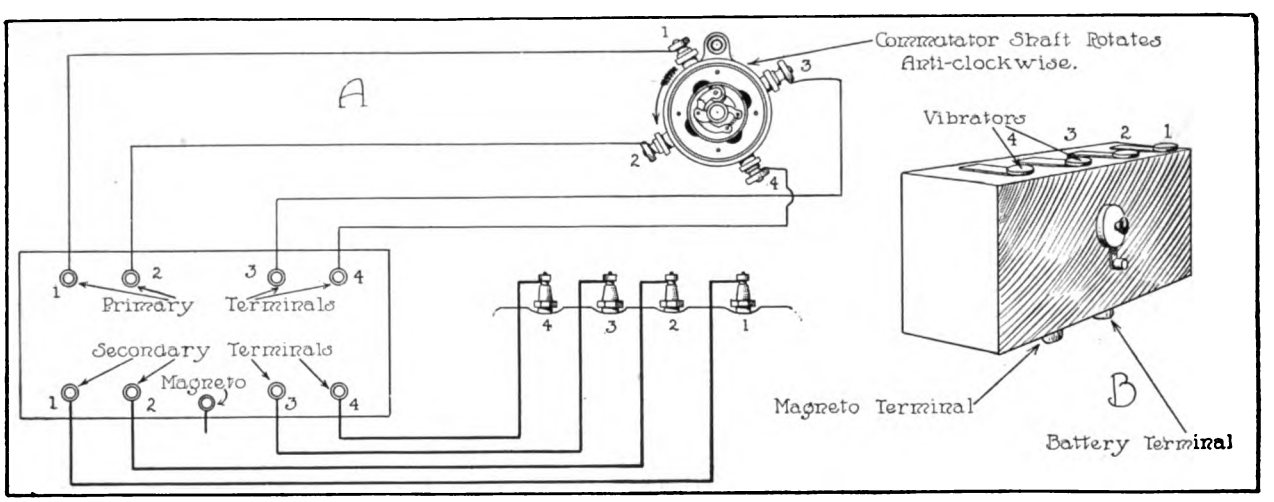


Fig. 2—Outlining Ignition System of Model T Ford: A, Showing Primary and Secondary Leads; B, Depicting Vibrators of Coil Corresponding to Numbered Spark Plugs.

Locating Missing Cylinders.

There are several practical methods of locating which cylinder is missing explosions. The coil may be utilized and B shows the vibrators, these being numbered 1, 2, 3, 4, corresponding to the plugs in the cylinders. The cylinder nearest the radiator is designated as the No. 1. By holding down with the fingers, vibrators 4, 3, 2, with motor running, current will be

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cut off to all cylinders except the No. 1, and if the plug or coil be at fault the motor will stop. The other cylinders may be tested in a similar manner. If upon screwing down the adjusting member, the vibrator

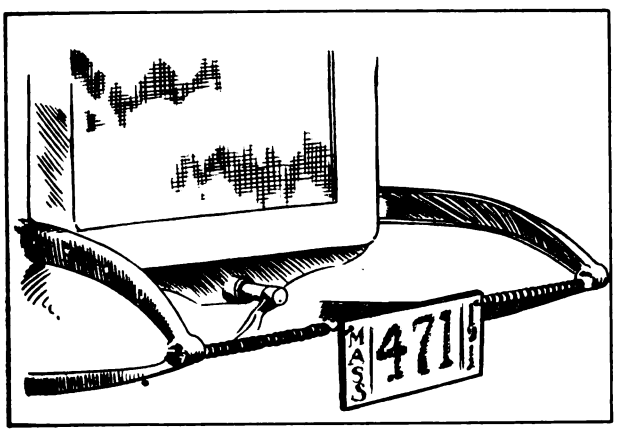


Fig. 3—How License Plate May Be Suspended by Coiled Springs.

buzzes, the fault is likely to be due to the plug which may be examined and replaced by a new one if necessary.

Another method is to short circuit the plug with a screw driver, taking care to utilize a tool having an all wood handle, else one is likely to receive a shock. The metal of the instrument is used to make a connection between the cable terminal and some convenient metal of the motor. This should be done with the cut-out open so as to note by ear the explosions. The spark may be tested in a similar manner by holding the point of the screw driver about .25 or .5 inch away from the cylinders with the other part of the tool in contact with the cable terminal. Still another method, which is more troublesome, however, is to loosen the binding nuts of the spark plugs and take one wire at the time, holding it near metal and noting if a spark jumps the gap. Each wire may be tested in a similar manner.

Testing with Dry Cells.

When the car is equipped with a set of dry cells, the locating of ignition troubles is somewhat easier because there is a constant supply of current with the motor inoperative. Each plug may be examined by turning the motor until a contact is made at the timer for the cylinder in question and with the plugs out and laid on the cylinders, the condition of the spark may be ascertained easily. Care should be exercised to see that only the shell of the plug comes in contact with the metal and not the terminal or exposed portion of the wire.

A simple way of making the contact at the timer is to utilize a screw driver as depicted at Fig. 1 C. This makes a connection similar to that by the roller and contact members. If the coil buzzes with the motor idle, turn starting handle slightly to break contact at timer. The coil may also be tuned by connecting a wire to any metal of the car and placing the other end on the primary connection of the coil and adjusting the screw.

Adjusting Coil.

The coil is adjusted by turning down or up the screw member and when the cylinder does not fire evenly and strongly the screw should be turned down slightly until the explosion is snappy. The contact should be light—just enough to bring about the desired explosion at slow speeds for the voltage of the magneto increases with the speed of the car. The coil should always be adjusted at low speeds. Too severe contact will result in burning the platinum and when this condition exists considerably more current is utilized as the burnt metal sets up resistance.

It is poor policy to use a file to clean these points which require attention from time to time. It is not essential to remove the screw or vibrator for this work and at Fig. 1 is shown a simple method of cleaning and truing the points by the use of the finest emery paper. A narrow strip is utilized and placed between the point adjusted so that they just grip the paper. The latter is then grasped at A A and moved back and forth, taking care to keep the paper in a horizontal position. The paper is then reversed and the lower point treated, after which the unit is adjusted. This saves removing the parts, a task the novice should not attempt.

Wiring Troubles.

The wiring system of the car is very simple and should the wires become broken or removed, they may be replaced easily by following the wiring diagram outlined at Fig. 2. Should it become necessary to rewire the timer the operation will be simplified by noting that the roller and block of the No. 1 terminal are in contact as shown in the drawing. The replacing of the remaining leads will be an easy matter.

If the timer be removed, and the motor cranked by accident so as to change the position of the rotating camshaft, the ignition will have to be retimed. Several ways are suggested but a simple method is to bring the No. 1 cylinder up on the compression stroke, remove plug and insert finger, noting if the

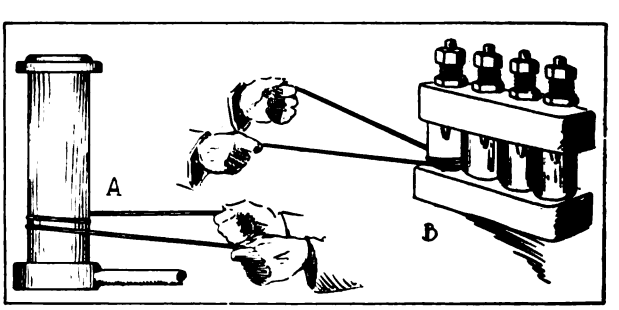


Fig. 4—Method of Cleaning Glass Oil Gauge Tubes with String.

piston is at the top of the stroke, or dead centre. The timer is then replaced with contact being made by the No. 1 block of the timer with the roller. This is the member at the left of the portion to which the

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lead rod connection is attached. The No. 2 is the next to the left and so on.

The correctness of the leads may be ascertained readily by testing with a screw driver if batteries are installed in the car. From time to time the commutator should be washed out with gasoline or kerosene and refilled with a fresh lubricant. If by accident any one of the primary wires to the member should become broken within the carrying cable, it can be located by the same test as conducted with the screw driver. By keeping the contact points of the coil clean and adjusted properly the car will run smoothly and sweetly, developing its maximum efficiency provided the other components of the power plant are performing their proper function.

SUSPENSION OF LICENSE PLATES.

In most states the law requires the display of two license tags, one at the front and the other at the rear. Some motorists object to drilling the metal body or fender for fastening the rear number and although devices are made for securing the tag to the tail light bracket these involve expense. A simple and inexpensive method of suspending number plates is depicted at Fig. 3 and as will be noted, consists of two spiral springs one end of which is hooked into the number tag and the other extremity secured to the spring bolts. The springs should be substantial and considerably shorter than the distance between the frame so that the plate will be held securely and prevented from swinging.

CLEANING GLASS OIL GAUGES.

Many oiling systems of the motor car include a tube-like gauge of glass which is utilized to denote the amount of lubricant being fed by the system or the quantity in the container. Where these members are exposed they accumulate dust and dirt, making it difficult to note at a glance whether the oil be dropping or the amount registering.

Many owners of the model T Ford fit a gauge to the crankcase and as it is exposed, it collects dirt. While the centre may be cleaned easily the lower portion is more difficult. At Fig. 4 A is presented a suggestion for removing foreign elements when a cloth fails. It consists of taking a coarse, soft string and making a couple of turns around the glass, drawing one end of the twine and then the other, imparting a sawing motion as outlined in the sketch. If the string be soaked in gasoline, the incrusted deposits will be removed easily.

Where sight feeds are fitted to the dash such as shown at B, it is impossible to get back of these members with a cloth when cleaning. The string kink may be utilized, employing a piece of fine wire attached to one end of the twine to enable the material to be passed around the tube.

AFFORDING AN AUTOMOBILE.

The question as to those who can afford an automobile was considered recently by R. C. Hupp, of the R-C-H Corporation, Detroit. He emphasized the fact that the horse does less and poorer work, but is never called extravagant, adding: "As far as I know a man always bought a horse because it was a profitable investment. Why an automobile should be purchased for any other reason is a mystery."

According to Mr. Hupp, anyone who can afford a horse can afford an automobile, and in fact should purchase one and save money. A machine is more economical than the horse on account of the greater territory which can be covered. A light car can be operated over 1000 miles of ordinary roads a month at a cost of $10 for oil and gasoline, with a total expense account of $20, including tire expense and interest on investment. Few horses cover 700 miles a month, and cost at least $25 for feed and shoes, without considering interest and depreciation, which latter would amount to a large item for a horse driven 25 miles a day.

RAYFIELD IN CONTEST WORK.

The Rayfield carburetor, made by the Findeisen & Kropf Manufacturing Company, Indianapolis, Ind., is quite popular with racers, who appreciate the importance of the carburetor in contest work of all kinds. The list of race winners discloses many drivers who use the Rayfield, no matter what car they drive, included among whom may be mentioned: Disbrow, Nikrent, De Palma and Mulford. In economy and reliability contests the member is prominent, cars equipped with it showing marked efficiency. In the recent Quaker City Motor Club gasoline economy contest, the winning American used a Rayfield, and scored 9.63 points out of a possible 10, by making a little under 23 miles to a gallon of gasoline. In the reliability event six Case cars which finished without penalty carried the Rayfield, and Mrs. D. W. Harper, who captured the Women's Prize, used one on her Case.

CLEVELAND AUTOMOBILE COUNTRY CLUB.

The Cleveland Automobile Club, composed of prominent motorists of the Ohio city, has formed the Cleveland Automobile Country Club, and secured for a clubhouse the Dover Bay Park hotel, situated on a bluff overlooking Lake Erie, 12 miles from the city. The grounds are large and pleasant, and the proximity of the lake gives opportunity for water as well as land sports. Cottages may be rented, or rooms secured in the clubhouse, and it is expected that the local motorists will avail themselves of the opportunity to secure all the pleasures and benefits of a country club at small cost.

Advocate uniform motoring laws in the interests of pleasant and profitable interstate touring.

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PRESERVING CRAWFORD NOTCH.

The State of New Hampshire is to be commended and the people of the United States to be congratulated upon the action of Gov. Robert P. Bass in taking the initial step toward the acquisition by the commonwealth of Crawford Notch, one of the most famous beauty spots in America. Thousands of motorists have taken advantage of the liberal touring laws in New Hampshire to visit all sections of the White mountains and are thoroughly familiar with the particular charm of this locality.

The step has not been accomplished without considerable effort. Gov. Bass was hindered at every turn by a number of large timber concerns, who refused to set any price upon their property and were actively at work destroying the natural beauty of the place by felling the big trees on the wooded slopes. Appeal was made to the supreme court, which tribunal has just handed down a decision in favor of conservation.

As a result, a commission will be appointed to go over the property and assess damages upon it. The state will begin surveys at once, and the commission will make the award, after which the property will be acquired and saved to all time for the people. The motorists of the entire country will be under a debt of gratitude to Gov. Bass, which will not soon be forgotten.

WIRE VS. WOOD WHEELS.

For some time past there has been a growing tendency to revive the old discussion concerning the respective merits of wire and wood wheels. While there has been some effort to create the impression that satisfactory wood for the purpose was becoming scarce, this contention has been denied vigorously by those who are perhaps in the best position to know. However, the situation has been sufficiently acute to warrant investigation of the advantages claimed from the use of wire members.

Across the water, the wire wheel not only has held its own but has been growing steadily in popularity. It is quite significant that many of the American cars sold in these foreign countries are thus equipped either by the agents or by the owners directly after purchase. It is claimed that a majority of the machines entered for the Grand Prix in France next month are to be fitted with wheels of this type.

And this brings up the fact that at least one car entered for the 500-mile race on the Indianapolis speedway, Memorial Day, is to be fitted with wire wheels. Perhaps no better object lesson could be devised than will be provided as a result of this test, and there is every reason for believing that the outcome of the experiment (for such it must be regarded) will be watched with interest by the great body of American motorists, as well as the motor car manufacturers.

OPENING OF GLACIER PARK.

It is indeed welcome news that the United States government has decided to open Glacier national park in Montana to automobile traffic under suitable restrictions. If this action presaged a similar decision with respect to Yellowstone national park, the motorists of America would be still better pleased.

Now that a step in the right direction has been taken and a precedent has been established it will be more difficult than ever for those in authority to explain to the satisfaction of automobile owners and users the necessity for forbidding these vehicles in

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other national preserves. The argument that was raised, with respect to the animals which would be frightened, cannot be expected to hold, since there is every reason to believe that the animals in Glacier park are just as primitive as those of Yellowstone park.

It has been pointed out, time and again, that one of the things which has prevented the popularization of transcontinental touring in this country has been the failure of the United States government to lend its aid in opening up the beauty spots to automobile traffic. America has just as many attractions as Continental Europe, and one of the principal reasons why Americans do not "See America First," is because they have not been encouraged to do so by those whose first duty it should be to lend every material aid. It is to be hoped that the opening of Glacier park marks the beginning of a new era in this regard.

A DANGEROUS PRACTISE.

While there is every reason to believe that their number is decidedly limited it is nevertheless a fact that there exist certain experienced motorists who find great pleasure in the discomfiture of new owners whom they meet upon the road. One of the favorite amusements of this class is to run directly in the middle of the highway until almost in front of the other car before suddenly turning to the right and just clearing the novice's machine. This is a decidedly dangerous practise, largely because of the possible failure of a steering gear or some other important part of the steering mechanism, in which event the probability of a serious accident is decidedly in its favor.

In this connection it may be remarked that the old time courtesy, which was accorded by one motorist to another whom he might meet in trouble on the road, is fast becoming a lost art. It ought to be unnecessary to suggest that an offer of assistance costs nothing and means a great deal under certain conditions.

MASSACHUSETTS STILL HESITATES.

The latest advices from Massachusetts indicate that the legislators are thoroughly undecided as to what they should do with the proposed radical legislation which has been laid before them. The propositions to increase the registration fees under a scheme which seems to offer no reasonable features, and to restrict the weight of motor trucks which may be allowed to operate on the public highways have failed to impress either the public or the members of the legislature as possessing sufficient merit to be enacted into law. However, there seems to be no one who has the necessary courage to settle the matter one way or another.

In the meantime, the automobile business is bound to feel the effects of the situation. This applies particularly to the sale of commercial vehicles. Many concerns which may be convinced that they should adopt the modern method of transportation are at a loss to know what to purchase, since it is possible that legislation will be passed at any moment which will make this purchase unavailable for use.

There has been a suggestion that the legislature intended to allow these matters to lie on the table until after a summer recess, or to pass them along to the next session for solution. It certainly is to be hoped that nothing of this nature will occur. Massachusetts cannot help but realize that the automobile industry has reached proportions which warrant better treatment at its hands.

NEED FOR ROAD PATROL.

There is no gainsaying that this has been a decidedly backward spring, but those who have had occasion to utilize the roads, at least over a goodly portion of the East, are at a loss to understand why they should be in such poor condition, when so much money has been appropriated for their care and maintenance. The condition in mind is that in which numerous small holes or indentures are to be noted.

It has been suggested by those who may be presumed to be in a position to understand the need, that the establishment of a suitable road patrol early in the season would obviate the necessity for more substantial expenditures later in the year. Wherever these small holes might be found, the patrol would mark them in some manner, so that the work of repair could be accomplished with little effort and small expense. There appears to be quite as much need for wise administration of the funds now available as for increasing the fees required from motorists.

Several cities are maintaining patrols of the nature suggested, it being the practise of these men to see that the necessary minor repairs are made without delay. If municipalities are able to carry out this plan without unduly encroaching upon the appropriations for road work, it would sem that it might be extended to become a part of the state highway system.

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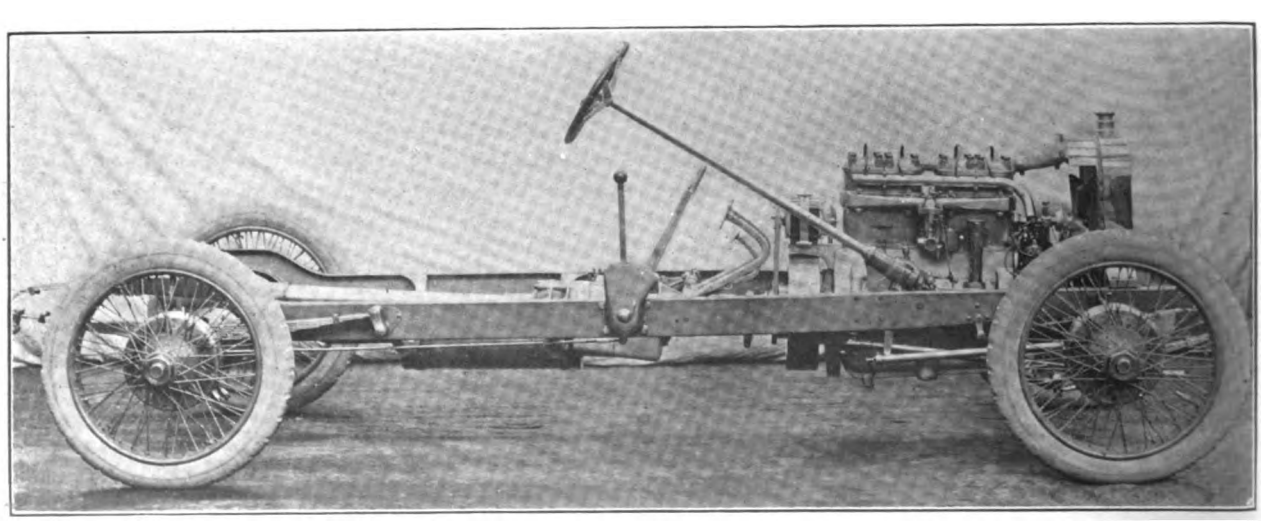
The American public is more than ordinarily interested in the latest product of Argylls, Ltd., Alexandria, Dumbartonshire, Scotland, for the reason that this employs the new Argyll single sleeve motor, which was displayed for the first time at the recent Olympia show in London. Not all of the models manufactured by this concern are thus equipped, the highly efficient poppet valve engine still being retained for several cars made by it. The design shown herewith is termed the Prince Henry in which a sleeve motor of 25 horsepower is utilized.

Accompanying illustrations present the four-cylinder engine completely assembled as well as a vertical cross section through one of these cylinders, from the latter of which the construction and action of the single sleeve may be noted. It will be seen that the crankshaft, connecting rod and piston are of the usual type, the particular features being the single sleeve valve with its specially shaped ports, the corresponding ports in the cylinder and the mechanism for operating the valve.

As is usual in four-cycle engines the sleeve is operated at half the engine speed. The valve actuating shaft B is geared to the crankshaft A by a silent chain and revolves at the same speed. On this shaft B opposite each cylinder is a small worm wheel C, which engages with a disc wheel D, revolving at half crankshaft speed. This disc wheel is carried in a phosphor bronze cage bearing and is fitted with a thrust ball bearing and oil retaining cap, the whole being easily removable.

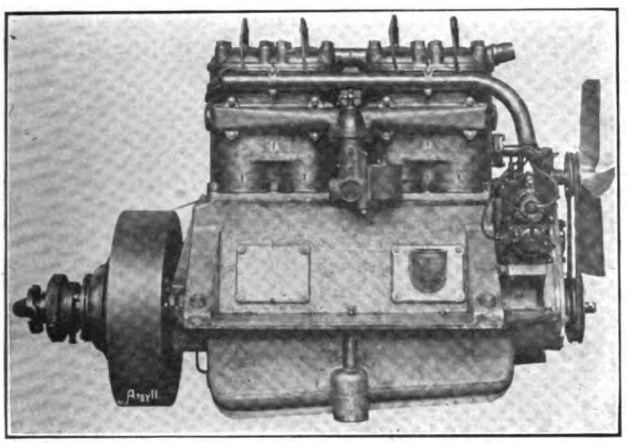
On the face of the disc wheel at a fixed distance from the centre, a hole is bored through the body, and in this hole a pin E is free to work both in and out, as well as to revolve. It also has a flattened end which fits between the jaws at the botton end of the sleeve valve F and is held in position by a fitted bolt passing through a hole in the pin E and corresponding holes in the jaws of the sleeve F.

It will be understood that as the sleeve crank revolves the pin E carries the sleeve with it, so that the latter itself besides travelling up and down also works sidewise in one direction when the sleeve crank is working through the top half of its revolutions, and sidewise in the opposite direction during the bottom half. For example, if a fixed pencil were held against



Twenty-Five Horsepower Argyll Chassis, Fitted with Single Sleeve Motor, Brakes on All Four Wheels, Worm Drive and Demountable Wire Wheels.

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Four-Cylinder Argyll Sleeve Valve Motor Completely Assembled.

the sleeve during one revolution of the sleeve crank, it would be seen that the line so drawn would form an ellipse.

In the cylinder there are six ports, three on each side, those on one side being exhaust members and those on the other inlet. The sleeve has five ports, two being exhaust and two inlet, the odd port acting alternately for admission and exhaust. The cylinder is closed at the top end by means of the head G, which may be described as a fixed piston, having the same diameter as the motor piston and projecting into the cylinder, so that between the cylinder wall and head an annular space is formed in which the sleeve works. A broad spring ring H is fitted in the bottom end of the head.

As the piston begins to go down on the suction stroke, the inlet ports of the sleeve begin to register with those in the cylinder, following the elliptical line, until upon nearing the completion of this stroke, the bottom edges of the sleeve ports are just about to pass behind the broad ring in the cylinder head.

As the piston moves upward on the compression stroke, the sleeve also moves upward, the ports travelling well up behind the ring, until at the highest point of travel ignition takes place. During the downward movement of the piston the sleeve travels with it.

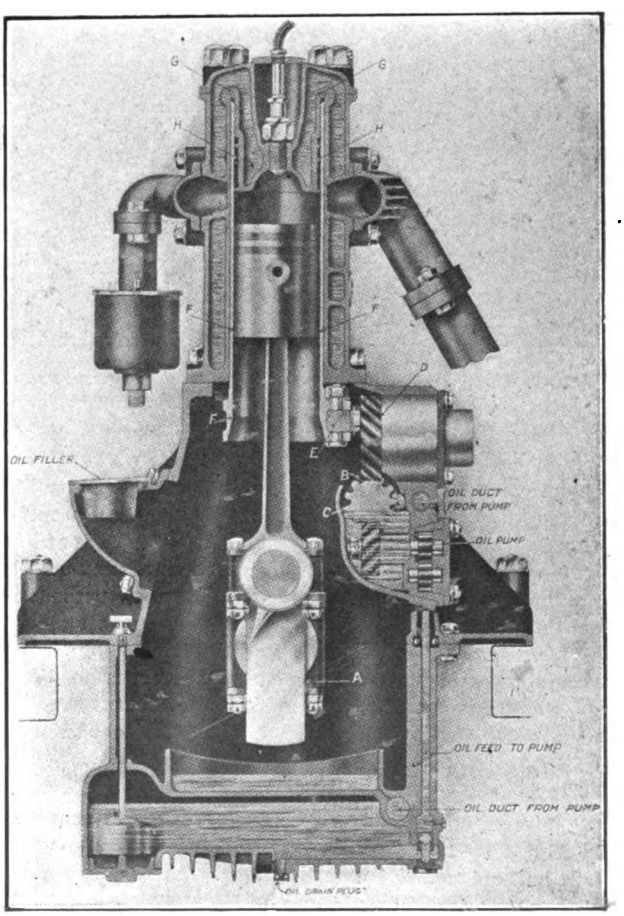
At the bottom of this stroke the exhaust ports of the sleeve have come down past the broad ring and are beginning to register with those in the cylinder. This continues throughout the exhaust stroke, until at the beginning of the suction stroke again, the exhaust ports close and the inlet ports commence to register as previously explained.

It is claimed by the maker that this twisting motion of the sleeve possesses inherent advantages. The sleeve never comes to rest, but is continually in motion in one direction. In addition it is maintained that this action provides for more efficient lubrication, spreading the oil over the entire surfaces with which the sleeve comes in contact.

A shaft running across the front of the motor and driven by a gear from the sleeve driving shaft, operates the magneto at one end and the water pump at the other. The oil pump also is driven at a right angle to this sleeve shaft. There is an oil trough under each cylinder into which the big ends dip, and after performing its functions all lubricant is filtered through a fine wire gauze before returning to the main reservoir.

The clutch is of the flat plate, multiple disc type, running in oil. The transmission provides four speeds forward and reverse. Brakes are fitted to all four wheels, these being operated either by hand lever or pedal. All act together, but compensate diagonally, thereby reducing any tendency to side slip. Springs are semi-elliptic in front and three-quarter elliptic in the rear.

The frame is of pressed steel, channel section, securely braced and gusseted where necessary, having a sub-frame riveted to the cross bar for carrying the engine and gearbox. The front axle is a drop forging. The rear member has been designed to secure absolute quietness. Final drive is by worm, on a full floating shaft, fitted throughout with ball bearings. Detachable wire wheels are standard equipment.



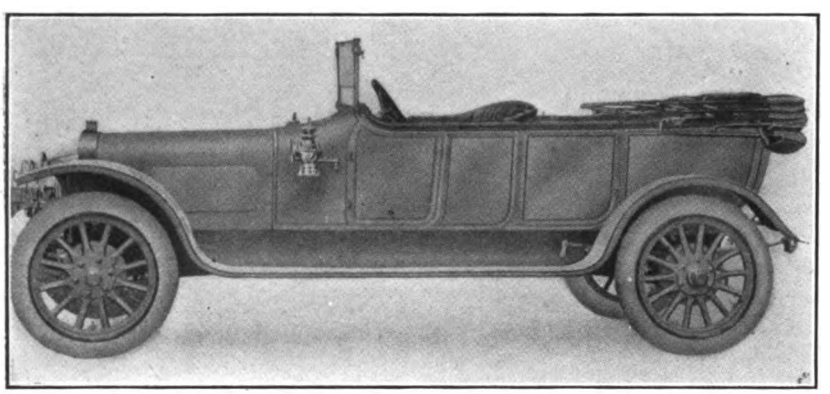
Sectional View of Argyll Sleeve Valve Motor, Depicting Method of Operation.

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According to Consul Jose de Olivares of Madras, India, the advent of the motor vehicle in that vicinity is of comparatively recent date, but within a very brief interval it has supplanted carriages drawn by horses to a great extent. American machines have succeeded in gaining a foothold in the face of much opposition and prejudice, and it is earnestly to be hoped that manufacturers and exporters in the United States will follow up the prestige thus gained by inaugurating an aggressive campaign looking toward the eventual supremacy of the American car in Madras. The consulate is anxious to grant the fullest co-operation, and expects to receive genuine responsiveness on the part of dealers and purchasers throughout the district.

★

The ninth annual automobile and motorcycle exhibition of the Bohemian Automobile Club of Prague was held in that city in April. The Studebaker Corporation, with three cars, was the only American exhibitor, although the Ford agent secured space but was handicapped in the non-arrival of machines. It is understood that there is a splendid market in Bohemia for cars selling at from $4000 to $5000, and that if American manufacturers will take sufficient interest in the opening, it is believed they can supplant those from Italy, France, Belgium and Germany, which now control the field. European makers pay particular attention to the body work, presenting graceful lines, and taking great care in rubbing down and filling before painting. Exterior appearance seems to be considered by the Bohemians to be of greater importance than mechanical features. The next exhibition will be held during the second week in April, 1913.



Twenty-Five Horsepower Argyll Prince Henry Type Car, with Seating Capacity for Five Persons.

★

Several entries have been filed for the international Alpine tour of the Austrian Automobile Club, which will be held in July, among them being the following: Prince George, Graf; Duke of Brunswick-Luneburg, Stift; Prince Elias of Parma, Austrian Daimler; Count Alexander Kolowrat, Laurin-Klement; Count Draskovitch, Laurin-Klement. Both princes will drive their own machines. As yet, there does not appear to have been much interest awakened in the event outside of Austria, but it is anticipated that several countries will be represented, including the United States.

★

Arrangements have been completed for the annual summer visit of the Institution of Automobile Engineers in Great Britain to Paris, June 20-22. Some 75 members of the organization have signified their intention of making up the party, which will proceed in two sections, one by way of Calais and the other by way of Dieppe. The headquarters of the institution will be at the St. Lazare Terminus hotel, from which motor 'buses will convey the members of the party to the various works to be inspected, including the following: Mors, Gnome, De Dion-Bouton, Bleriot, Darracq, Gobron-Brille, Panhard, Lavasser and Deperdussin.

★

F. Leslie Bruford, secretary of the Automobile Club of Victoria, Ludstone Chambers, 352 Collins street, Melbourne, Victoria, Australia, announces plans for a motor car display in the Exhibition building at Melbourne, in the near future. Applications are now being received for show space. This notification has been made with the idea of giving American manufacturers and agents sufficient opportunity to make arrangements for being well represented. Cars produced in the United States are extremely popular in that territory, and it is hoped that full advantage will be taken of the opportunity afforded. Mr. Bruford will be glad to take up the matter with those who make application for space.

★

Royalty has given its official sanction to the Knight type of motor, several reigning sovereigns having made purchases of cars thus equipped as follows: King George of Great Britain (six), Czar Nicholas and the Empress Dowager of Russia, King Alphonse of Spain, Emperor Mushito of Japan (three), Duke of Sparta, Crown Prince of Sweden, Grand Duchess of Vladimir, Duke of Connaught and seven maharajahs of India.

Panhard & Levasser of France report an increase in production of nearly 100 per cent. for the fiscal year ending May 1. The Minerva Motor Company in Belgium says its only difficulty is in producing the cars fast enough to satisfy the demand. The English Daimler concern reports that more than 7000 Knight-Daimler cars have been sold by it.

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An accompanying illustration presents the Sizaire-Naudin car, designed by Georges Sizaire for the

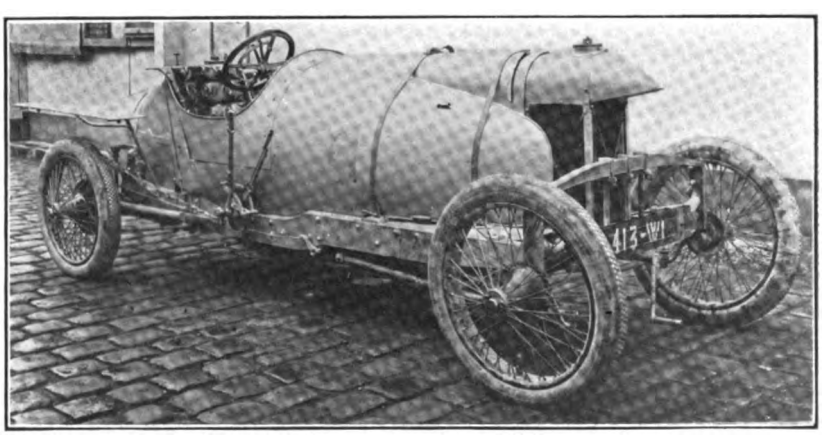
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French Grand Prix over the Dieppe course in June. The machine offers a number of unusual features, the entire design and construction being with a view to reducing wind resistance to an absolute minimum. Perhaps no one detail stands forth more prominently than the novel radiator.

When seen at first glance this appears to be in two parts, the first taking the form of a reverse V, while the second is a horizontal tubular member placed across the front of the car. This latter, however, is for the purpose of cooling the lubricating oil. The reverse V construction has been carried out with the idea of collecting the rushing air and forcing it to lend its maximum aid in cooling the motor.

The water compartment is on top, extending toward a sharp point at the front, and it will be noted that the filler cap is of ample proportions. The fuel tank is located behind the seat, and this portion of the body also is of pointed design.

The front spring suspension is decidedly unique, the spring itself being carried well above the axle, and nearly midway between the top and bottom of the vertical radiator. The wind resisting fenders over the rear wheels are also worthy of note. Detachable wire wheels are employed as will be true of all French cars entered in the event, with the exception of the Delages. Similar equipment will appear on the Spanish Hispano-Suiza, German Mathias, and British Vauxhall and Calthorpe entries.



Sizaire-Naudin Entry for French Grand Prix over the Dieppe Course in June.

★

Toronto, Can., is to have a new automobile factory, a company having been organized in that city to manufacture a six-cylinder car. The new concern is to be capitalized at $200,000, and a factory will be erected at a cost of $55,000. Canadian products will be utilized exclusively with the exception of the frame, front axle and wheels. The company will consist of Norman Allen, Herbert Hall, J. S. Saunders, Walter Reeves and Peter Lawson.

INDIANA PLANS TRAVELLING SHOW.

The Indiana Automobile Manufacturers Association of Indianapolis is considering the project of a travelling automobile show of Indiana made cars. The plan, as outlined by President J. J. Cole of the Cole Motor Car Company, calls for a special railroad train carrying the exhibit of each company and show tents in which to display the cars, so that the affair takes on the aspect of a circus. It is possible that the plan may be tried out in the fall, when the 1913 models are ready.

Motorists should see that their individual states require lights on all vehicles using the highways at night.

HAVOLINE OIL PATHFINDER STARTS.

The pathfinder of the Havoline Oil Company, New York City, recently started out on a tour of the New England states and the Middle West to gather data for the second edition of the Havoline touring book. Reports are being sent daily to the Automobile Club of America as to the road conditions. It is expected that a great deal of valuable information will be collected and published in the Havoline book.

ORPHAN'S AUTOMOBILE DAY ASSOCIATION.

The annual meeting of the Orphan's Automobile Day Association of New York, Inc., was held recently and officers elected for the coming year as follows: President, Mrs. J. D. Smith; vice president, W. J. Morgan; treasurer, W. C. Poertner; secretary, A. J. Inderrieden; acting secretary, Mrs. D. C. Stidham. The annual outing of this association, when a large number of New York's orphans are taken for an automobile trip, has become one of the features of the trade at the metropolis, and is supported by private owners, dealers and manufacturers as well. Plans are being prepared for this year's event, and already a number of cars have been placed at the disposal of the association, including those of the following makes: National, International, LaFrance, Bergdoll, Pope-Hartford, Mitchell, Knox, Metallurgique, Winton, Case, Warren, Cunningham, White, Stevens-Duryea, Abbott-Detroit, Chalmers, Lozier, Oldsmobile, Havers, Oakland, Palmer-Singer and Marquette.

KEATON PLANT FOR DETROIT.

The plant of the Keaton Motor Car Company, which was recently organized by F. M. Keaton and William Houck, is to be located in Detroit, arrangements having been made to obtain a factory there. It is planned to make 1000 cars this year, based upon the Renault design.

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CORRESPONDENCE WITH THE READER

The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Acetylene Mixture.

(1373)—I understand from the correspondence column of your most valuable Journal that acetylene absorbed by gasoline gives a more powerful explosive mixture than gasoline alone. I would consider it a very great favor if you will inform me of a simple method of obtaining this mixture. LOUIS ENGEL, JR.

Philadelphia, Penn., May 18.

Regarding the mixing of acetylene and gasoline the article dealt with probable dangers of the two products uniting or mixing with air in a closed room, or a garage, and being ignited by a flame. A certain authority holds that such a mixture would produce a more powerful explosion than a gasoline vapor.

As far as the writer can ascertain a mixture of acetylene and gasoline is not utilized although it was stated in the article that the former could be carbureted; that is, mixed with air in a special device and transferred to the combustion chamber in the usual manner. In some self-starting devices it is claimed that the engine may be operated by the equipment until the supply from the tank becomes exhausted.

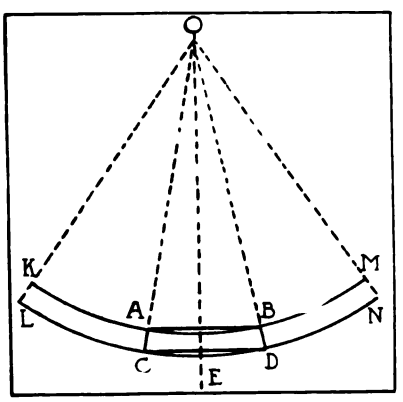


Fig. 1—Working Diagram for Cutting Lining for Cone Clutch.

The proper acetylene mixture is 10 parts of air and one of the gas. This is brought about by a mixing valve incorporated between the tank and cylinders. There are several upon the market which perform this function automatically. While by experimentation one of these members could be made it would be better to purchase one, as considerable time and expense would be saved in the installation.

Slipping Clutch.

(1374)—I have a model 38 Overland which I have operated less than 3000 miles. I cannot tighten the high speed clutch any more. It continually slips, and the pedal won't stay in high. It is the planetary type transmission. Could you inform me how to remedy it? Would it take an expert to replace a part that might be causing the trouble? GEORGE S. MARSHALL.

Basehor, Kan., May 12.

The slipping of the clutch is due to operating with the member improperly adjusted and the wear to a lack of lubricant. The best method would be to disassemble the transmission and examine each part carefully. A new plate probably will be required, but this may be determined by inspection. Unless one is familiar with the work it is best to have the repair attended to by a capable repairman. If there is an Overland agent convenient he will be able to locate the trouble and give an estimate as to the cost of the repair.

Storage Battery Plates.

(1375)—Being a subscriber of The Automobile Journal I would like to be informed regarding the Faure type of storage battery plates utilized for electric lighting of the motor car. What I wish to ascertain is whether the active material, oxide of lead, applied in a paste form is the same for both the negative and positive plates, and how these members may be distinguished.

J. WALLER.

Brooklyn, N. Y., May 14.

In the Faure or pasted type the lead plates are coated with minium or litharge made into a paste with acidulated water. When the material is dry these plates are placed in a bath of diluted sulphuric acid and subjected to the action of a current, by which the oxide on the positive plate is converted into peroxide, and that on the negative reduced to finely divided or porous lead. The positive plate may be distinguished easily by its color, being a brown or a chocolate. The negative is a light gray. Ignition batteries are not practical for electric lighting because of their low discharge rate. A lighting battery, however, may be utilized for ignition purposes.

Relining Cone Clutch.

(1376)—As a new subscriber to your valuable publition, am taking advantage of your offer, published in the last issue to aid owners in making repairs to their cars. I purchased a second hand machine and am having trouble with the cone clutch. The repairman informs me that it requires a new lining because the old one is worn out. Would like to do this work to save expense of repair bills. NEW OWNER.

Portland, Me., May 17.

The simplest way of releathering the clutch is to remove the old member and utilize it as a pattern. When this is not possible the following method may be employed: Take a large sheet of paper and draw a side elevation of the clutch cone as outlined at Fig. 1.

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A, B, C, D. Produce the lines A—C and B—D, until they meet at the point O. Next draw the centre line O—E. With the centre O and radius O—C, describe an arc L—N, and with radius O—A, describe another arc K—M.

Next, measure the largest circumference of the cone. For example: Suppose the circumference of the cone to be 60 inches. On a pair of dividers take a distance a small fraction of this, say one inch. From the point E where O—E cuts the larger arc, lay off round the arc this dimension 30 times in the same direction. This will give the point L. With the centre E and radius E—L mark off the point N. Join L and N to centre O. Then K, L, M, N will be a figure the same shape and dimensions as to be cut. Cut out of the paper the figure K, L, M, N, and use as a pattern from which to cut the leather. This pattern can then be marked and utilized when necessary in the future.

The clutch leather should be left about .25 inch short and the two ends riveted to the cone first so that they butt against each other. The leather is then soaked with hot water and stretched onto the cone, in much the same manner as a pneumatic tire is fitted to a rim. As the leather dries it will shrink tightly into its place. It is then secured by copper rivets, care being taken to see that the heads are well below the surface of the leather. The cone is next mounted on a lathe and the material trued up. In fitting the leather it is best to mount it with the shiny side of the material next to the cone.

After the clutch has been replaced it should be soaked liberally in oil and during the first 50 or 100 miles be well lubricated. It is essential that the leather be kept soft and pliable as when it becomes hard it is apt to burn or char when slipping.

Vibrator Inoperative.

(1377)—What is the cause of failure to start from the switch of a Bosch type of dash coil such as employed on the Marion car? I can start on the batteries by cranking, but when I push down the button on top of coil there is no buzz and the motor won't start. A set of batteries lasts but a short time. Was informed by a repairman that the coil was short circuited and was advised to ship it to the Bosch company for repairs.

A READER.

Providence, R. I., May 11.

It is evident that a short circuit exists. The best plan would be to remove the coil, an operation accomplished by unscrewing the cap, which will permit the withdrawal of the coil proper, and send it to the maker. The Bosch Magneto Company maintains a service station at Boston near the Motor Mart. Perhaps it would be advisable to drive the car to Boston and have the ignition system inspected thoroughly.

Water in Acetylene Pipes.

(1378)—Am driving a model T Ford and operate a good deal at night. The gas lamps give me considerable trouble, and although I blow out the pipes and clean the burners, they do not stay clear. Is there any way the trouble can be cured, or will a new generator be necessary?

FORD.

Topeka, Kan., May 12.

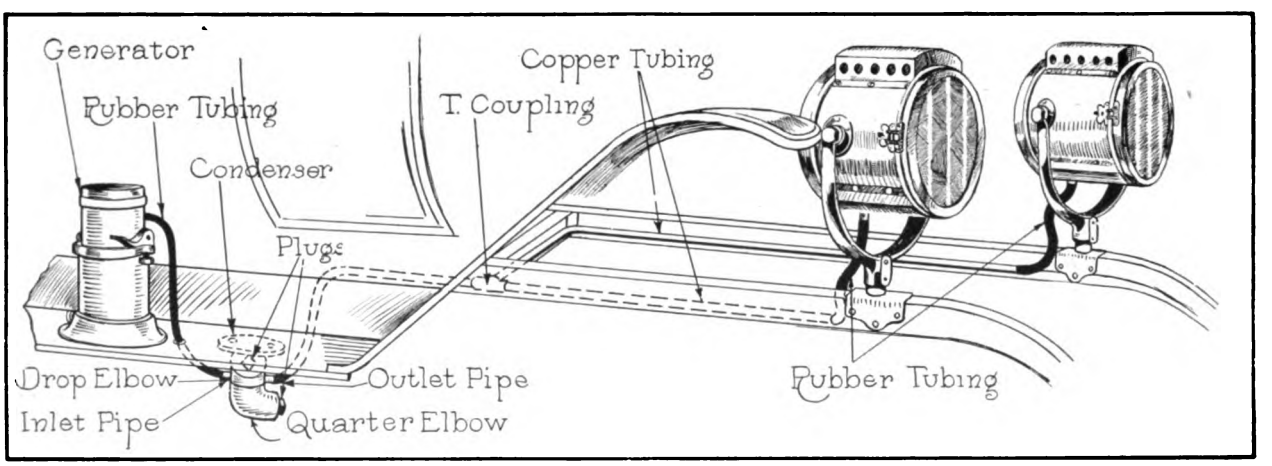


Fig. 2—Inexpensive Device for Catching Moisture in Piping of Acetylene Lighting System Utilizing a Generator.

To ascertain if the fault be that of the generator, examine the deposit in the bottom of the vessel and if it be dry it denotes that the device is operating properly. If the material be wet or soggy, and the lights continue to burn for some time after the generator is shut off, it shows that the latter is not working properly and that the water is not feeding as it should to the carbide.

In the case referred to the trouble is more apt to be due to the presence of moisture in the tubing because of condensation. This usually occurs in the first 12 inches or so after the gas leaves the generator and consequently the pipe and rubber connections should slope directly downward to the lowest point in the system and continue a foot or more in order to drain any possible moisture toward the generator instead of in the direction of the lamps.

At Fig. 2 is reproduced a drawing from the Aug. 26 issue of The Automobile Journal, which illustrates a method of incorporating a water trap for retaining any moisture that may be present in the system. It is constructed easily and is inexpensive as the material

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may be procured readily from almost any plumber.

It consists of a drop elbow with a male thread, quarter-elbow and two plugs. The drop member has a flat flange perforated for screws and is attached under the running board as shown in the drawing. The quarter-elbow is screwed to this and plugs utilized to close the openings. The former is tapped and threaded to take a connector and a .25-inch copper tubing to which is attached the pipes leading from the generator to the trap, and thence to the lamps. All moisture will collect in the trap and can be removed easily by unscrewing the lower plug. A petcock may be installed if desired, in place of the plug member. As the trap will hold considerable water, and will require emptying occasionally, the device will answer all purposes as well as being cheaper than ready made water traps. The method of installation is also suggested in the diagram.

Stress and Strain.

(1379)—Am a reader of your magazine and notice the reference to torsional and tensional strains and stresses, and that a certain part is made to take care of these. Will you kindly explain what is meant by the terms?

INFORMATION.

Cisco, Tex., May 19.

There is some difference of opinion among writers as to the definition of these terms. An external force applied to a body, so as to pull it apart, is resisted by an internal force, or resistance, and the action of these forces causes a displacement of the molecules, or deformation. Some writers call this a stress, and the internal force a strain. Others hold a reverse opinion. Some authorities never use the word "strain" in their writings to avoid confusion.

Merriman states: "A stress is a force which acts in the interior of a body, and resists the external forces which tend to change its shape. A deformation is the amount of change of shape of a body caused by the stress. The word 'strain' is often used as synonymous with stress and sometimes it is also used to denote deformation."

Stresses are of different kinds such as tensile, compressive, transverse, torsional and shearing. A tensile stress or pull, is a force tending to elongate a piece. A compressive stress or push is a force tending to shorten it. A transverse stress tends to bend it. A torsional stress tends to twist it. A shearing stress tends to force one part of it to slide over the adjacent part. Tensile, compressive and shearing are called simple stresses. Transverse stress is compounded of tensile and compressive stresses, and torsional of tensile and shearing. To these five varieties might be added tearing stress, which is either tensile or shearing, but in which the resistance of different portions of the material are brought into play in detail, or one after the other, instead of simultaneously, as in the simple stresses.

Lengthening Valve Stems.

(1380)—I read in a motor publication that valve stems which had become worn and were not adjustable could be lengthened by placing on an anvil and hammering. I understand the ends are hardened and if the temper is drawn for drawing won't the metal have to be rehardened? L. E. MOWRY.

St. Albans, Vt.

The ends of the stems are hardened and if the temper be drawn will have to be retempered. In drawing a valve stem care should be exercised not to bend it and the drawing should be at a point above the cotter pin hole and not at that portion that enters into the tappet member. While the writer has lengthened these members requiring but a slight increase, it is advisable to have it done by a blacksmith or some one familiar with the work.

Phosphor Bronze.

(1381)—What is the difference between phosphor bronze and any other bronze? INQUISITIVE.

Hannibal, Mo., May 18.

Bronze is an alloy of copper and tin with small proportions of other elements. In the year 1868, Montefiore & Kunzel of Liege, Belgium, found by adding small proportions of phosphorus or "phosphoret of tin or copper" to copper that the oxides of that metal, nearly always present as an impurity in more or less quantity, were deoxidized and the copper much improved in strength and ductility, the grain of the fracture became much finer, the color brighter, and a greater fluidity was attained. The different bronzes are produced by combining different alloys such as silicon, aluminum, etc.

Timing the Spark.

(1382)—I have an 1908 Oldsmobile roadster with a storage battery, coil and timer for ignition. The motor will not throttle down and I have closed the carburetor throttle as much as possible but it does not improve it as I wish. I cannot advance the spark very far without the engine knocking. Sometimes with the spark advanced a trifle I get a kick from the starting handle when cranking slowly. What is the cause? L. L. M.

Deming, N. Mex., May 10.

The ignition timing is too early; that is, the spark takes place before the piston comes to the top of the compression stroke. This accounts for the motor racing. It is easily remedied. Loosen locking nut or binding screw of commutator or timer on shaft and move arm with roller contact block back; that is, in a reverse direction to that in which it rotates when the motor is running. Try about a .25 inch, relock nut and start motor. If the latter does not throttle enough, set the roller back a slight distance and repeat until the desired speed is accomplished. This lateness of spark will be offset when the motor is running by the amount of the advance of the spark lever.

The Parrish Manufacturing Company, which has been manufacturing car frames in Reading, Penn., is to erect a plant in Detroit. A site has been secured and plans are under way for the factory, which is to be one of the largest of its kind in the country. Frames will be produced here for the Middle West trade, while the Reading plant will continue to supply eastern makers.

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SCHOOL GIRL NEW ENGLAND BABCOCK AGENT.

FEW women engage in the sale of motor vehicles as a business. There are many obvious reasons why this is so. First of all the average woman has no business training and intuition is not a substitute for the clear reasoning that is necessary in competition. Technical and mechanical education and practise is entirely foreign to woman and it is rare that one acquires either. Besides this the work of demonstrating, maintenance and care is regarded as an occupation for which only a man is fitted, while salesmanship is not often experienced by the fair sex.

Miss Virginia E. Aiken, a 16-year-old miss of Brookline, Mass., has demonstrated there is exception to the rule, for she has achieved a success as a business woman that is nothing short of remarkable for one so young. Not only is she agent for a car, but she is the New England representative of the Babcock Electric Carriage Company, Buffalo, N. Y., and as such she is entitled to do business in any of six states included in her territory. Until six months ago she had had no business experience. She was attending the Runkle school without any special purpose in mind other than to obtain a good general education.

Miss Aiken is a niece of Day Baker, New England representative of the General Vehicle Company, and for four years or more has driven electric carriages about, becoming one of the most expert of drivers. She secured a license to drive several years ago and has driven many thousands of miles, principally with electrics. One vehicle she drives is a Columbus and the other is the Babcock runabout in which she is shown in the accompanying illustration.

Now, Miss Aiken is practical and she began to study the electric carriage with keen enthusiasm. Instead of merely giving attention to the maintenance and care she went back to rudiments and systematically acquired knowledge concerning the battery and the motor. She studied electrical subjects carefully and mastered each with its particular reference to the vehicles. She was fortunate in having her uncle as an adviser and under his direction she was able to apply her knowledge to good advantage.

Constantly using the electric machines she met with all conditions that might be encountered and it was with extreme satisfaction that she solved all problems and successfully met every situation. The girl did not hesitate to work about the cars whenever necessary. She found delight in mechanical work and did it surprisingly well.

The time came when the head of the Babcock company reached Boston with the intention of discontinuing the agency because of the apparent absence of interest in electric cars He met Miss Aiken and during a conversation his purpose was told. "I'm so sorry," said she, "for I know I could sell some cars for you."

"Why don't you take it?" Mr. Babcock asked her.

It was a strange proposition, to be sure, and then Miss Aiken though of her resources, for unlike the majority of girls she had a bank account that represented a great deal to her.

She knew that she would have to carry several machines in stock and be prepared to give service to all owners of Babcock cars, and how to plan a business that would be a success was something for which she was not prepared. But Mr. Babcock urged her to accept. When he found that she would require her capital to conduct her business he made a suggestion that was accepted and in a comparatively short time, a few hours, in fact, she was the New England agent for the cars.

Miss Aiken was a school girl and she did not care to abandon her education, but she proposed to make that agency a success. She immediately secured an office in a Brookline garage, engaged a girl stenographer and bookkeeper, and began a campaign. Then the cars arrived and all of the time that she had was given over to visiting prospects and demonstrating. Next she began to advertise and made it known that she was a business woman. When she sold her first machine she laid aside half the profits to advertising, and this, and her energetic work, brought to her other customers.



Miss Virginia E. Aiken, Babcock Electric Agent.

During the winter she was a very busy young woman. She was an exhibitor at the automobile show in Brockton, Mass., where she showed a runabout as a demonstrator, and at the Boston automobile show she worked days and evenings showing three different types of cars and gave frequent demonstrations. She and her assistant were the busiest of those making display, for many were attracted by their energy and interest.

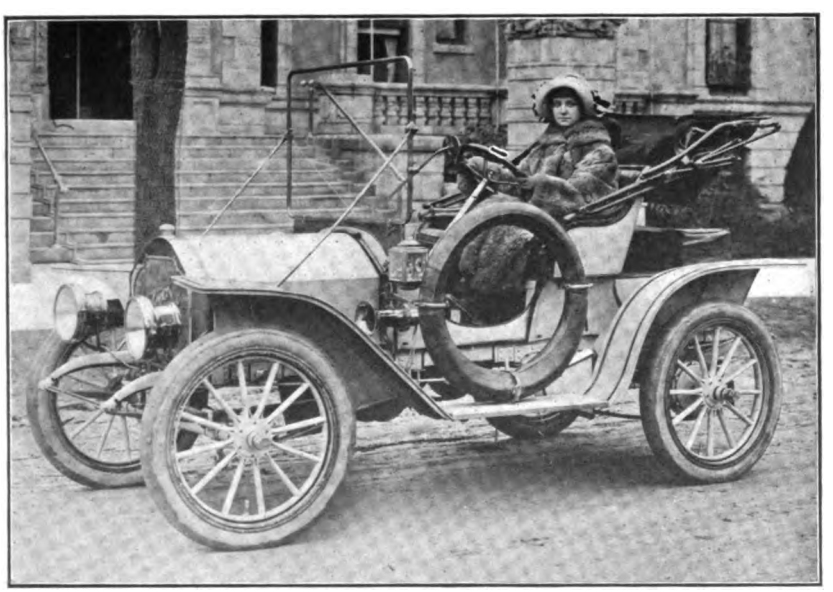
Some of those familiar with electric vehicles were inclined to regard Miss Aiken's agency rather lightly and a number of them questioned her to learn, very

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much to their surprise, that she was equally or even better informed than they, and there was no doubt of the conservatism of her statements. The sincerity and earnestness of the young woman impelled their admiration and she had innumerable visitors who learned of the practical value of the electrical vehicle in a practical talk with a very practical and business-like girl.

The result of the show has been a very busy season for Miss Aiken. She now has four cars always in stock and she is prepared to make deliveries without delay. She has systematized her business, keeps files of all her advertising and her press notices, and outside of her office work she is prepared to give all her customers and car owners the best of attention.

Miss Aiken is tall, slender and decidedly girlish, modest and refined in her manner and speech, but she has acquired a deal of selling knowledge and can demonstrate her cars with the skill and assurance of the expert salesman. She has been successful from the first and it seems probable that she will meet with a larger measure of success as her experience is broadened.



Miss Aiken at the Wheel of Her Babcock Electric Demonstrating Car.

CANADIAN BODY COMPANY.

The Fisher Body Company, Ltd., has been organized in Canada and will manufacture automobile bodies of aluminum, steel and wood. The new concern is capitalized at $150,000, and has purchased a plot of ground in Walkerville, Ont., on which will be built a plant which will have a capacity of upwards of 100 bodies a day. The incorporators are F. J. Fisher, L. Mendelssohn and A. Mendelssohn, who constitute the Fisher Body Company and the Fisher Closed Body Company, both of Detroit.

CARBO-LIGHT TANKS POPULAR.

The Carbo-Light tank is proving quite popular with motorists, so much so that the maker, the Carbo-Light Company, Anderson, Ind., has found its manufacturing facilities inadequate. This has necessitated placing an order with the Shenango Manufacturing Company, Pittsburg, Penn., for the manufacture of 60,000 tanks of various sizes, on which delivery is expected to begin in a short time, relieving the situation at the Anderson plant. The general offices of the company are to be located at Pittsburg, although the western selling branch is to remain in Anderson.

OPENINGS FOR AUTOMOBILES.

The following openings for the sale of automobiles are reported by United States consuls whose addresses and full information concerning the opening may be obtained on application to the bureau of manufactures, Department of Commerce and Labor, Washington, D. C., giving the number.

No. 8766. A government official in a foreign country has informed an American consulate that he desires to receive particulars concerning motor cars suitable for the tropics. He particularly desires information regarding medium priced cars. Correspondence with this official may be in English.

No. 8769. An American consular officer requests catalogues from the manufacturers in the United States of the very finest motor cars. These catalogues should show details of the cars, especially the interior upholstering and fittings. A car was recently purchased by a resident of his district for $8000, and at the present time it is the best machine in the market, but other residents are desirous of securing a better car, and American manufacturers should take advantage of this opportunity. The price of the car will be no object.

PRESIDENT OF 50,000-MILE CLUB.

The first president of the Maxwell 50,000-mile club is Lee Meriwether, a noted author and tourist, who has driven Maxwell cars more than 100,000 miles. He was the first motorist to qualify for one of the gold medals which the Maxwell-Briscoe Motor Company is presenting owners who have covered 50,000 miles, and it is reported that a large number of drivers have followed his example, and that several high mileages have been reported, showing that the automobile is an exceedingly popular means of long distance travel.

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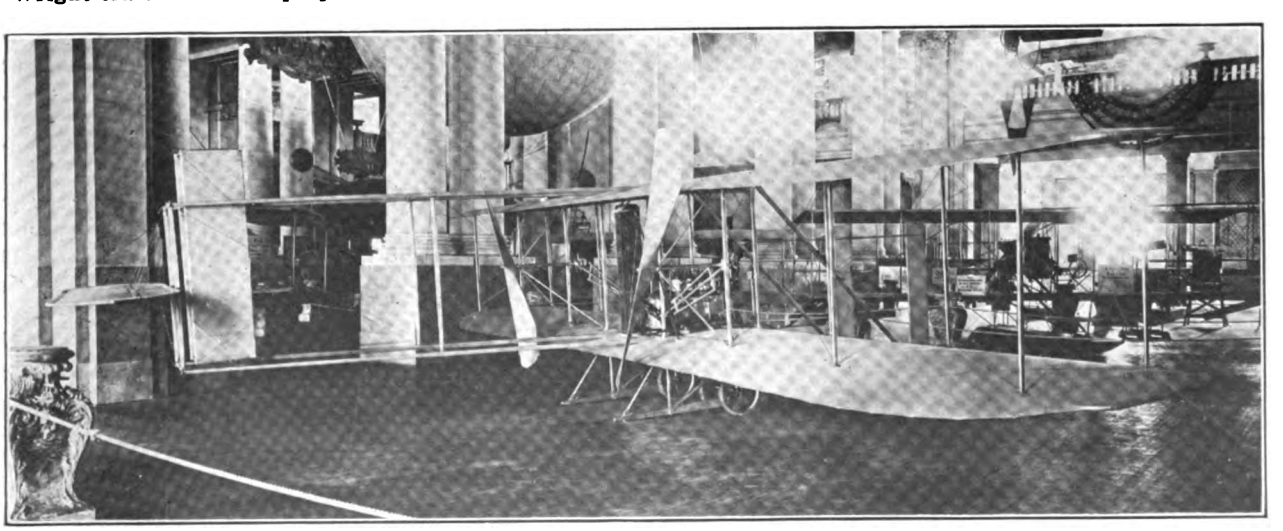
The opening of the first international aerial craft show in the Grand Central Palace, New York City, May 9, was accompanied by official recognition on the part of the United States Navy. Rear Admiral Hugo Osterhaus in command of the fleet then at anchor in the Hudson river, was invited to a banquet given in his honor at the rooms of the Aero Club of America by President R. J. Collier of the club, the invitation being delivered in person by Mr. Collier, utilizing a Burgess hydraeroplane driven by Walter Brookins. The successful outcome of this feature was sent from the United States cruiser Washington, Admiral Osterhaus' flagship, by wireless to a station fitted up on an aeroplane in the exhibition hall, creating a decidedly profound impression.

Concerning the show itself: Undoubtedly the most interesting machine on exhibit, largely because it was the first aeroplane constructed to specifications furnished by the United States government, was the new war biplane made by the Burgess Co. & Curtis, Marblehead, Mass. In many respects this is decidedly different from any machine previously produced in America.

Although built under the Wright patents, the new Burgess-Curtis biplane bears little resemblance to Wright craft. But one propeller is employed and this is located in front. The fuselage is entirely enclosed in an aluminum casing and is of the so-called monoplane design. The motor is a 70 horsepower Renault, located in front, above the fuel and oil tanks. The seats for pilot and passenger are arranged tandem fashion, and all controls, save those for wing warping, are enclosed.

The spread of the main planes is 43 feet, and the width five feet nine inches. These are so designed that the spread may be reduced to 34 feet six inches. It follows that the wing construction is in sections, the wiring of which is so arranged as to make dismantling a simple and easy matter. When fully rigged the machine has a total supporting surface of 450 square feet. The monoplane tail is similar to that of the Nieuport monoplane. The landing chassis is of particularly rugged construction, and is strongly braced with diagonal wooden struts.

The latest type of Wright biplane also was shown, although the model presented did not include the new stabilizing device. The one conspicuous change over the 1911 design was the placing of triangular stabilizing fins at the end of an outrigger extending forward about 10 feet from the front and centre of the main planes, instead of on struts leading from the forward



General View of International Aircraft Exhibition in Grand Central Palace, New York City, with Latest Wright Biplane in Foreground.

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end of the skids. The radiator has been moved to the rear and the fuel tank has been placed at the rear of one of the seats, giving a clear view ahead. The horizontal rudder at the rear has been increased to about 14 feet, and the dual control has been improved so that each operator is provided with a right hand lever.

Considerable interest was manifest in the Curtiss hydaeroplane purchased by the Russian Navy, which was shown for the first time at an organized display. Its details do not differ from the regulation Curtiss land and water machine, however.

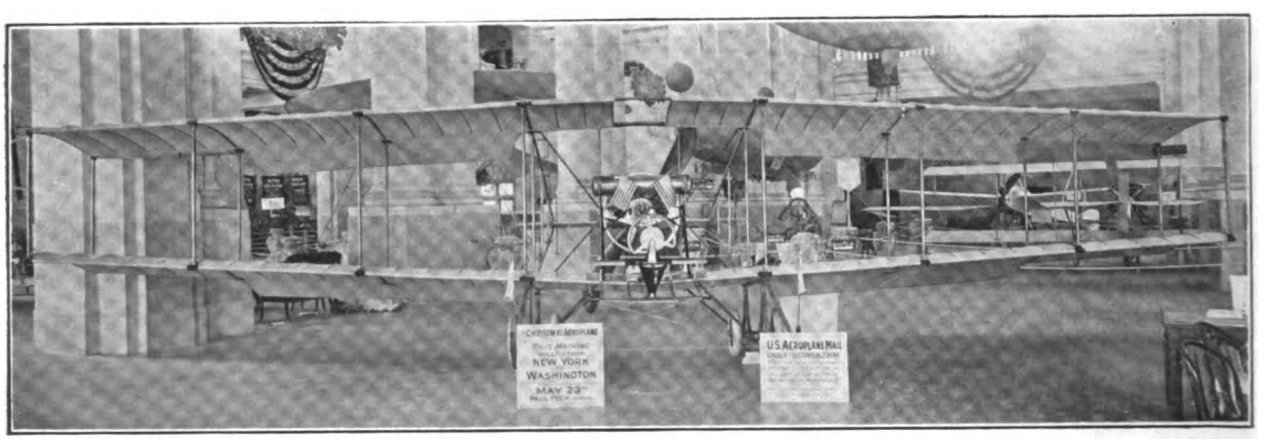
The largest craft on display was the Jacobs-Emerson multiplane, with 724 square feet of supporting surface and weighing something like 2000 pounds. It has proven its title to being a practical machine by making a flight at an altitude of 180 feet at Atchison, Kan. The motive power is supplied by two 35 horsepower engines.

David Palmgren exhibited a monoplane fitted with two 50 horsepower motors and two propellers. This is constructed of steel tubing and covered with aluminum. Among other features, it is equipped with a self-starting device, and folding wings. It is supposed to be capable of carrying 12 persons.

J. Edson Gallaudet presented a monoplane, in which the entire front, with the exception of the lower portion of the landing chassis, is enclosed with sheet aluminum. A single skid protects the rudder in the rear, the tail carrying out the resemblance to a fish.

The Max Ams hydraeroplane, built in Mt. Vernon, N. Y., is a big three-seated biplane of 50-foot wing spread above and 36 below, the design in other particulars being somewhat upon the order of the Curtiss. The pontoons are two in number and are not unlike the Burgess-Wright, while the rudder resembles the Wright.

An accompanying illustration presents the Christmas biplane, made by the Washington Aeroplane Company, Washington, D. C., with which Paul Peck was scheduled to deliver the mail between New York City and Washington, May 22, as it was seen during the show in the former city earlier in the month. Postmaster-General Hitchcock has created a new route, known as No. 607,002, for this purpose and Peck has been sworn in as an official mail carrier without compensation by the government. The machine is equipped with a 50 horsepower Gyro motor, also a Washington product.



Christmas Biplane, Utilized by Paul Peck in Carrying the Mail between New York and Washington, on Display at the Show.

Rules to govern the competition for the Clarence H. Mackay army aviation trophy, have been formulated, making the following provisions: A column of troops will move along a road or roads unknown to the competitors, who will proceed to locate the column and report to the commanding officer. The trials are to take place in September or October of the present year. Points will be gained as follows:

Accuracy in locating on a map the position of the main column, 50; accuracy with which the strength of the body is determined, 50; accuracy and brevity of writing report, 50; best time, 50; maintaining an average altitude of 1500 feet, 50; accuracy in alighting at starting point, 50. Any competitor who drops below 1000 feet loses the contest, except that he shall not be debarred from making another trial, on the ground that to fly at a lower altitude than 1000 feet would prove suicidal in actual warfare. Full details will be made public later.

A new air danger is revealed in the statement of Mrs. Calbraith P. Rodgers, widow of the well known transcontinental aviator who met death in flight near Los Angeles, Cal., some two months ago, that the dead body of a sea gull was found wedged in the rudder of his machine sometime later. This report is verified by Frank Shafer, mechanician for Rodgers. Parmalee was flying near the same city May 14, when his machine suddenly dropped like a plummet some 500 feet

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before he could right it, because of a collision with one of these gulls.

Moreau of France claims to have secured automatic stability, with a machine in which he has been making test flights near Paris. According to the dispatches Moreau was able to take photographs, utilizing both hands and allowing the aeroplane to take care of itself. He also asserts that during one of his flights he covered a distance of 30 miles without touching the levers except when turning, rising, descending and alighting.

The Aerial Navigation Company has been organized in England for the purpose of maintaining an aeroplane ferry across the English channel. Several large biplanes, capable of carrying four passengers each, are to be employed in carrying those who desire to make the journey.

The Aero Club of France has arranged a Grand Prix d' Aviation for June 16-17, in which the contestants will be required to cover a course bounded by Angers, Cholet, Saumur and Angers, seven times, making a total of 682 miles, in two days. The event is open only to French aviators, utilizing French machines. Prizes aggregating $20,000 are offered.

In order to honor the memory of Samuel Pierpont Langley, the first to construct a successful mechanical flying machine, utilizing a steam engine, the Aero Club of Washington, D. C., has decided to celebrate Langley day each May 6. Langley's first successful demonstration was made May 6, 1896. This year an aviators' field day was held at the Chevy Chase Club grounds in that city.

Following the announcement that two Japanese had received pilot's licenses from the Aero Club of America in the Curtiss flying school in California, comes the information that W. B. Atwater of New York is in Yokohama for the purpose of demonstrating a Curtiss hydraeroplane to the Japanese navy officials.

The committee in charge of the German national aviation fund, created for the purpose of presenting a fleet of aeroplanes to the Kaiser, already has secured $500,000 of the necessary $750,000. Germany now has 50 military aeroplanes, besides the largest fleet of war dirigibles in the world. The government will expend $1,500,000 in acquiring aeroplanes during the coming year, and the fund is being raised for the purpose of bringing the total equipment in excess of that possessed by France.

John F. McGee of Pawtucket, R. I., who has been interested in aviation for a number of years, having produced a model Bleriot monoplane with more or less success, has decided to become a recognized pilot. He has signed a contract with Harry Atwood, and will fly a Wright biplane with the company represented by Atwood until Jan. 1, at least. He hopes to make a cross country flight from Boston to Providence early in June.

McGee has been driving and working upon automobiles for the past eight years and is thoroughly familiar with the internal combustion motor. During the international meet at Belmont Park in 1910, he was employed by J. C. McCoy, vice president of the Aero Club of America, and in that position had access to the hangars throughout the meet. He associated himself with the late John Moisant, and became particularly interested in the Bleriot monoplane used by that aviator.

Later he began the study of the Wright and Burgess-Wright biplanes and is now well versed in their construction and method of operation. Atwood considers him a decidedly apt pupil and has promised to place a machine at his disposal as soon as he has made the necessary flights.

After being postponed a number of times the first trials in the bomb dropping contest, for which a Michelin prize of $10,000 has been offered, were held near Paris early in the month. Although four competitors were scheduled to appear for the test, but two were present, these being Lieut. Bosquet in an Henri Farman biplane with 50 horsepower Gnome motor, and Lieut. Maillefert in a larger machine of the same make with 100 horsepower Gnome. The final competition closes Aug. 15. One American aviator, Lieut. Scott, U. S. A., is entered.

Flying a Wright biplane high over the battleships and forts in and around Boston harbor, May 20, Arch Freeman dropped "bombs" on the decks of the Rhode Island and New Jersey, and into Forts Banks and Heath, and the Charlestown navy yard. In each of these was a note reading: "What if this bomb were 16 ounces of nitroglycerine instead of flour?" It was without doubt the most convincing argument the United States army and navy have yet had of the practicability of the aeroplane in time of war. Some of the bombs were dropped from an altitude of only 500 feet, which is considered by army officials to be suicidal under active conditions. Others reached their targets from a height of 1500 feet.

King George V of Great Britain and officials of the British Admiralty were treated to an exhibition of the hydraeroplane in flight over the fleet at Weymouth, England, May 18, when Horace Short tried out his new craft before the King. The machine was virtually a Short biplane to which pontoons had been fitted, but it was the first time the British men-of-war had had opportunity to witness the possibilities of this newest craft in action.

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ANNEALING SPINDLE PINS.

In replacing worn spindle pins with new members a repairman noticed that the threads of the part broke away at the slightest contact. A further examination of the bolt revealed the fact that the threaded end had been tempered too hard. Had the pin been utilized an accident might have ensued. The bearing portions of the pin were wrapped with a wet cloth and the temper drawn from the threaded end, and when replaced in the spindle gave efficient service. When these members have the appearance of being too highly tempered on the threaded end, they should be tested and the metal annealed.

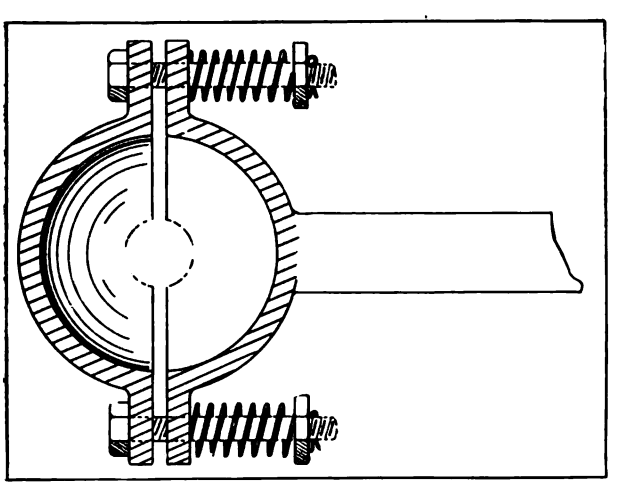


Fig. 1—Simple Method of Fitting Springs to Ball Socket Joints of Steering System.

SPRING STEERING CONNECTIONS.

While provision is made in the modern car for the absorption of road shocks to the steering system, many of the older types are not thus equipped. A method of fitting a spring device to the reach rod connections as well as those connecting the steering mechanism was noted by the writer recently. The car was an old model and the steering connections were of the ball and socket type as outlined at Fig. 1. Considerable play existed which wear was taken out, and as the owner complained of these parts rattling the repairman devised the kink outlined in the drawing.

The screw bolt holes in the half to which is attached the rod, were enlarged slightly to remove the thread and a new bolt fitted, one having the thread cut up about half way from its end to the socket member. A stiff spring was placed over the bolt and a nut screwed on and up to obtain the desired tension. Cotter pin holes were then drilled and retaining members fitted as depicted in the drawing. The job was not expensive and reduced road shocks to a minimum as well as eliminated rattle.

CRACKED WATER JACKETS.

The following method for repairing cracked water jackets is given in the Autocar. Open the crack in the jacket to a V shape without increasing the opening on the inner side, then smooth the edges and deposit on them any of the preparations sold for silver plating. The material will readily adhere to the smooth surfaces and the repair will not only endure but will be unnoticeable.

WHEN A MUFFLER INCREASES POWER.

That a muffler may increase the power of a motor instead of decreasing it may seem paradoxial and utterly impossible, but such has proved to be the case. Occasionally two-cycle motors are found which are faster and give more power when muffled than when the cut-out is opened. The explanation is that the muffler and manifold are of such shape that the gases are set into vibration as in an organ pipe and so flow more quickly, clearing the cylinder better than when the muffler is not utilized and the motor exhausts directly into the open air.

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SMALL HEAVY FUEL CARBURETOR.

In view of the fact that the internal combustion engine is being used more extensively, and that the number of mechanically propelled vehicles is increasing rapidly, the demand for gasoline is assuming large proportions. Already the problem of utilizing heavy fuels such as kerosene is being given serious consideration and there are a number of devices for the evaporization of this fuel applicable to the hydrocarbon motor.

This subject is being given more attention abroad perhaps than in this country, and it is interesting to note that a German named Durr has been experimenting for some time with a design which is said to fulfill all expectations. A striking feature of the carburetor is its size, that for a 15 horsepower engine being but 2.75 inches high and 1.875 inches in diameter. That it is compact and simple will be noted by the accompanying illustrations, that at Fig. 3 being an exterior view.

Another interesting feature is that it is floatless, fuel being supplied to the bottom of a circular casing by pressure from the fuel container, but the amount is controlled by means of a needle valve operated by suction. It is claimed that the weight of the needle and its component valve when at rest suffices to prevent the flow of fuel.

The needle is acted upon directly by the partial vacuum in the intake pipe which is in direct communication with the top of the fuel control valve. The latter is integral with the needle valve itself, and its periphery is a working fit inside the casing. The needle is drilled with a duct for the liquid fuel, which is drawn up when this is raised from its seat.

By referring to Fig. 2 it will be seen that air enters the bottom of the casing under the fuel control valve and thence is drawn through suitable small openings at high velocity into the top of the fuel outlet, the needle performing most of the functions of the usual jet. The desired atomization is actually secured at the coned top, this being brought about by the meeting of separate streams of air and fuel moving through their respective apertures at high velocity.

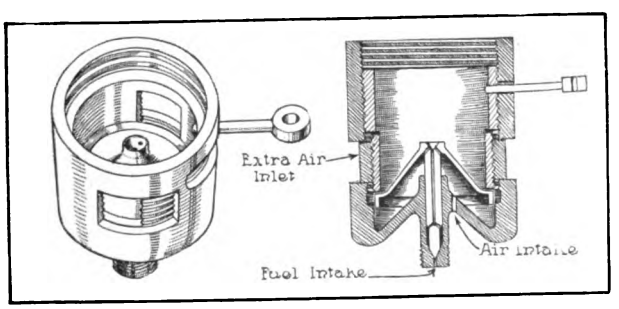


Fig. 2—Showing Top of Atomizer and Fuel Control Valve of Durr Heavy Fuel Carburetor.

To provide for the variable speed of the internal combustion motor the designer has fitted an auxiliary air member. This is neatly combined with an arrangement for positively limiting the lift of the fuel control valve. An inner sleeve, screwed internally to rotate in the threaded interior of the casing, covers

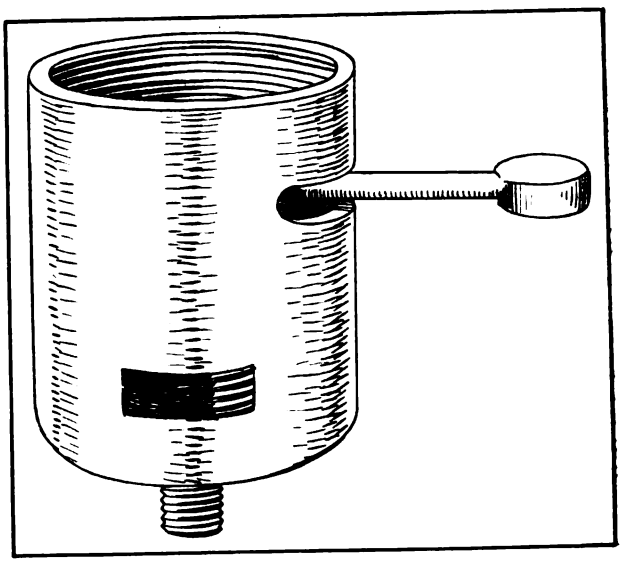


Fig. 3—The Durr Carburetor, Noticeable for Its Smallness and Absence of the Usual Float.

and uncovers a port to the outside air, thus regulating the amount of atmosphere that may be drawn in with the already aerated fuel.

When this sleeve rises or falls, as the case may be, its bottom end being of such a diameter as to serve as a stop to the fuel control valve, and to the lift of the needle, the supply of pure fuel is correspondingly regulated. As additional air is admitted, the range of lift for the needle is increased. When the suction on the jet itself becomes reduced, the fuel supply capacity is increased.

Comparative tests on a car with a 50 horsepower motor developed the fact that with gasoline and the usual carburetor the engine yielded 62 horsepower, brake test, and utilized 9.87 ounces of fuel. A Durr carburetor under similar conditions gave 71.9 horsepower and used 7.85 ounces of heavy fuel. The features claimed of the Durr carburetor include more power, lower consumption of fuel and economy.

NEED OF PROPER EQUIPMENT.

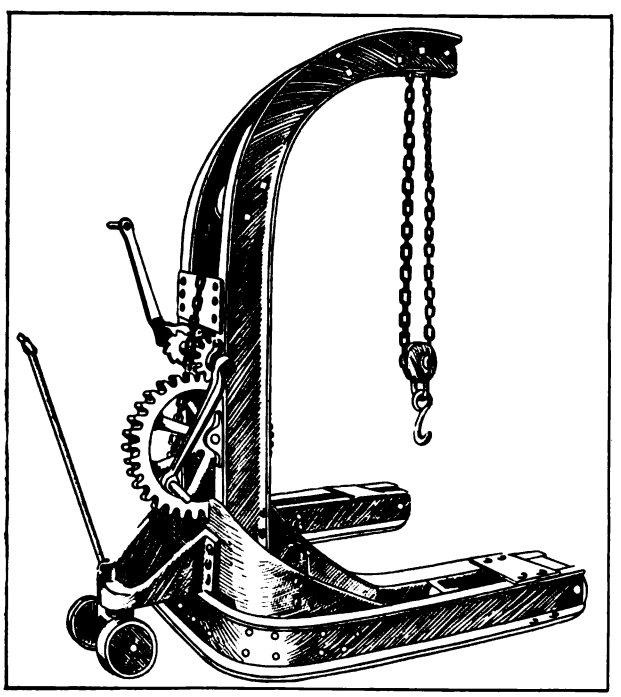
The quality of work turned out by a garage is dependent upon the machine and tool equipment of the repair shop no less than upon the ability of the repairmen. While some men, given a hammer and a wrench, and with a lathe at their disposal, can make almost any repair that comes into the shop, they are rare, and work performed under such conditions is bound to result less favorably than when ample facilities are provided.

Today, when automobilists are demanding more accurate and exact work from the garage, and are bringing in jobs that were formerly considered hope-

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less and beyond repair, the repair shop must be thoroughly equipped to do all kinds of machine work if it is to secure and retain trade. It is the garage with the best equipment that gets the big jobs.

If a man has a job of welding, and the garage where he has been buying his gasoline has no welding outfit, he may be expected to hunt up a place where he can get the work done. As a result, the first shop not only loses the profit on that particular piece of work but places itself in a position to lose the man permanently. It is not good business policy, other things being equal, to turn any work away as the customer may find some other establishment which can and will do all his work. It is because of the necessity for keeping old customers, as well as obtaining new ones, that the outlay for modern machine equipment should be given proper consideration.



LaFayette Portable Crane.

When viewed from the standpoint of first cost, many men think that the expense of some machines is too great, and that the automobile trade of the vicinity will not be sufficient in the particular line of work which the machines perform to warrant the expenditure. This is often, in fact usually, a mistaken idea, and the garage proprietor has not seen the full field from which he may draw custom. There is no especial reason why a drill press in a garage should work on automobiles only, except that the owner does not go out after any other class of work.

A garage with a good machine equipment is fitted to do all the work of the modern machine shop, just as the latter can make automobile repairs with great facility. Many a machine shop has found in this class of work a decided addition to its trade, and a few garages are beginning to realize that with a good machine equipment they may find in the usual machine shop work an excellent source of income during the dull months.

Portable Crane.

Outside of a lathe, perhaps the most useful device a garage can have is a portable crane. Not only does it save the time and strength of repairmen but it makes possible work that could not be performed by men alone. Motors, transmissions, unit power plants etc., can be lifted out of a car in a fraction of the time that otherwise would be required, without a particle of danger to either the men or the part, and with the minimum of effort. The whole front or rear of an automobile may be lifted several feet in the air, to facilitate repairs. Used in this way, the crane surpasses a repair pit, as it may be brought up to a window or other convenient source of light, while the pit often is found to be too dark. The repairman is also given more room in which to work.

The LaFayette Engineering Company, LaFayette, Ind., is making a steel portable crane which should prove especially valuable for garage use. It may be operated by one man and enables him to lift the heaviest part unaided. The feet go underneath the chassis and are long enough to render the crane perfectly stable. The overhang is three feet six inches, so that it has sufficient reach to get around a car in almost any position. It is easy to push around even when loaded, as the wheels run on roller bearings. All parts of the machine are of steel, with machine driven steel rivets, so that it is exceedingly strong and durable. The chain is tested to three tons and is wound on a drum by hand, large reduction gears minimizing the effort required. The weight complete is 900 pounds.

Power Drill.

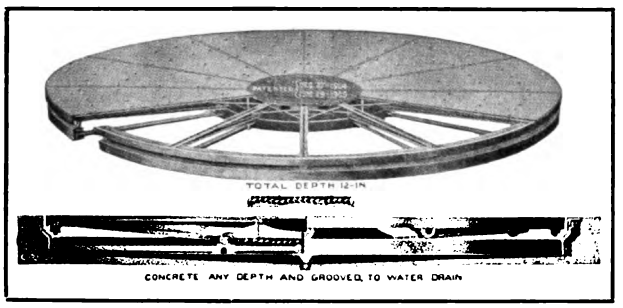
Another decidedly useful machine is a power drill, as those who have tried to drill steel by hand have abundant reason to know. Not all garages have a source of power, however, and in that event a power drill necessitates obtaining such a source, unless it be equipped with electric drive, as is the 20-inch double back geared upright power drill, made by the Champion Blower & Forge Company, Lancaster, Penn., and illustrated herewith. This is fitted with an electric motor, which may be had in various styles to be used on any type of current.

As nearly every garage is wired for electric lights, this drill has an almost universal application, current being taken from a convenient bulb socket by means of the usual plug and cord. The electric motor is held on an arm of the frame, at such distance from the driving pulley that the belt is long, giving an even uniform drive. Control of the motor is easy, being at all times under the direction of the operator without moving from his position at his work, through a switch conveniently placed.

The machine may be used either as a plain drill or as a back geared drill, the change being made in an instant by sliding the gears in or out of engagement by means of a lever. It will drill with perfect accuracy holes up to 1.5 inch, and is simple in operation, yet

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has all the feeds and speeds and automatic features on much more complicated devices. Eight speeds are provided, with power, hand screw and lever feed. The



Universal, Auto-Turntable of 8000 Pounds Capacity, Which Operates on Ball Bearings and Requires but a Depth of 12 Inches.

gears are machine cut and the bearings are large, insuring long service.

The spindle is counterbalanced by a weight in the hollow column, thus relieving the spindle arm of undue strain and making a substantial construction. An automatic stop attachment is provided with a quick return lever, which gives a rapid motion to the spindle. The table is lowered and raised by means of a screw, which is quick in action and self-locking, holding it steady and firm. The handle which operates the screw is conveniently placed.

The drill works to the centre of a 20-inch circle. The spindle is 1.25 inches in diameter and is bored with a No. 4 Morse taper, with a graduated sleeve. The drive is from the motor to pulleys by means of a two-inch belt, the pulleys being of the four-step variety, eight inches in diameter, and with 2.5-inch face. The speed for ordinary drilling is 300 revolutions a minute. A hanger attachment for drilling rims, which will be found very useful about a garage, may be had as extra equipment. The weight complete is 900 pounds.

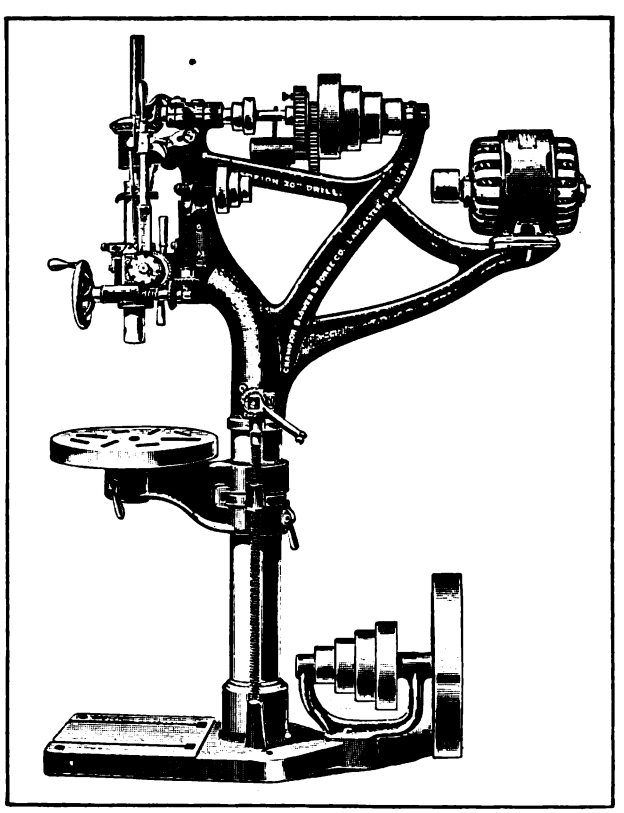
THE UNIVERSAL AUTO-TURNTABLE.

Numerous stables and other buildings are converted into garages and the original design is such that they do not lend themselves readily to the storage of automobiles without the operator of the car exerting considerable skill in backing the machine into its position. This is especially true of long, narrow buildings. To overcome these difficulties a turntable is fitted and the majority of up-to-date concerns are equipped with one or more of these devices.

In the accompanying illustration is presented the product of the Canton Foundry & Machine Company, Canton, O., maker of cranes, jacks, etc. A feature of the Universal turntable is that it may be installed easily, requiring as it does, but a depth of 12 inches, this arrangement permitting of utilization on upper floors as well as the ground. The device is ball bearing, seven balls operating in a patented grooved, serpentine track. These balls are spaced properly and sustain the weight, and as each member is crowded over the summit another follows into its place. All balls not on a summit revolve in lubricating oil with grooves fully protected from dirt.

The superstructure is of structural steel, built in truss form, top plates are braced, and the entire construction makes for great strength and durability. The table proper has a checkered iron centre, with steel plates extending to its periphery, and these members are sloped slightly to provide for drainage. They are also reinforced by angle irons at proper intervals, these being riveted crosswise underneath and supported on structural trusses. The only foundation required is circular concrete, perfectly level, and slightly larger than the table. The former is grooved to provide drainage to the sewer.

The Universal table is furnished complete with angle iron foundation supporting band firmly bolted to outer rim and the former is fitted with bolts for imbedding into the concrete floor thus holding the band in place. The tables which are operated easily by one person, are made in four sizes, 108, 132, 144 and 156-inch wheelbase with table diameter of 12, 14, 15 and 16 feet, respectively. Each has a supporting



Champion Electric Drive 20-Inch Drill.

capacity of 8000 pounds. A feature of the device is that it cannot tilt as the slightest depression throws castor wheels on the outer rim to the rim track.

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MOTORING NEWS OF NATIONAL IMPORT.

Splitdorf Magneto Interests Reorganize with Additional Capital---Two Large Tire Concerns Combine Forces---Personnel of New Henderson Company---Next Year's New York Show---Glacier Park Opened to Automobiles.

The entire automobile industry is interested in the announcement of the formation of the Splitdorf Electrical Company, duly incorporated under the laws of New Jersey, with a paid-in capital of $3,500,000, which will take over the business heretofore conducted under the name of C. F. Splitdorf, Inc., at Walton avenue and 138th street, New York City. The concern is an entirely new organization with a stock issue of $1,500,000 in seven per cent. cumulative preferred shares and $2,000,00 in common stock. John F. Alford, president of the Torrington Company, Torrington, Conn., is direct sponser for the new corporation and becomes its president, while Charles F. Splitdorf has been elected vice president.

C. F. Splitdorf, Inc., is one of the best known concerns in the industry. The growth in the production of Splitdorf magnetos, coils and spark plugs has been decidedly marked, and in the face of strenuous competition has made its impression upon the European market as well as at home. It may be stated in passing that the name of Splitdorf has been connected with electrical devices of one nature or another for over half a century. It is hinted that still other electrical fittings for automobiles are to be expected from his inventive genius in the near future.

The Torrington Company is closely identified with a number of concerns, each with factory facilities in Torrington, Conn., in the manufacture of various automobile accessories, motorcycles, etc. Windshields, carburetors, motor boat engines and similar fittings have been manufactured by it, or its associates, for a number of years. The combination of these interests with those of the Splitdorf laboratories is of distinct importance.

No radical changes are contemplated, for the present at least. As has been stated, Mr. Alvord becomes president and Mr. Splitdorf, vice president, of the new organization. Bryant S. Keefer has been elected treasurer and Carlos W. Curtiss, secretary and general manager. These officers and John R. Viles will constitute the board of directors.

GOODRICH-DIAMOND MERGER.

Two Large Automobile Tire Concerns Amalgamate with Capital of $90,000,000.

One of the largest transactions in the history of the automobile industry is noted in the purchase of the Diamond Rubber Company of Akron, O., by the B. F. Goodrich Company of that city, involving, according to the official statement of the interested parties, the sum of $45,000,000. It would appear that the Goodrich concern is to be reorganized in a measure, the following officers and directors being proposed: Chairman of the board, F. A. Hardy, Chicago; vice chairman, F. A. Mason, Akron; president, B. G. Work; vice president and general manager, A. H. Marks; vice president and works manager, E. C. Shaw; vice president and sales manager, H. E. Raymond; vice president and assistant sales manager, W. B. Miller; secretary, C. B. Raymond; treasurer, W. A. Means; additional members of the board, O. C. Barber and C. C. Goodrich. The official statement follows:

"Goldman, Sachs & Co., announces for itself and Lehman Bros., New York City, and Kleinwort Sons & Co., London, that arrangements have been completed for the purchase by the B. F. Goodrich Company (New York) and the transfer to it of the property and business of the Diamond Rubber Company. The companies, as is well known, occupy premises in the city of Akron, O., and are two of the half-dozen largest and most successful concerns of the kind in the United States, each manufacturing a great variety of rubber goods, including automobile tires.

"The consideration to be paid by the Goodrich company is to consist of $15,000,000 of the seven per cent. cumulative preferred stock and $30,000,000 of the common stock of the B. F. Goodrich Company. For the purpose of enabling it to carry out the transaction the B. F. Goodrich Company will immediately call a meeting of its stockholders for the purpose of authorizing an increase of its capital stock by the issuance of an additional $15,000,000 of the preferred stock and an additional $30,000,000 of common stock.

"When this increase of stock shall be effected, the capital of the B. F. Goodrich Company will consist of $30,000,000 of seven per cent. cumulative preferred stock and $60,000,000 of common stock. Goldman, Sachs & Co., and Lehman Bros., of New York City, and Kleinwort Sons & Co., of London, have agreed to purchase from the Diamond Rubber Company a large block of the stock of the B. F. Goodrich Company, which, together with the previous purchase of stock made at the time of the organization of the present B. F. Goodrich Company, will comprise about one-half of the entire issue of the preferred stock of the latter company and a considerable amount of the common stock as well.

"It is expected that in consequence of the acquisition of this interest by the banking houses named and

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the distribution of a portion of their stock among their clients a very much broader market for the securities of the B. F. Goodrich Company will exist in the future than has ever existed for the securities of either the old B. F. Goodrich Company or the Diamond Rubber Company. Stockholders of the Diamond Rubber Company upon the distribution of its assets will receive a considerable amount of cash in addition to their several shares in the stock of the B. F. Goodrich Company preferred and common.

"The Goodrich company will retain the executive staff of the Diamond Rubber Company in addition to its present staff, and it is not expected that any radical change in organization or operating conditions will occur."

PRODUCE HENDERSON CAR.

Organization of Company Which Will Manufacture Indianapolis Machine Is Completed.

Much interest attaches to the organization of the Henderson Motor Car Company, Indianapolis, Ind., announcement of which was made recently, largely because of the position held by the Henderson Motor Sales Company, to which the new concern is a logical successor. The personnel of the old distributing agency for Cole cars, made by the Cole Motor Car Company, is represented in the new, with the addition of several names which have been more or less prominently identified with the automobile industry for several years.

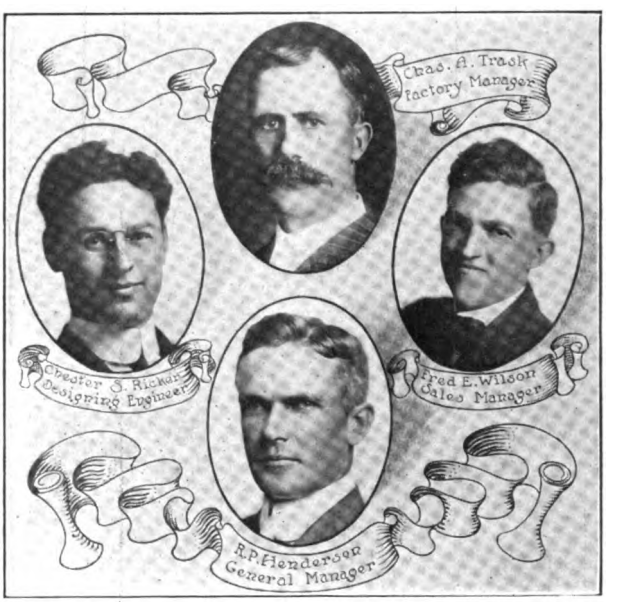
L. Carter, the president, also is one of the largest stockholders in the Cole Motor Car Company. R. P. Henderson, vice president and general manager, was connected with the Parry Manufacturing Company for a number of years, and has been identified with his brother in the management of the Henderson Motor Sales Company for a considerable period. C. P. Henderson will remain in complete charge of the Cole sales organization, retaining his position as a director of the Cole Motor Car Company, although one of the principal stockholders in the new concern.

Lucius S. French, the secretary, will be in charge of the Henderson advertising. He not only enjoys a wide acquaintance among motor car dealers, but he also possesses a practical knowledge of automobile advertising which has been gained by successful sales promotion work which he has accomplished in the past. The finances will be under the direction of C. K. Share, treasurer, formerly treasurer of the Willys-Overland Company, and a recognized authority on automobile office systems.

Fred E. Wilson is the new Henderson sales manager. He formerly held the same position with the Marion Motor Car Company and is well known by dealers throughout the country. The Henderson factory is to be operated on a system which was perfected by Factory Manager Charles A. Trask, formerly director of one of the largest plants of the General Motors Company. He has only just returned from an extended trip abroad, studying automobile manufacturing plans in Continental Europe and in the British Isles. He also is quite prominent in the Society of Automobile Engineers, being chairman of the committee on papers.

Chester S. Ricker, the chief engineer, is one of the most prominent motor car engineers in the country. He has taken an active interest in the S. A. E. work during the past year, having read a number of papers before that society. Perhaps he is best known as a technical expert, and the articles on motor car construction from his pen have attracted much attention both in and out of the industry.

The advantages of an energetic and harmonious organization have been demonstrated by the Hendersons in the past, and their success has been due, in a large measure, to the fact that every member of the



Department Managers with the Newly Organized Henderson Motor Car Company.

force was a specialist in his respective line. This policy is noticeable in the enlarged concern. The new car will be shown to the public for the first time during the progress of the 500-mile race on the Indianapolis motor speedway, May 30. It will sell for a moderate price, and is claimed to be the only one produced in Indianapolis selling for such a figure.

SECOND VERMONT SHOW.

Residents of the Green Mountain State Visit Burlington to See New Models.

While most of the cities and towns on the so-called minor show circuit of the country have held their annual exhibits some time since, Burlington,

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Vt., waited until the actual opening of the touring season before inviting its citizens to inspect the 1912 models. The event was held early in the month and was termed the second annual Vermont automobile show, being staged in the state armory under the management of George D. Jarvis.

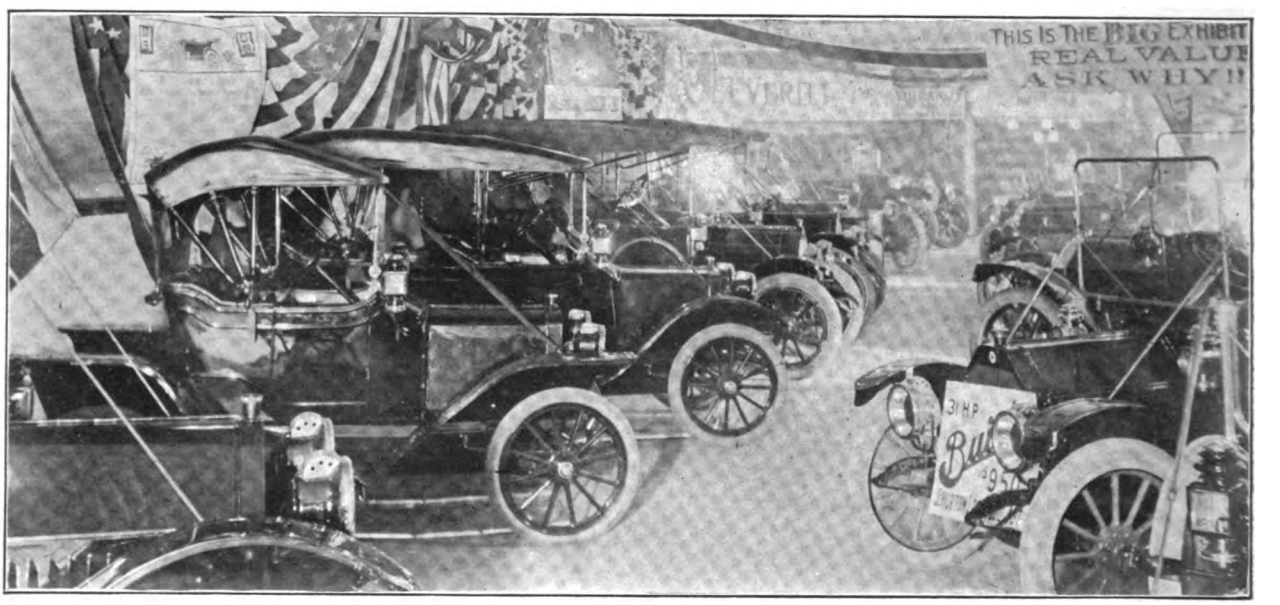
Vermont has developed decided interest in the motor car during the past two years, as was evidenced by the large attendance which greeted this second annual event. The different makes of cars and accessories were disposed about the interior of the building under a canopy of bunting in the national colors, while the entire assembly was brilliantly lighted by electricity. Music was furnished by Lessor's orchestra and a colored quartette from the 10th U. S. Cavalry, stationed at Fort Ethan Allen. Several sales of importance were made throughout the display which was a decided success from every viewpoint.

ONE NEW YORK DISPLAY.

Two Buildings to Be Utilized by Automobile Board of Trade for 1913 Exhibit.

While all sorts of rumors have been circulated respecting the national show in New York City next January, it was not until recently that any definite statement had been made by the parties most directly interested. Previous to the holding of the Madison Square Garden display of last January, it was announced that it would be the last showing of automobiles in the historic structure. Since that time plans for tearing down the building have been held in abeyance, and it is now announced that the 1913 show will be held therein.

More properly speaking, there will be two shows,



Interior of State Armory at Burlington, Vt., During the Progress of the Recent Second Annual Vermont Automobile Show.

Among the exhibitors of cars were the following: H. G. Bennett, Barre, Cadillac; H. D. Drury, Essex Junction, Westcott; Flanders Auto Company, Burlington, E-M-F, Chalmers, Overland, Jackson; Geo. D. Jarvis, Burlington, Ford; Walter B. Johnson, Essex Junction, Velie, Paige-Detroit; A. F. Lauzon & Co., Burlington, R-C-H; J. Horton Lockwood, Burlington, Buick; H. S. Morgan, Burlington, Hudson; Dr. George D. Samson, Burlington, Everitt; Van Ness Garage, Burlington, Reo, Mitchell, Premier; Vergennes Auto Company, Vergennes, Oakland; H. L. Ward, Burlington, Stearns-Knight.

Accessories were displayed by the following: Sherwin Electric Company, Standard Oil Company, Spear-Martin Fur Company, Underhay Oil Company, William L. Tobey, L. C. Demain, L. K. Goddard and Geo. D. Jarvis & Son.

as the Automobile Board of Trade holds a lease for the new Grand Central Palace, in which the National Association of Automobile Manufacturers held a display this year. However, the two displays will be under the same management in 1913. The Automobile Board of Trade will divide the exhibitors between the two buildings, and while both will be open to all makers of cars and accessories, the scheme for the allotment of exhibition spaces has not been worked out as yet.

Regarding the demolition of the Madison Square Garden, it appears to be decided definitely that it will not be accomplished until late in 1913. The new arena which was to have been utilized by the Automobile Board of Trade for next year's show, will be completed in time for the 1914 exhibition, it is anticipated.

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GLACIER NATIONAL PARK.

Motorists Win Permission to Utilize Their Cars in One of the Government Preserves.

The secretary of the interior, under whose jurisdiction the various national parks of the country are held, has issued regulations concerning the admission of automobiles to the Glacier national park in Montana as follows:

"No automobiles will be permitted within the metes and bounds of the Glacier national park unless the owner thereof secures a written permit from the superintendent or his representative. Applications for permits must show: Name of owner, number of machine, name of driver and inclusive dates for which permit is desired, not exceeding one year, and be accompanied by a fee of $1 for a single round trip through the park, or a fee of $5 for each machine per annum.

"Permits must be presented to the superintendent or his authorized representatives at the park entrance on the government road. The permittee will not be allowed to do a transportation business in the park without a special license therefor from the secretary of the interior.

"The use of automobiles will be permitted on the government road from Belton, Mont., to administrative headquarters at Lake McDonald between the hours of 7 in the morning and 9:30 at night.

"Automobiles will stop when teams, saddle horses, or pack trains approach, and remain at rest until they have passed or until the drivers are satisfied regarding the safety of their horses.

"Speed will be limited to six miles an hour, except on straight stretches, where approaching teams, saddle horses and pack trains will be visible, when if none be in sight, this speed may be increased to a rate indicated on signboards along the road; in no event, however, shall it exceed 15 miles an hour.

"Signal with horn will be given at or near every bend to announce to approaching drivers the proximity of a machine. Horses will have the right of way and automobiles will be backed or otherwise handled as necessary, so as to enable horses to pass with safety.

"All permits granted at any time when automobiles can enter the park will expire on Dec. 31, of the year of issue."

THOMAS COMPANY HEADS.

Men Who Direct the Production of This Well Known Car Under Present Management.

Since the reorganization of the E. R. Thomas Motor Car Company, Buffalo, N. Y., maker of Thomas cars, something over a year ago, the aim of the officials has been to bring about a strong organization of men, able to work together in complete harmony. It has been maintained that in the automobile business nothing is of greater importance than the personnel of the factory executive heads.



Officials and Department Heads of the E. R. Thomas Motor Car Company.

The reason for this lies in the rather complex nature of the business with its numerous departments, such as engineering, stock, purchasing, manufacturing, accounting, financing, advertising, sales, service, etc. Each requires a capable supervisor to maintain a high standard of excellence and from all is demanded the fullest co-operation in order to secure the necessary unity of action.

Accompanying photographs present the leading executive heads of this institution, each of whom has had many years of experience with the best known makers of high grade cars in America.

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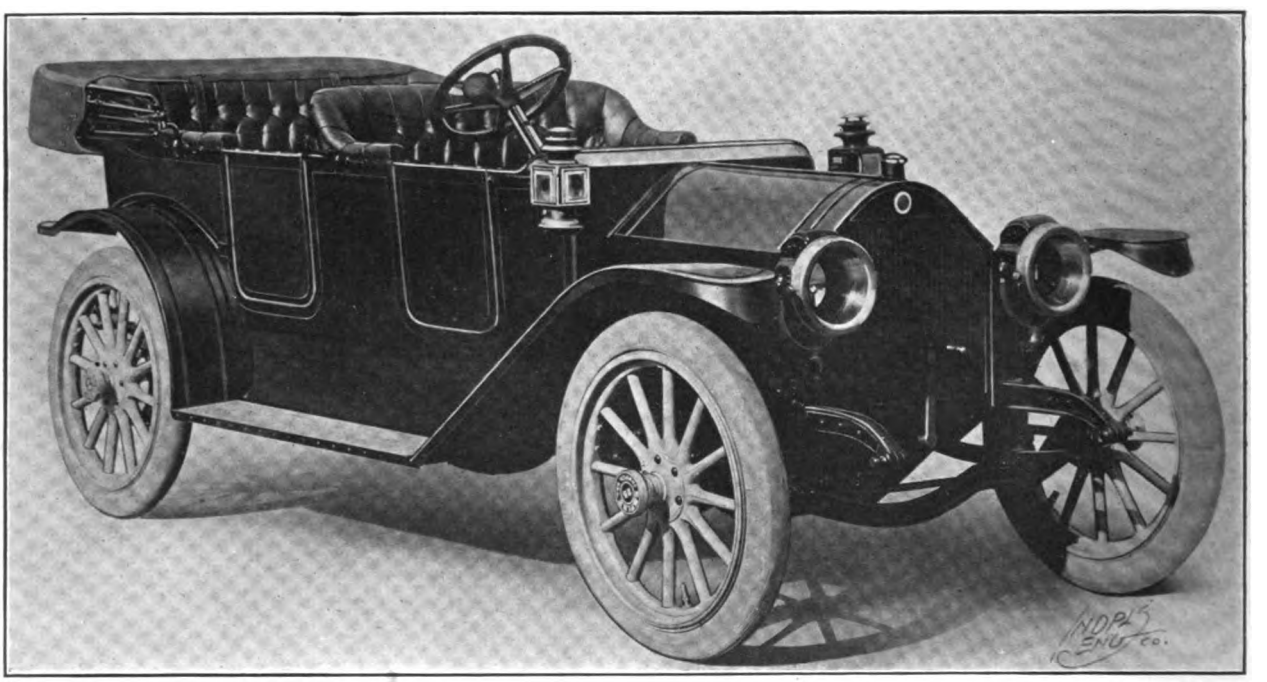
THE EMPIRE 1913 TOURING MODEL.

THE Empire Automobile Company, Indianapolis, Ind., has announced that its 1913 line will include the Empire "25," which is designated as the "Little Aristocrat." The appellation is applied because it is maintained that the machine, despite the low price, has the appearance of a costly vehicle, with power, speed and endurance to satisfy the most exacting motorist. The body is particularly smart and it is said to be the design accepted following a competition by builders for a prize offered by the company, this policy being adopted to secure the submission of as many ideas as was possible.

The company has for several years produced a well known roadster, this being conservatively rated at 20 horsepower, which was its specialty until the advent of the new model. The "25" chassis is fitted with a touring body that has a seating capacity of five, and the "Little Aristocrat," with increased wheelbase as contrasted with the roadster, is termed the "big brother" of the runabout type so familiar to motorists. The purpose of the company is to market this machine as a standard and to develop and specialize it as a vehicle especially adapted to the needs of the great majority of automobilists.

The chassis was designed with a view to securing the greatest degree of simplicity and the complete accessibility so desirable for satisfactory maintenance and repair and the protection of all moving parts from abrasive substances that would cause unnecessary wear. In simplification of the design departure was made to a considerable extent from the runabout model, but these changes are principally with the power plant, which is an entirely new creation. The policy of the designer has been to incorporate in the car features that are characteristic of machines of decidedly higher price and to have all the comfort to be found in vehicles of greater proportions.

The motor, clutch and transmission are a single assembly, contained in one housing and forming a power plant that is in every way protected against the usual causes for deterioration. The design is exceedingly simple and efficient and it is maintained that the car will carry a load of five passengers and make 40 miles an hour over average roads, having an unusual degree of flexibility and being particularly easy to control.



Three-Quarter View of the 1913 25 Horsepower Touring Car, the Latest Production of the Empire Automobile Company.

The engine is a four-cylinder, four-stroke cycle type with L head cylinders, the valves being located at the left side. The cylinder units are cast in pairs and are a fine quality of gray iron, the bore being 3.5 inches and the stroke 4.5 inches. The horsepower rating by the S. A. E. formula is 19.6, but as the ratio of stroke to bore is 1.285 to one, and there is undoubtedly greater power with the long stroke engine, the claim of the maker that the motor will produce 25 horsepower is conservatively based. The cylinders are cast with the heads and the water jackets integral, and with large openings in the head of each unit, by which the core is removed. The jacket spaces are designed to insure satisfactory cooling and positive

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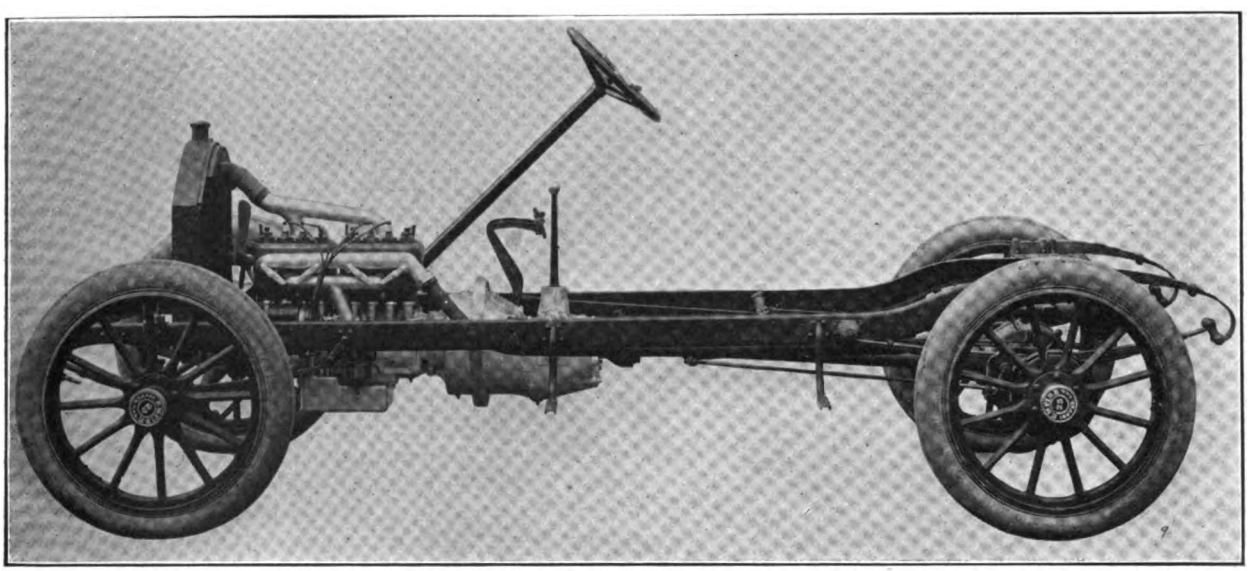
circulation of the water, which enters the cylinders at the base of the jacket on the right side and, after circulating around the cylinder walls, is carried off by large outlets at the top of the cylinders to which the outlet manifold is connected. These outlets are covered by plates secured by cap screws.

The cylinders are bored, aged to insure against distortion from internal stresses, then reamed and ground to size. The pistons are of the same grade of gray iron and after being turned are ground to fit the cylinders. The pistons are fitted with three rings that are turned and ground on the edges and the periphery, fitting the ring channels accurately.

The crankcase is an aluminum casting in three sections, one of which is the bottom and another the housing that encases the timing gears. The crankcase main section is divided by a cross web that carries the centre main bearing. There are pits formed in the bottom section to collect the lubricant into pools beneath each crank throw and in the divisions are ducts by which a level is maintained. The ends of the case and the central web carry the main bearings for the crankshaft and the camshaft. Attached below the bottom of the crankcase is the reservoir for the lubricant, which has a capacity that will permit driving several hundred miles without replenishment.

The crankshaft is installed from the rear of the assembly. It is of a superior quality of steel, carefully ground to size and heat treated to insure strength. It has a diameter of 1.5 inches save at the rear bearing, where the diameter is increased to 1.625 inches, and a total length of bearings of 10.25 inches, the length of the forward, middle and rear bearings being 3.5, 2.75 and four inches, respectively. The bearings are lined with a fine quality of antifriction metal, scraped to an accurate fit. The camshaft is made of a similar quality of metal as the crankshaft and is of large size, finished with much care to insure strength and durability. The camshaft is carried in three large bearings of high class metal. The connecting rods are of steel I section, drop forged, and the big ends are fitted with bearings of fine metal two inches in length at the crankpins. These bearings are carefully secured and may be adjusted as desired. The wristpins and the wristpin bearings are large and the pins are hardened and ground to size.

The valves have ports of 1.5 inches diameter and abundant clearance to insure complete exhaust of the burned gases and adequate aspiration of the fuel charge. The valves are nickel steel heads with steel stems and are designed for hard service. They are actuated by large tappet rods that are provided with adjusting screws and nuts to compensate for wear, and the tappet guides, the tappets, the springs and valve stems are enclosed to protect them from water, dust and other abrasive substances. The protection is such that there is easy access to the valve mechanism for adjustment or restoration.



Side View of the 1913 25 Horsepower Empire Touring Car Chassis, Showing the Unit Power Plant and the Centre Control Lever.

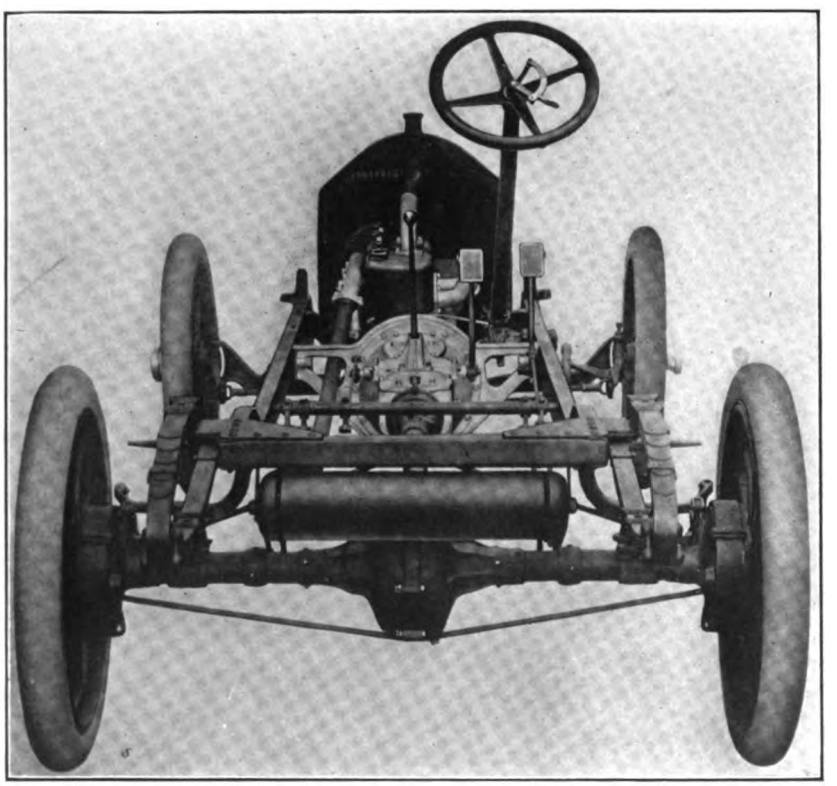
The motor is cooled by the thermo-syphon system, the water circulating through the liberal water spaces of the engine and being cooled by a large radiator, the radiation being heightened by a fan mounted on a bracket at the forward end of the crankcase and driven by a belt from a pulley on the extension of the crankshaft. The bracket is so designed that the belt may readily be adjusted for tension. The engines have been driven under all conditions and the radiation has been such that no motor has ever been overheated.

The lubrication is by a gear driven pump that draws the oil from the reservoir beneath the engine case and causes the three main bearings to be flood-

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ed. The excess oil is drained into the four pits beneath the crank throws, into which the big ends of the connecting rods swing, the splash affording lubrication for the camshaft bearings, the cams, tappets and tappet guides, the wristpins and their bearings and the pistons and cylinder walls. The drainage from the forward main bearing supplies the lubricant for the timing gears and their bearings. The overflow from the oil pits drains to the oil reservoir, where it is filtered and again pumped through the system.

The ignition is by a high-tension magneto, with a set spark, driven by an outside shaft, there being no advance lever, the only adjustment possible being through change of timing. The wiring is exceedingly simple, there being the four leads from the distributor to the four spark plugs and the ground connection through the switch. The switch is located on the dash within convenient reach of the driver. The engine is started with the magneto with a quarter-turn of the crank, there being no battery necessary. The wiring is short and heavy, well protected from water, oil, dust and the usual causes for wear. With but a single system and few leads of cable there is a minimizing of complications and greater certainty of endurance. The carburetor is a float feed automatic type, giving a uniform mixture at all speeds.



Rear View of the 1913 Empire Touring Car Chassis, Displaying the Spring Suspension, Rear Axle Construction, and the Power Plant and Control Mechanism.

The clutch and the flywheel are incorporated in one assembly contained within a housing bolted to the rear of the engine case, to which access is had by a large handhole covered with a plate retained by cap screws. The clutch is of the disc type, with a plate nine inches diameter, faced with Raybestos. This clutch is operated without lubricant, is easy in engagement and does not cause jolts or jars, while it is proof against heating.

Bolted to the clutch housing is the transmission case, also of aluminum, which protects the gearset of the selective type, having three forward speeds and reverse. The gears are large, with .875-inch face, of specially treated steel, and the shafts are of similar proportions and material, mounted on annular ball bearings throughout. The gearset is designed for hard service and is expected to endure under any character of work to which it may be subjected.

The power plant is installed on the forward frame cross member and is supported by two arms integral with the clutch and flywheel housing that are fitted into the channels of the frame side members. These arms are made in skeleton form for lightness.

The drive is by propeller shaft from the transmission shaft through two universal joints to the differential gear incorporated with the semi-floating rear axle. This rear axle assembly includes two sections of the differential housing, to which are riveted the tubes containing the driving shafts. The driving shaft with the pinion shaft, carried on heavy bearings, is protected from torsional strains by a stout torsion tube to the forward end of which radius rods extend from yokes just within the brake flanges of the axle. The axle is further supported by a truss rod that is adjustable and insures against the strains of a heavy load.

The driving shafts of the axle and the differential gearing are mounted on substantial bearings, the wheels being keyed to the ends of the shafts. The axle housing, reinforced for strength, carries the spring saddles, and the sturdy flanges for the brake shoes.

The front axle is a special steel drop forged I section with unusually large yokes, it being designed to have extreme endurance. The steering knuckles are of similar proportions and the spindles have uncommon strength. The tail lever and the tiebar are intended to have great wear. The tiebar is behind the axle to protect the bar from contact with road obstructions.

The frame is of pressed steel channel section of

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liberal dimensions and it is raised at the rear to permit the use of the three-quarter elliptic springs. There is one cross member besides the end members and the arms supporting the power plant assembly. At the rear the gusset plates are riveted to the top of the frame and the plates are of heavy metal, extended outward to support the ends of the upper quarter of the suspension springs. The plates are lower than the spring quarters and to them are bolted the springs, heavy clips being used. The lower halves of the springs are supported by the saddles and large clips. The rear ends of the springs are shackled and the forward ends are carried by a substantial hanger. The forward springs are semi-elliptic and these are carried under the chassis frame. The wheels are wood, artillery type, 32 inches diameter, and are fitted with quick detachable rims and 32 by 3.5-inch tires. The wheelbase is 104 inches.

The control is by a steering column with a 17-inch hand wheel with aluminum spider set at the right side, there being a throttle lever mounted above the wheel. The steering gear is the full worm and gear type and is irreversible. The clutch is controlled by the left pedal, which is also connected with the emergency brake, so that by "pushing through" the clutch pedal the emergency brake is applied. The service brake is actuated by the right pedal. The service brake is external contracting on drums on the rear wheels and the emergency brake is external expanding within the same drums. The brakes are of liberal size and extremely powerful. The speeds are secured through the shifting lever of the gearset which is mounted on top of the transmission case and is in the centre of the car at the left of the driver. There is no connection between the transmission and the chassis frame and the power plant is protected against the torsional stresses that might result from linkage or direct attachment. The fuel supply is contained in a tank under the driver's seat of 12 gallons capacity, and it is supplied to the carburetor by gravity. The motor is unusually well silenced by a large muffler installed under the rear of the chassis, and by a long exhaust pipe of generous proportions.

The chassis is equipped with a commodious body of aluminoid steel with wood frame and trimming, of the full vestibule fore door type, the design being with straight lines from front to rear. The dash and the cowl of the body are a single casting that gives unusual rigidity to the chassis and to the body. There is abundant leg room in the forward compartment and the tonneau is ample in size, seating three comfortably. The seats are wide and deep and are especially restful, having low cushions and easy springs, with upholstering of excellent leather. The doors have all handles fitted inside the body. The fenders are wide and graceful and the body is protected by a mud apron between the chassis and the running boards. The running boards are entirely free and the car can be entered from either side without obstruction. The finishing hardware is nickel plated.

The car as marketed is equipped with a horn, a set of five lamps, two gas headlights, and oil dash and tail lights, tools, jack, and tire repair outfit and foot pump.

NEW LUBROLEINE PACKAGES.

The latest edition of "The Mission of Lubroleine," published by the Fiske Bros. Refining Company, 24 State street, New York City, maker of Lubroleine lubricants, is ready for distribution and will be sent free to all who make request. The booklet is replete with information regarding the proper lubrication of the motor car, and among other things calls specific attention to the new packages in which a portion of the product of the company will be packed in the future. This applies more particularly to Lubroleine gearcase lubricant, formerly known as Phoenixo, and to Lubroleine gearcase compound, which are now packed in square cans instead of round. The name of Centaur graphite grease also has been changed to Lubroleine graphite grease, and that of Climax Synovia to Lubroleine cup grease.

CRAWFORD NOTCH TO BE A PARK.

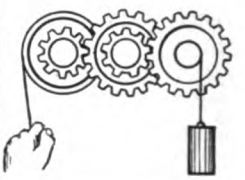
Crawford Notch, the beautiful "Gateway to the White Mountains," which is used by so many motorists in touring in that section, is to become the property of the State of New Hampshire and be maintained as a park, as befits its scenic splendor. Gov. Robert P. Bass has been fighting for some time to secure possession of the property from the timber owners who threatened to mar its beauty by their logging operations, and by a recent decision of the supreme court condemnation proceedings are to be instituted. A commission has been appointed, and will go over the property to make the award. This will be welcome news to lovers of the famous New England district, for the logging operations threatened to spoil the beauty of the mountain sides.

IMPORTANT GOOD ROADS MEETING.

Six states are to be represented in the fourth annual Intermountain good roads convention which is to be held in Logan, Utah, on June 12-14. It is expected that the convention will be the largest of its kind ever held in the Rocky Mountain district, with delegates present from Colorado, Wyoming, Montana, Idaho, Nevada and Utah. The accommodations of the city, though there are several hotels, will be inadequate, it is thought, and arrangements have been made with the Oregon Short Line to fill the sidings of the town with sleeping cars for the visitors. One of the main objects of the convention will be to work to secure government aid in the construction of roads in the mountains, where road work is so expensive and needs to be so well done. Interstate highways will be also featured.

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RECENT MOTOR VEHICLE PATENTS



Youngs Fuel Lock.

One of the most practical methods of locking the motor car to prevent theft or its use by other than the owner or operator, is cutting off the supply of fuel to the carburetor. Fred Elliott Youngs, Detroit, has been granted a patent for a fuel locking device which may be operated from the seat, the securing mechanism being fitted to the dash. Interposed in the main line is a valve member which shuts off the supply of fuel. Extending from the device is a housing, carrying a rotating member which actuates the valve. The top of the housing is equipped with a locking device which prevents the valve being opened by others than those possessing the key.

Lutwyche Headlight.

The development of electric lighting equipments for the motor car has stimulated the efforts of inventors and a novel lamp has been patented by Edgar J. Lutwyche, Chicago. The lamp casing proper is open at one end and has a reduced neck at the opposite extremity. Within this member is fitted the electric lamp consisting of a parabola, the larger end of which is secured to the main lamp and cushioning means are also provided. The bulb extends horizontally from its socket and is equipped with the usual means for connecting the wires.

Hylton Hood Hinge.

Water tight hoods are essential on the motor car to prevent rain from reaching the power plant and affecting the operating of the ignition system. John C. Hylton, Chicago, has patented a hinge which differs from those of ordinary construction inasmuch as each of the two companion leaves have the whole of one edge rolled in cylindrical shape and these formations partially enclose each other. Each cylindrical edge being greater in extent than a semi-circle, the leaves are held in pivotal connection at any desired angle to each other. Each end is provided with notches adjacent to the ears and thimbles on the ends of the latter project into these notches.

McKiel Lamp Connector.

Recently, considerable attention has been paid to the development of automatic rotating headlights by inventors and a new design is noted in the device upon which James B. McKiel of Marshall, Tex., has secured a patent. The movement of the light in conjunction with that of the vehicle is obtained through an arm attached to the reach rod of the steering mechanism. The lamp is rotably mounted and is fitted with a spring arm member which is connected to the actuating member by a pivotal link.

Pieper Electrolytic Cell.

A patent has been granted to Oscar H. and Alphonse F. Pieper, Rochester, N. Y., for an electrolytic cell. It comprises a hollow chamber having radiating compartments with connecting passages at the top and bottom, also with the electrode chamber. The bottom of the latter is lower than that of the other members, and is designed to collect any and all sediment that may be present. The chambers and passageways are formed of an integral casting having apertures in alignment with the passageways and clean-out plugs are fitted in said apertures.

Gooderham Windshield.

A windshield of the adjustable type, also permitting the upper part to be displaced when desired, has been patented by Albert E. Gooderham, Toronto, Canada. It comprises an upper and lower sash so arranged to be moved into the same vertical plane, or into a plane at an inclination thereto, so as to present an opening between the top edge of the lower member and the bottom edge of the upper. The upper part is provided with foldable means as well as for holding. Its position is secured by stay rods carrying slidable brackets, and to these members are attached braces pivotally connected.

Klell Convertible Body.

A convertible automobile body presenting interesting features, inasmuch as it combines the function of touring car and limousine, has been patented by Albert Klell, West Park, O., assignor of one half to Henry Barnes of Cleveland, O. The regular open body is equipped with a laterally projecting border about its top. The closed body is fitted with barrel members, these registering with recesses in the other body, and having rotary locking devices for the purpose of fastening securely both bodies. It is claimed by the inventor that the upper body may be removed or replaced in a short time and that the design is such that it does not detract from the appearance of the vehicle.

OTHER PATENTS GONE TO ISSUE.

Lamp Support, James B. Eastes, Konowa, Okla. A support for automobile headlights connected with the steering reach rod, so that lamps are turned as the car turns.

Horn Bulb, H. W. Lester, assignor to the Post & Lester Company, Hartford, Conn. A horn bulb provided with

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a metal ferrule covering the neck and flaring back toward the body preventing undue distortion of the rubber and consequent cracking.

Tire Tool, Adam A. Long, Rochester, N. Y. A bar, one end of which fits around the wheel hub and other is formed as a handle, bears a plate which guides the tire into the rim. Placing the plate on the rim and the bead of the tire on the plate, it is only necessary to swing the bar around the wheel to force the tire into the rim.

Electric Horn, Solomon Rosofsky, Brooklyn, N. Y. A wheel rotated by a motor strikes against the arms connected to a diaphragm, the bearing of these arms on the wheel being adjustable from the outside, regulating the sound.

Motor, James F. Hopper, Sherman, Tex., assignor of one-half to Hamlet C. Smith. Motor in which compressed air is injected into explosion chamber to ignite charge.

Limousine Top, Oscar N. McCallister, Mount Vernon, Ind. A top adapted to transform the usual touring car into a limousine.

Top, Alexander Ritchie, Detroit. Has only one bow at each side of the seat, being held at the front and the rear by straps.

Hydrometer, Edward W. Smith, Philadelphia. A hydrometer for storage batteries consisting of a syringe containing the hydrometer proper, the nozzle of the syringe being closed by a block containing an S shaped passage which excludes air, so that the syringe full of fluid may be inspected where convenient.

Windshield, James E. Stevenson, Puyallup, Wash. A windshield adapted to fold on itself at the side of the car, the transparent part being of flexible material carried on rollers on the dash.

Whistle, Emmet P. Gray, Detroit. An exhaust whistle attached to the side of exhaust pipe, with which it connects by means of a valve, normally closed. The opened valve extends into the pipe, directing part of the gases into whistle.

Spark Plug, Luther H. Wattles, Providence, R. I., and Matie C. Messler, Pawtucket, R. I. A spark plug containing a piston actuated by the motor compression and revolving the armature of a generator to produce an electric current.

Nut Lock, Elmer L. Minnig, Harrisburg, Penn. Nut is provided with a pin bearing an eccentric pawl which engages with the threads of the projecting end of the bolt, preventing loosening of nut until pawl is thrown out of engagement with threads.

Indicator for Acetylene Generator, Joel E. Hill, Lexington, N. C. An indicator for acetylene gas generators, by means of which the amount of carbide unconsumed is shown.

Seat, Ludwig Wilkening, Hanover, Germany. A spare seat for automobiles, made of wire with a curved spring beneath the side member.

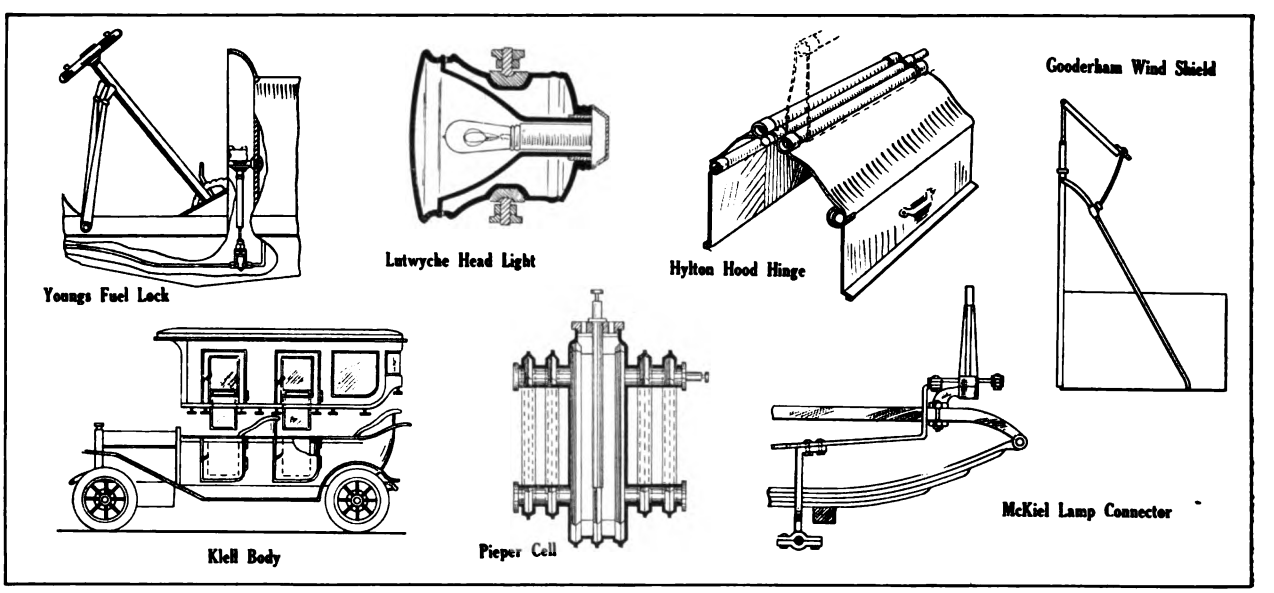
Control Lever, Alfred T. Sturf, Flint, Mich., assignor to Buick Motor Company. A control lever for fore door bodies, the sector being attached to the top of the door, inside. This lever is provided with a handle and is adapted to engage and manipulate other levers not so provided, beneath the sector.

Steering Rod, Jacob H. Stull, Fremont, O. A universal jointed steering rod which may be tilted in any direction and is provided with means for holding it in any determined position.

Air Pump, Frank C. Virtue, Toronto, Can. Has inlet valve at bottom and outlet valve to hose at top. The foot irons are adapted to fold along the pump cylinder.

Spring, Herbert Austin, Barnt Green, near Birmingham, England. A full elliptic spring, the middle of the upper member of which is pivotally attached to the frame while the inner end is linked to the pivot connection of the corresponding end of the lower member to the frame.

Spark Plug, Vincent G. Apple, Dayton, O. The ends of the centre electrode are fused intimately with the insulating material of the core, effectually closing the passage through which the electrode is inserted.



Latest Ideas of Inventors Along Lines of Interest to the Manufacturer, Agent and Owner, Including Fuel Locking Device, Rotating Headlight, Convertible Body, Etc.

Motor, Harry Whidborne, Plymouth, and J. J. Lishman, Salcombe, England. A motor of the two-cycle type, with a two-diameter piston. The cylinders are arranged in pairs, the larger end of one piston compressing a charge for the explosion chamber of the other cylinder. The large end works in an annular chamber in two parts and compresses two independent charges of gas and air.

Oil Can Holder, Amos Hutton, Chicopee Falls, Mass. A bracket holding a bar which is provided with an aperture guarded by jaws which grip the spout of an oil can.

Motor, Robert McKee, Philadelphia. A reversible four-cycle motor, in which means are provided for advancing the lead of the cams when reversing and at the same time keeping the direction of revolution of the camshaft unchanged.

Windshield, Frederick Schimpfer, Union, N. J. A windshield in three parts, the lower one fixed, the middle one hinged to this, and the upper one pivoted to the frame.

Carburetor, Frederick Barthel, Detroit, assignor of one-half to F. E. Wadsworth. A carburetor for two-cycle engines, in which the needle valve opens directly into the cylinder. The crankcase compression is communicated to the gasoline in the device, forcing it into the cylinder at the same time that the air escapes through the port into the cylinder.

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SUCCESS WITH REPUBLIC TIRES.

A particular instance in which a salesman has won deserved promotion after several years of earnest endeavor to prove his worth to the concern with which he is connected, is that of John H. Kelly, recently appointed sales manager of the Republic Rubber Company, Akron, O., maker of Republic tires. Mr. Kelly was for nine years manager of the Chicago branch of the company, the business of which grew under his direction until it was second in importance only to that conducted by the home office, itself.



John H. Kelly, Sales Manager, Republic Rubber Company.

He is decidedly well known in the motoring world, largely because of his connection with the reliability runs and hill climbs conducted by the Chicago Motor Club, of which he is a member. In fact, his acquaintance is much wider than the industry, as for 14 years prior to his connection with the tire business he was actively engaged in the sale of bicycles. As a member of the Cycling Club of Chicago he was particularly enthusiastic in promoting this cause, pushing his wheel over most of the highways of northern Illinois in the interests of good roads and the mount which he represented.

Soon after becoming identified with the Republic Rubber Company, as manager of the Chicago branch, Mr. Kelly joined the Chicago Automobile Trade Association and a little later was selected as one of its directors. As was true of every endeavor with which he became identified, this association received his very best effort. Undoubtedly, while the members will join with many others who know him, in congratulating him upon securing added responsibilities in his new field, they cannot help regretting that his removal to Akron will result in a distinct loss to motoring activities in Chicago.

GROSSMAN OFFERS PRIZES.

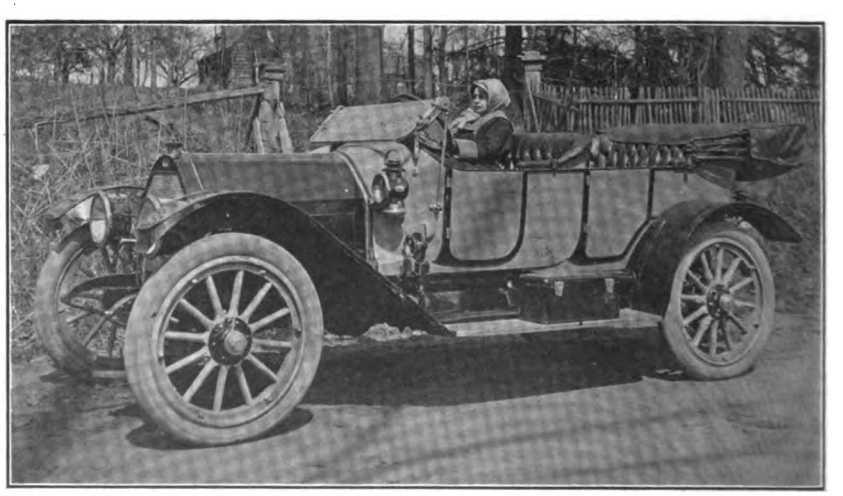
The Emil Grossman Company, New York City, has offered prizes to the amount of $1350 to the winners in the 500-mile race at Indianapolis on Memorial Day, provided they use Red Head spark plugs. The winner will receive $1000, second $250 and third $100, on this condition.

COLE CAR MATCHES HER HAIR.

Senor Juan Peixotto Asunsulo of Brazil recently called at the salesrooms of the Colt-Stratton Company, New York City, eastern distributor for the Cole Motor Car Company, Indianapolis, Ind., and desired that Capt. Harry L. Stratton, vice president of the concern, should show him a car that would accommodate four people. Capt. Stratton suggested a Cole toy tonneau model, and a demonstration brought about an immediate sale.

There was only one proviso and that was that the trimming on the body work should match exactly Senora Asunsulo's hair, which her husband declared was of the most beautiful golden brown in the world. It was a decidedly new proposition for Capt. Stratton, but he undertook to fill the order as given and succeeded so well that Senora Asunsulo and her husband declared themselves the happiest Spaniards alive when the machine was ready for delivery and shipment to Brazil.

An accompanying illustration presents Senora Asunsulo at the wheel of her new car, as taken just before her departure from New York for her home in Brazil. The hood and panel work are of rich golden brown, while the remainder of the body is in pleasing contrast.



Senora Asunsulo of Brazil in Her Cole Toy Tonneau, the Color Scheme of Which Matches Her Hair.

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TO SELL OVERLANDS ABROAD.

Claude A. George has been selected by President John N. Willys of the Willys-Overland Company, Toledo, O., to represent the maker of Overland cars abroad in the establishm e n t of an European depot at Hamburg, Germany. The choice is one which will meet with favor by a large number of people both in and out of the industry, who are well acquainted with Mr. George and his particular fitness for the commission.



Claude A. George, Foreign Manager, Willys-Overland Company.

His connection with the industry has been such as to command widespread attention, having been assistant sales manager of the Willys-Overland Company for several years. Previous to his connection with that concern he was an European representative of the Eastman Kodak Company, so that his field in the new work assigned to him is by no means unknown by him.

The foreign business of the Overland has grown so fast during the last year that this move was regarded as absolutely essential. Several agencies are maintained all over the Continent, as well as on the British Isles, and the Overland product has come to be recognized as particularly adapted for the foreign market. The future success of the enterprise will depend largely upon Mr. George, and his many friends will agree with President Willys in believing that he will meet the opportunity.

SALESMEN RELIEVE FARMERS.

A decidedly novel idea in selling automobiles to farmers has been put into operation by western salesmen of the United States Motor Company. Farmers at this time of the year are too busy ploughing and doing other farm work to have time to talk to salesmen, so one enterprising man evolved the idea of carrying a farm hand or two to relieve the farmer while he looked over the car and took a demonstration. The scheme seems to be meeting with success, the farmers being willing to talk automobile when they know that their work is not being delayed.

YEATS RESIGNS TO FORM COMPANY.

G. H. Yeats, who for the past year and a half has been assistant sales manager of the Abbott Motor Company, Detroit, and previously had been sales manager of the company since its formation, has resigned. He has organized the G. H. Y. Auto Supply Company in Detroit, and has taken a store at 882 Woodward avenue, where a general line of automobile supplies will be carried, and a large jobbing and retail business conducted. This change from an important position with an automobile concern to a supply house has caused considerable surprise to Mr. Yeats' friends and the trade as well.

NOW WITH BAKER ELECTRICS.

An important announcement is made in the information that H. A. Worman, formerly advertising manager of the National Carbon Company of Cleveland, O., has become identified in the same capacity with the Baker Motor Vehicle Company of that city, maker of Baker electric pleasure and commercial cars. Mr. Worman is recognized as an authority on advertising and selling, frequent articles from his pen having appeared in magazines devoted to constructive work along these lines.

After leaving college, he associated himself for a period of five years with the National Cash Register Company, Dayton, O., obtaining valuable experience, which has been combined with his own natural aptitude for this field of endeavor. Later he became identified with the A ddressograph and International Harvester companies of Chicago.



H. A. Worman, Advertising Manager, Baker Motor Vehicle Company.

Since removing to Cleveland, Mr. Worman has been actively interested in the development of classes in sales and advertising methods in connection with the Y. M. C. A. schools. He is regarded as a convincing lecturer and writer upon the subject of his profession and the Baker Motor Vehicle Company is to be congratulated upon securing his services.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



Columbus Gets the Convention.

According to the constitution of the Federation of American Motorcyclists, official notice of the national assembly must be made in the various motorcyling journals, and in compliance with that provision the following official communication from President G. H. Hamilton is presented:

Editor, Automobile Journal—
Kindly be advised that the city of Columbus has been selected for the 1912 F. A. M. national meet. The Cleveland Motorcycle Club and Columbus Motorcycle Club were the two clubs making a bid for the meet and a majority of the directors voted in favor of Columbus. There were five votes for Columbus, two for Cleveland and at this writing the votes from the other two members have not been received.

I would appreciate very much your making announcement in your next issue that the 1912 meet will be held in Columbus, O., and conducted by the Columbus Motorcycle Club on July 17, 18, 19, 20 and 21, the first business meeting to be held at 9 in the morning of Thursday, July 18th, at the Virginia hotel. I kindly ask you not to overlook making mention to this effect.

Yours very truly,
G. H. HAMILTON,
President, F. A. M.

New York City, May 15, 1912.

The Tentative Programme.

The details of the programme have not been worked out fully as yet, and are in the hands of the Columbus Motorcycle Club. The following tentative programme has been submitted to the directors of the F. A. M. for their approval:

Wednesday—Reception of riders and delegates at headquarters in Virginia hotel. At 8 in the evening, reception and smoker at the clubhouse of the Columbus Motorcycle Club.

Thursday—At 9 in the morning, first business session in hotel parlors. At 10 in the morning, parade of riders through Columbus. At 2 in the afternoon, business session. At 8 in the evening, entertainment of riders and delegates, including lunch and refreshments, at motordrome.

Friday—At 10 in the morning, business session. At 2 in the afternoon, races at motordrome. At 8 in the evening, visit to Olentangy park.

Saturday—At 2 in the afternoon, races at motordrome.

Sunday—At 2 in the afternoon, races at motordrome.

Amendments to Constitution.

Conforming to the constitution of the F. A. M., President Hamilton makes official announcement of proposed amendments to the constitution, in order that they may be acted upon at the convention, as follows:

First—That the first clause of section 1 of article III of the constitution, which now reads: "There shall be held between June 15th and Sept. 15th of each year a national assembly of the F. A. M., at such time and place as the board of directors may decide upon * * * * *", shall be changed to read as follows: "There shall be held between Nov. 15th and Feb. 15th of each year a national assembly of the F. A. M. at such place and time as the board of directors may decide upon * * * *".

Second—The following addition to article III of the constitution, to be known as section 3 shall be added thereto, to read: "Section 3. There shall be held between June 15th and Sept. 15th



New Swenson Building, Providence, R. I., the Future Home of the Providence Motorcycle Club as Well as of B. A. Swenson, Rhode Island Agent for Indian Machines.

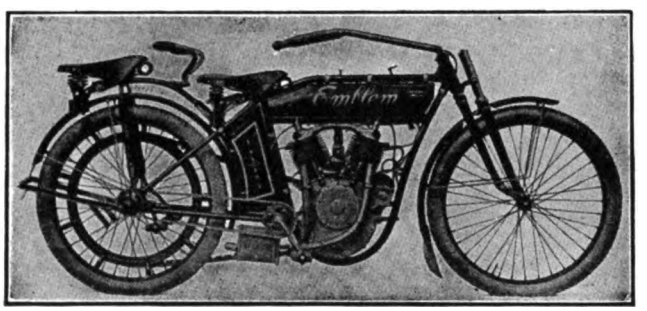
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SERVICE AND RELIABILITY

For his third tour around the world, which began May 10, F. G. Koegel selected the sturdy Emblem, because his investigation led him to believe that no other mount would perform the task with the same degree of comfort and reliability.

Hundreds of owners can testify to the satisfactory performance of the sturdy Emblem under all sorts of road, weather and climatic conditions. It is built for service and reliability and always makes good.

Get an Emblem today and learn just how enjoyable real motorcycling is.



Write Dept. D for Catalogue and Descriptive Literature. If Not Represented in Your Territory Ask for Agency Proposition.

THE EMBLEM MANUFACTURING COMPANY

Also Makers of the Famous Emblem Bicycles.

ANGOLA **ERIE COUNTY** **NEW YORK**

in each year a national F. A. M. championship race meet, at such time and place as the delegates at the annual meeting of the national assembly shall decide."

Third—That the clause in section 1 of article VIII of the bylaws, which now reads: "Between the dates of June 15th and Sept. 15th" shall be changed to read: "Between the dates of Nov. 15th and Feb. 15th."

Fourth—That the following addition be made to article VIII of the bylaws, to be known as section 3: "There shall be held between the dates of June 15th and Sept. 15th of each year a national F. A. M. championship race meet, at such time and place as the delegates at the annual meeting of the national assembly shall decide."

These proposed amendments are signed by J. A. Hall of 322 East 22nd street, Brooklyn, N. Y., who maintains that these changes are absolutely necessary for the future welfare of the organization. He holds that with the rapid growth of the F. A. M. comes the growing importance of business matters which should receive the careful consideration of every member and every delegate representing other members. As these matters grow in importance, he thinks the seven or eight men who comprise the board of directors should not be called upon to decide them for a membership of nearly 15,000.

Mr. Hall suggests that the winter meeting might be held during the progress of the New York or Chicago shows. Inasmuch as no pleasure events would be held in connection with these meetings, under his plan, excepting a possible banquet, he believes that the delegates, elected by the clubs and with their expense borne by the clubs, would be able to give their undivided attention to the business before them.

Championship Races.

Inasmuch as the national meet is to be held on a board track this year the board of directors has made provision in the competition rules as follows:

"Be it resolved by the board of directors that: Being in favor of having the professional championship events run off at the national meet, we therefore resolve that there be competed for at the national meet

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation
American Motorcyclists,
BANGOR, MAINE.

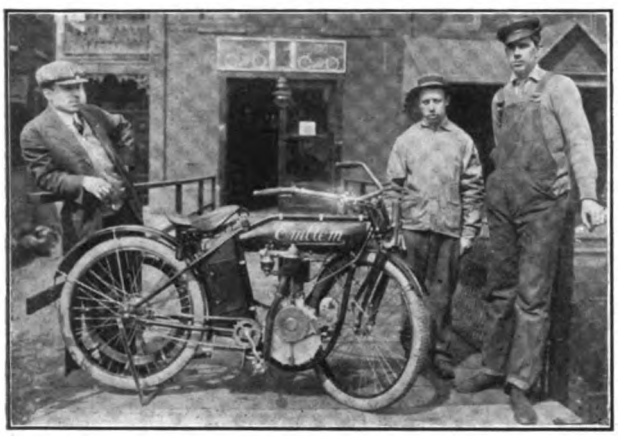
Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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three professional championships for the distance of five, 10 and 25 miles; that the winners of these events shall be known as the national professional motor-



S. A. Flamm, Philadelphia Agent for Emblem, After His Collision with Touring Car.

cycle champions of America for the distances stated, and that for each championship there shall be awarded three medals consisting of gold, silver and bronze for the value of $50."

Providence Club's Picture Run.

The annual picture run of the Providence Motorcycle Club, Providence, R. I., which has come to be recognized as one of the principal events in the New England states, will be held May 26, clubs within a radius of 75 miles being invited to attend. Arrangements are being completed with a moving picture company to take the views this year, and this is expected to prove an added inducement for the various clubs to be well represented. The plan should meet with the hearty approval of the F. A. M., as by this means the growing importance of the motorcycle will be shown all over the country, wherever moving picture houses are maintained.

The club headquarters in the new Swenson building, Blackstone and Broad streets, will be ready for inspection May 26, although the members of the club do not expect to be settled until Memorial Day. An accompanying illustration presents the exterior of the building, the view being taken before it was actually completed. Motorcyclists' Rest, as the new clubhouse is to be known, will occupy the second floor on the left of the picture.

The Sturdy Emblem.

One of the claims made by the Emblem Manufacturing Company, Angola, N. Y., maker of Emblem mounts, is that its product is sturdily constructed. An accompanying illustration shows one of these machines in the hands of Samuel A. Flamm, the Philadelphia agent, immediately after its collision with a touring car. Mr. Flamm writes as follows concerning the accident:

"This machine I was riding myself when the accident occurred. A big touring car got in my road and I tried to push it aside. You can see what happened. As to myself, I came off lucky, and the machine as you can see is very little damaged, only bending the forks. The motor and the control were as perfect as the day they came out of the factory. The forks do not show a fracture, but a clean bend. I was going at a fairly good clip and everyone I show the forks to says they do not understand how it was the machine did not suffer more than it did. This, of course, shows the sturdiness of the sturdy Emblem. In fact, I am proud of the Emblem."

Rhode Island Club Activities.

At the regular meeting of the Rhode Island Motorcycle Club, Providence, R. I., May 20, steps were taken toward securing new clubrooms near the centre of the city. The list of officers for the ensuing year was completed by the election of the following committee members: Competition committee, J. C. Hyllstead, W. E. Johnston and Vernon Speere; entertainment committee, J. C. Loftis, H. G. Baxter and A. Fazzi.

May 19, the members of the club took part in a run to Cliftondale, Mass., the flying field of the New England Aviation Company, of which Harry Atwood is the head. One of the club members, Harry Jones, who formerly rode a Merkel, is flying a Wright biplane, having already made some 15 flights. Jones is fast becoming an experienced aviator, controlling his own machine, although the instructor still goes with him to see that nothing happens. He expected to give his fellow club members an exhibition of his ability along this line, but the weather would not permit him to do so.

May Compete in Canada.

After consultation with President Hamilton of the F. A. M., it has been decided that the chairman of the competition committee will permit without further formality, all members of the federation to compete in Canada under sanction issued by the Canadian Motor-



Donald Johns, Well Known Racing Rider, and His Indian.

cycle Association, and all members of that association will be permitted to compete in the United States under F. A. M. sanction upon presenting to the referee

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a card showing that they are members in good standing of the C. M. A. This permission is issued with the understanding and belief that the rules of competition of the C. M. A. will be similar to those of the F. A. M., and particularly with reference to the matter of allowing profesionals and amateurs to compete against each other.

Around the World on Emblem.

May 10, F. G. Koegel, who holds the world's record for walking around the world, and has made a second trip of the same nature on a bicycle, left Angola, N. Y., on an Emblem motorcycle, made by the Emblem Manufacturing Company of that city. The machine is rated at seven horsepower. He expects to complete the task within six months.

Rockford's Hill Climb.

The annual hill climb of the Rockford Motorcycle Club, Rockford, Ill., was held early in the month, the course measuring about one-half mile. The summary follows:

Twin-cylinder machines—First, H. Pearson, Merkel; second, C. Swanson, Harley-Davidson; third, Fay Young, Merkel; fourth, Ralph Olson, Indian; time, 0:24.8.

Single-cylinder machines—First, H. Jacobson, Harley-Davidson; second, H. Samuelson, Harley-Davidson; third, D. Erickson, Harley-Davidson; time, 0:32.

Perfect Scores in San Diego.

Thirteen of the 15 riders to start in the 386-mile endurance trial of the Motorcycle Club of San Diego, Cal., finished with perfect scores as follows: Clyde Elmer, P. M. Frazen, Henry Burkhardt, S. W. Dobson, C. F. Bruscki, Ray Smith, W. O. Borned, J. E. Dobson, Max Toews, James Urquhart, Dallas Keerer, House Walter and Edward Schmidt. Ten Indians, one Harley-Davidson, one Thor and a Pierce were the machines.

Hill Climb in Georgia.

The results in motorcycle classes at the annual hill climb of the Atlanta Automobile Club at Atlanta, Ga., May 11, were decidedly in favor of the two-wheeled mount, as compared with the racing motor cars. The summary follows:

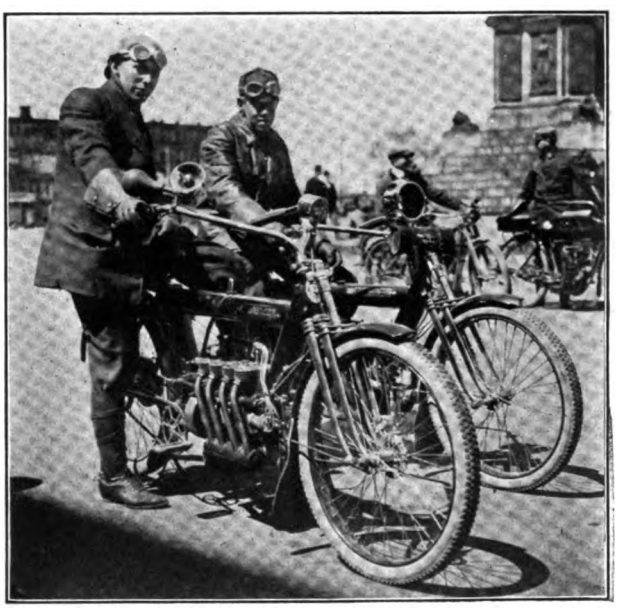
Stock machines, 30.5 inches—First, Doyle Mayfield, Indian; second, D. K. Campbell, Indian; third, R. O. Miller, Merkel; fourth, A. S. Williams, Indian; time, 1:13.2.

Stock Machines, 61 inches—First, H. Swanberg, Indian; second, A. C. Meixell, Indian; third, M. T. Burke, Indian; fourth, L. E. Kamper, Indian; time, 0:54.6.

Professionals, 61 inches—First, H. J. Glenn, Indian; time, 0:53.6.

Whitney Resigns.

P. B. Whitney of Chicago, vice president of the Lake District, F. A. M., has handed his resignation to President G. H. Hamilton. This action was not voluntary on Mr. Whitney's part, as he has been one of the most enthusiastic workers in the Middle West. His business as manager of the Chicago branch of the Hendee Manufacturing Company, Springfield, Mass., maker of the Indian, will not permit him to continue in office longer. In retiring from active work for the federation it is only fair to state that the organization has lost one of its best officials, and one upon whom it was fondly expected that the honor of president would be conferred at some time.



Earl Smith and Hollenbeck of Pawtucket, R. I., and Their Seven Horsepower Pierce Mounts.

Results in Lynn.

Eight of the 16 riders taking part in the endurance run of the Lynn Motorcycle Club, Lynn, Mass., May 12, finished with perfect scores. The distance

ATTENTION MOTORCYCLISTS

Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

B. A. SWENSON

298 Blackstone Street, Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00
(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY **Boston, Mass.**

Branches: 49 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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was about 140 miles, covering the triangle course from Lynn to Worcester, to Providence and return. The perfect score men and their machines were: Edward Haines, Harley-Davidson; H. Feeny, Harley-Davidson; A. B. Madison, Harley-Davidson; Lawson, Indian; Bryant, Harley-Davidson; Harry Phelps, Harley-Davidson; Shattuck, Indian; Lockwood, Indian.

Stadium at Brighton Beach.

According to advices from New York City plans are completed for the construction of a motorcycle stadium at Brighton Beach, L. I., near Coney Island. Thirty thousand dollars will be expended in the undertaking, it is stated, and it is expected that New York will prove as much interested in racing as Los Angeles, Chicago and other cities where the scheme has been given a trial.

Race Meet in South Carolina.

The first race meet of the Columbia Motorcycle Club, Columbia, S. C., was held on the afternoon of May 10. The events were well attended, and the club plans a repeat performance for July 4. The results follow:

Three miles novice—First, Leon Williams, Indian; second, F. S. Habenicht, R-S; third, H. F. Peterson, Indian; time, 3:49.2.

Five miles, open—First, Leon Williams, Indian; second, F. S. Habenicht, R-S; third, H. N. Snaverley, Indian; time, 6:17.2.

Twenty miles, private owners and trade riders—First, H. N. Snaverley, Indian; second, Leon Williams, Indian; third, M. C. Spears, Indian; time, 25:58.8.

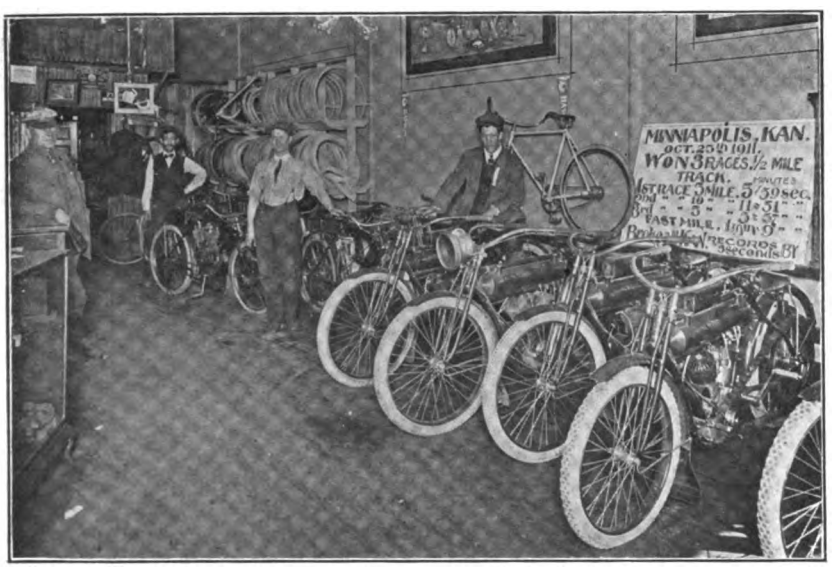
Five miles, miss and out—First, H. L. Davis, Indian; second, H. N. Snaverley, Indian; third, Leon Williams, Indian; time, 7:41.

Franchise for Riverview.

The board of directors of the F. A. M. has authorized Dr. J. P. Thornley, chairman of the competition committee, to issue a restrictive franchise for a board track to William M. Johnson of the Riverview motordrome, Chicago. Dr. Thornley also has been authorized to procure badges for the official referees.

Energetic Merkel Agency.

An accompanying photograph shows the interior of the agency maintained by Newby Bros., at Kansas City, Mo. The concern is agent for Merkel machines, made by the Miami Cycle & Manufacturing Company, Middletown, O., and also has a branch establishment in Topeka, Kan. One of the brothers, Clarence, was a recent visitor to the Merkel factory and stated that more machines of that make had been sold in Kansas City and Topeka than of any other. Without doubt this has been due largely to the energetic action of this concern.



Interior of the Merkel Agency Maintained in Kansas City, Mo., by Newby Brothers.

Club Notes Here and There.

The Hobart Motorcycle Club, Hobart, Ind., has become affiliated with the F. A. M., bringing in 15 members. The secretary is W. E. Corr, and his address, P. O. Box 166. The club is numbered 263.

Warren, O., has some 50 riders, whom W. Cooper of 96 First street is endeavoring to bring together and organize into a club.

Walter A. Good of Ashland, O., is working up sentiment in favor of organizing an affiliated club in his vicinity.

Some of the objects of the newly organized Lawrence Motorcycle Club, Lawrence, Kan., are to awaken wider interest in motorcycling, to enforce suppression of the objectionable open muffler, to arrange for pleasure runs and to co-operate with the automobile interests in securing good roads.

Erwin Keller has been elected vice president of the Topeka Motorcycle Club, Topeka, Kan., in place of George Roberts, resigned.

The Fulton County Motorcycle Club, Gloversville, N. Y., is advocating legislation for uniformity of laws governing the speed of motorcycles throughout that state.

The Motorcycle Club of Santa Cruz, Cal., is planning a race meet to be held at the new amusement park now being constructed at Opal.

The Harlem Motorcycle Club, New York City, has elected the following officers for the ensuing year: President L. H. Guterman; vice president, Daniel J. Willis, Sr.; secretary, D. J. Willis, Jr.; treasurer, David Epstein; captain, Arthur C. Bergenstein.

The Aberdeen Motorcycle Club has been organized at Aberdeen, Wash., with 19 charter members. The following officers have been elected: President, M. O. Adams; vice president, Harry Prentice; secretary, Leon McNeal; treasurer, R. E. Barnes.

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Twenty-two riders in Burlington, Ia., recently organized the Hawkeye Motorcycle Club with the following officers: President, T. Field; vice president, George Swan; secretary, E. C. Marquard; treasurer, Joseph Miller; captain, George Hartman; first lieutenant, Leo Masters; second lieutenant, Harry Mauthe.

Indians Lower Records.

New attempts to lower existing records were made by Indian riders on the Los Angeles track May 17, Ray Seymour creating new professional marks from one to 21 miles, his oil giving out on the 22nd mile, and Claflin reducing the amateur time from one to 17 miles, inclusive. The marks exceeded were set by Excelsior riders April 19, with the exception of the professional record for one mile, and the amateur for 15, 16 and 17 miles, the new and old figures being given as follows:

World's Professional Records.

		Old	New
1	mile	0:41.2	0:37.0
2	miles	1:17.0	1:14.4
3	miles	1:56.8	1:52.6
4	miles	2:36.8	2:30.2
5	miles	3:17.0	3:08.4
6	miles	3:57.2	3:47.4
7	miles	4:38.0	4:25.8
8	miles	5:18.6	5:04.4
9	miles	5:58.4	5:42.6
10	miles	6:38.6	6:21.8
11	miles	7:18.6	7:00.0
12	miles	7:58.4	7:39.0
13	miles	8:38.0	8:17.4
14	miles	9:17.2	8:56.8
15	miles	9:56.8	9:35.2
16	miles	10:36.8	10:14.6
17	miles	11:17.0	10:53.2
18	miles	11:56.6	11:32.8
19	miles	12:36.6	12:12.8
20	miles	13:16.0	12:52.8
21	miles	13:56.0	13:32.4

World's Amateur Records.

		Old	New
1	mile	0.39.8	0:38.8
2	miles	1:20.0	1:18.4
3	miles	2:01.0	1:58.8
4	miles	2:41.4	2:38.8
5	miles	3:22.4	3:18.8
6	miles	4:03.4	3:59.2
7	miles	4:43.6	4:40.0
8	miles	5:24.2	5:20.8
9	miles	6:04.8	6:01.2
10	miles	6:45.0	6:42.0
11	miles	7:25.6	7:23.0
12	miles	8:06.0	8:03.4
13	miles	8:46.0	8:43.8
14	miles	9:26.4	9:23.8
15	miles	10:46.2	10:03.8
16	miles	11:30.0	10:44.4
17	miles	12:13.4	11:24.6

NEW FORD PLANT.

The Ford Motor Company, of Detroit, is still further extending its system of branch assembling plants, and has made plans to establish a station in Milwaukee, Wis. The Courteen block in that city has been leased and shortly will be occupied by the Ford people. Parts will be shipped to Milwaukee by water.

Massachusetts demands that every vehicle using the public highways during the hours of darkness shall be equipped with suitable lights. Why don't you advocate a similar measure for your state? Now is the time to act.

COVERT MOTOR VEHICLE CHANGES.

A change has taken place in the sales offices of the Covert Motor Vehicle Company, Detroit. C. C. Hinkley, the sales manager, recently resigned to go with the Chalmers Motor Company, and has been succeeded by N. Gould Allen, who was for sometime secretary of the Harrison Radiator Company, Lockport, N. Y. Mr. Allen will handle both the sales of the Covert company and the Harrison radiator from the one office, 1422 Ford building, Detroit.

MAINE TO REPAIR ROADS.

During the past few years Maine has been seeking its full share of the motor touring in New England, and as the result of a recent conference of state officials in Portland, the road between Bridgton and Fryeburg will be put in condition immediately. The cost of this work is estimated at between $10,000 and $15,000, part of which will be paid by the two towns, according to the new law. This will place one of the main arteries of travel to the White mountains in usable condition, the part in New Hampshire being in fine shape. With the repairing of the portion in Maine, there will be an excellent road from Bretton Woods, in the heart of the White mountains, to Portland, by way of Poland Spring.

Other important stretches are to be improved. Highway Commissioner Hardison has reported that surveys have been completed for building 7000 feet of road between Biddeford and Kennebunk, which will repair the worst of the road through the Kennebunk woods. Three miles of road through Wells also has been surveyed for repair, and over two miles in York. The road through Kittery is to be resurfaced and the route from Ogunquit to Cape Neddick entirely rebuilt. The governor has expressed approval of the plan of placing the new roads in the care of patrols which would cover daily a certain number of miles and make minor repairs before the breaks become extensive. This system is to be employed by New Hampshire.

GOOD MARKET IN TEXAS.

In contrast to the poor prospects for motor car sales in the Mississippi valley, where the floods have wreaked havoc, comes the reports of good crops in Texas and consequently prospects of a large sale of cars in that state. Glowing reports of the conditions of the crops have come in from every section of the state, with a wheat production of 18,000,000 bushels expected and an oat crop of 50,000,000 bushels. Corn was set back by early rains, but now promises good. Cotton will be produced to the total of 4,000,000 bales, it is said. Aside from crop condition, one of the most promising indications of a good market for automobiles is seen in the interest the farmers are taking in the machines, sales increasing rapidly.

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The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Diamond Motor Car Company, Pelham Manor, N. Y.; $10,000; incorporators, C. W. Rundell, C. W. Jaycox, Frank Davis.

Pfeiffer Allen Company, Newark, N. J.; $10,000; incorporators, L. F. Pfeiffer, S. W. Allen, George E. Clymer.

Automobile Fault Finder & Anti-Forgery Electric Pen Company, New York City; to manufacture automobile accessories; $50,000; incorporators, P. H. Couty, D. D. P. Ghadiali, Henry Weinberger.

Ceylon Filler Company of New Jersey, Camden, N. J.; $3000; incorporators, H. L. Merrick, J. A. Kinney, William Williams, T. W. Shore.

Kenedy Auto Supply Company, Kenedy, Tex.; $3000; incorporators, Levi Pullin, M A. Newmen, V. A. Smith.

Mandel-Frisch Auto Repair Company, Sioux City, Ia.; $5000; incorporators, A. J. Mandel, August Frisch.

L. A. W. Carburetor Company, New York City; $100,000; incorporators, N. Leinau, S. Heineman, H. A. Watkins.

Field Electric 'Bus Company, New York City; to manufacture electric cabs, etc.; $10,000; incorporators, William Eastman, C. J. Field, Burgess Osterhout.

Garden Taxicab Company, New York City; $15,000; incorporators, Richard Gruen, G. R. Schulze, J. J. Harvey.

Knickerbocker Motor Car Sales Company, New York City; $10,000; incorporators, Benjamin Harris, R. L. Noah, William L. Robertson.

Trojan Rubber Company, Stamford, Conn.; $50,000; incorporators, E. G. Hoffman, C. F. Waterbury, E. H. Johnson, Robert A. Fosdick, W. H. Taylor.

Westwood Auto Garage Company, Westwood, N. J.; $10,000; incorporators, Walter Peveraly, A. H. Steele, Walter Halliday.

The Stark Rubber & Novelty Company, Canton, O.; $100,000; incorporators, J. J. Lisbae, Walter A. Stafford, D. L. Holwick, Lester King, W. E. Scherer.

The Lansden Company, Allentown, Penn.; to manufacture and sell motors; $1,000,000; incorporators, William D. Schantz, W. L. Case, W. J. Maloney.

Queen City Cycle Company, Wilmington, N. C.; $25,000; to deal in motorcycles; incorporators, Eugene R. Pickard, James D. Pickard, Dora B. Pickard.

Thirty-Five Percent Automobile Supply Company, Augusta, Me., $1000; incorporators, E. M. Leavitt, M. M. Spinney, E. L. McLean.

International Trolleymobile Company, Portland, Me.; $1,000,000; incorporators, Robert E. Ahern, Dennis A. Meaher, Charles H. Gilmore, J. Ralph Wellman, Charles W. Noyes.

United Garage Company, Boston, Mass.; $15,000; incorporators, Jesse Good, James R. Jones, William F. Waters.

Blaisdell Automobile Company, Dexter, Me.; $25,000; to deal in automobiles and supplies and conduct repair shop; incorporators, Charles R. Blaisdell, Ernest D. Blaisdell.

Vanderheyden Garage Company, Troy, N. Y.; $5000; incorporators, Fred E. File, 18 Hoosic street, Troy; William G. Pike, Eleanor M. Pike.

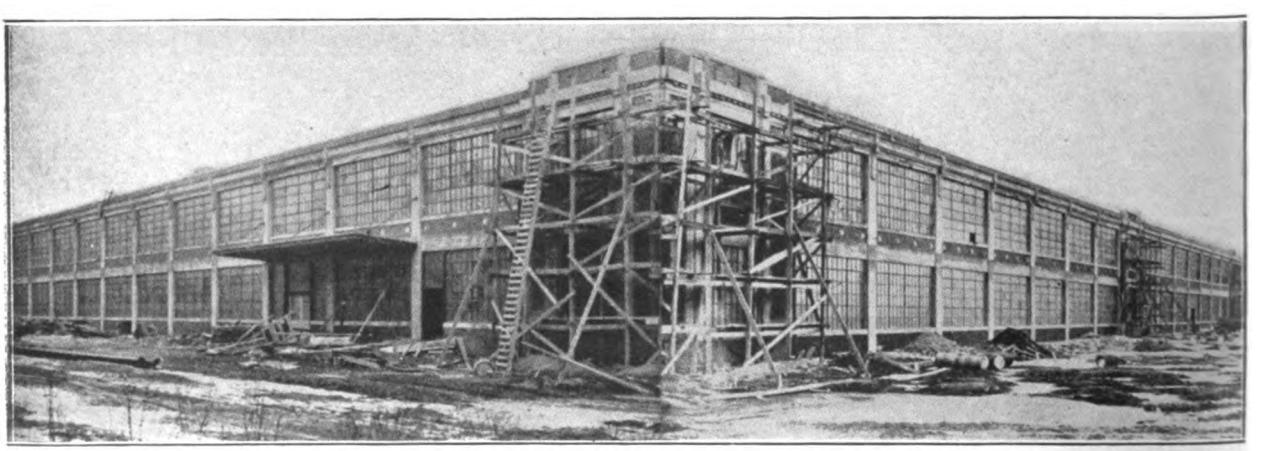
Brooklyn Delivery Company, New York City; $2000; to conduct automobile delivery; incorporators, M. A. Lynch, 109 W. 82nd street; Charles E. McMahon, E. S. Lucas.

Yonkers Auto Repair Company, Inc., Yonkers, N. Y.; $1000; incorporators, Herman Flader, Albert Kipfer, Elizabeth Kipfer.

Bayside Taxicab Company, Bayside, N. J.; $5000; incorporators, William Wagner, Charles B. Story, Charles Bonner.

Consumers' Rubber Company, Providence, R. I.; to manufacture and deal in rubber goods; $600,000; incorporators, P. W. Gardner, A. L. Churchill, E. Butler Moulton.

California Co-Operative Motor Company, Long Beach, Cal.; $150,000; incorporators, Joseph J. Mottell, W. H. Benette, S. H. Underwood, George A. Spicer.



Outer Shell of the Continental Motor Manufacturing Company's Plant in Detroit, Said to Be the Largest Structure of Its Kind in the World.

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The Bergdoll Car Company of Missouri, Camden, N. J.; to manufacture and deal in motor cars; $10,000; incorporators, Frank R Hansell, John A. MacPeak, C. U. Martin.

P. & A. Non-Metallic Oilless Bearing Company, Wilmington, Del.; $50,000; incorporators, E. E. McWhiney, William J. Maloney.

Never Puncture Tire & Tube Company, Wilmington, Del.; $1,500,000; incorporators, E. E. McWhiney, William J. Maloney, Norman P. Coffin.

Standard Engineering Company, Belfast, Me.; $10,000; to manufacture and sell automobiles and supplies; incorporators, A. W. Keating, Maurice W. Lord.

National Auto Specialty Manufacturing Company, Tama, Ia.; $10,000; incorporators, E. E. Harlan, John Pitka, L. L. Hufford.

Pennsylvania Automobile Company, St. Louis, Mo.; $10,000; incorporators, William A. Fortner, Claude G. Fordtrau, George P. Burleigh.

Republic Motors Company, Brooklyn, N. Y.; $2000; to deal in automobiles and motors; incorporators, Stephen C. Frere, Ernest J. Ellenwood, W. J. Maloney.

Presto Inter Rim Company, Portland, Me.; $200,000; incorporators, M. A. Thurston, H. P. Sweetser.

Como Automobile Supply Company, Charlotte, N. C.; $50,000; incorporators, Morehead Jones, C. C. Coddington, Mrs. M. M. Jones, Mrs. M. L. Coddington.

Eastern Motor Racing Association, East Orange, N. J.; to manufacture automobiles and motorcycles; $50,000; incorporators, H. H. Picking, C. O. Geyer, F. E. Ruggles.

Ford Auto & Truck Company, Inc., Clarendon, Va.; $25,000; incorporators, E. H. Bauer, W. W. Barnes, R. Gordon Finney.

Hassett & Rogers, Inc., Amesbury, Mass.; $18,000; to manufacture automobile bodies; incorporators, J. H. Hassett, C. H. Hassett, G. H. Collins.

North Jersey Auto Supply Company, Inc., Newark, N. J.; $80,000; incorporators, Max Permission, 525 18th street, Newark; A. C. Mohrof, C. G. Butler, F. W. Mead.

Broadway Penn Garage, Inc., Brooklyn, N. Y.; $2000; incorporators, Herman Goldstein, 181 Penn street, Brooklyn; Meyer Kaplan, Hyman Maisel.

Gressler Aviation Company, New York City; $25,000; incorporators, W. Romain Gressier, 139 W. 37th street, New York City; W. R. Kip, Gerardus P. Herrick.

Briggs Oil Company, Long Beach, Nassau country, N. Y.; $1500; to deal in oils and greases; incorporators, William S. Driggs, Long Beach; Abraham Lodholz, Henry J. Frink.

WITH THE MANUFACTURERS.

C. C. Hinkley has joined the Chalmers Motor Company, Detroit, as chief engineer, having left the Covert Motor Vehicle Company, Lockport, N. Y. He has had considerable experience in the automobile industry having been with the Olds Motor Works and the Owen Motor Car Company.

The Continental Motor Manufacturing Company, Detroit, has erected what is claimed to be the largest factory building in the world devoted to the manufacture of motors for automobiles. It is located near the plant of the Hudson Motor Car Company, and cost approximately $1,000,000. The capacity of the company, which has been given as 18,000 motors annually, is to be doubled when the new structure is in full operation. The total floor space is 240,000 square feet, the building covering 12 acres. The present plant at Muskegon, Mich., is to be continued in addition to the new one at Detroit.

A. R. Mosler & Co., has moved to new quarters at Webster and Wakefield avenues, Yonkers, N. Y., where a new factory and office buildings give more space and greater facilities. The factory is in a pleasant environment and is equipped with the most modern machinery.

The Goodyear Tire & Rubber Company, Akron, O., has placed the Cleveland and Toledo, O., branches in charge of the Detroit manager, E. F. Jackson, who also has charge of the branch in Grand Rapids, Mich. C. W. Holcker has been made local manager of the Detroit establishment.

The F-S Motors Company, Milwaukee, Wis., is manufacturing the F-S light delivery car in its large auxiliary plant at First and Oklahoma avenues, using Beaver motors and Weston-Mott rear axles.

The Goodyear Tire & Rubber Company, Akron, O., has made a number of changes in its sales organizations, as follows: William M. Boggs, formerly at Philadelphia, is now in charge of New Jersey territory; H. G. Bruning is taking care of motor truck sales in Cleveland, O.; F. H. Findlay has been transferred from the New York branch to Brooklyn with J. B. Linerd, who will travel from Brooklyn for solid tires; H. B. Morton, Chicago, has been placed in charge of Illinois territory in place of H. L. Lawson, with R. H. Campbell succeeding him in Chicago. New salesmen have been appointed as follows: H. W. Hoklas, Minneapolis; D. H. Cottrell, Buffalo; R. S. Grant, Cleveland; I. S. Roberts, eastern Missouri.

The Hyatt Roller Bearing Company, Detroit, has issued in booklet form reproductions of its advertisements, and is distributing the booklets to the sales and advertising managers of automobile concerns handling cars equipped with Hyatt roller bearings, in order to furnish them with selling arguments.

The United States Motor Company has taken new European headquarters in London at 212-14 Great Portland street. A five-story building has been secured and



Five-Story Building in London Occupied by the International Motors, Ltd., the European Branch of the United States Motor Company.

is occupied by the United International Motors, Ltd., as the foreign affiliation of the American concern is called.

D. F. Poyer & Co., maker of Menominee trucks in Menominee, Mich., has purchased the Gram factory buildings, the present facilities being too small. During 1912 a total of 300 cars is to be made.

The Kilgore Manufacturing Company, Boston, has moved into larger offices at 883 Boylston street. The Air shock absorber which the company manufactures has been improved, and may be had in a number of finishes to match any car, and in large sizes for trucks, as well.

The Hartford Suspension Company, Jersey City, N. J., is shortly to place on the market a new spark plug. No details of the plug have been made public, but it is stated that it will be of the two-piece type.

The Ross Gear & Tool Company, making truck steering gears in Lafayette, Ind., is to erect a new factory

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on North Eighth street, which will give it 50,000 square feet of floor space.

The East Aurora Motor Car Company has been organized in East Aurora, N. Y., with a capital of $8000 by A. L. Pierce, M. B. Paxon and Winfield S. Wilson. It is stated that automobiles will be manufactured.

H. A. Worman, formerly with the National Carbon Company, Cleveland, O., as advertising manager, has joined the Baker Motor Vehicle Company in the same city and taken charge of the advertising department.

The Fisk Rubber Company, Chicopee Falls, Mass., has opened a new Pacific Coast headquarters in San Francisco, on Van Ness avenue. The building is two stories high, of reinforced concrete, and contains, besides the salesrooms and offices, a complete service department for repairs and vulcanizing.

The Kissel Motor Car Company, Hartford, Wis., has leased a large four-story building at the corner of 26th and Wabash avenue, Chicago, and now occupies in that building nearly 100,000 square feet of floor space, the largest devoted to the automobile business in the city. The building has been turned into a model service station.

The Great American Rubber Company, Conshohocken, Penn., has appointed the following agents: Seldom Motor Car Company, Houston, Tex.; E. S. Sporting Goods & Auto Supply Company, Athens, Ga.; J. B. McClelland, Sault Ste. Marie, Mich.

The Mack Bros. Motor Car Company, Allentown, Penn., has purchased six acres of ground adjoining the plant and will erect an addition.

The Miller Carburetor Company of Los Angeles, Cal., has decided to move to the Middle West, and has taken temporary quarters in Indianapolis, where the company will be closer to the industry.

GARAGE AND DEALER.

W. R. Campbell, who recently purchased the West machine shop in Evart, Mich., is having it torn down and is to erect a modern concrete garage. Several men will be employed, and the establishment is expected to be completed in time to care for the summer tourists.

Harry Baker of Cleveland, O., has become manager of the E. Stewart Automobile Company, San Francisco, handling S. G. V., Marquette and Crawford cars in northern California.

Tri-City Auto Supply Company recently opened in Rock Island, Ill., at 319 Nineteenth street. The company is the only exclusive supply house in the locality, and carries a full line of accessories.

Kiel & Evans, Oakland, Cal., has taken the agency for the Commerce truck, made by the Commerce Motor Car Company, Buffalo, N. Y.

The American Auto Company is the latest automobile concern to open in Davenport, Ia., handling the American underslung at 211 East Second street. Salesrooms and a garage have been opened.

Paul R. Pels has taken hold of the management of the Benz Auto Import Company, filling the vacancy left by the resignation of Jesse Froelich, who still retains his interest in the company.

F. W. Johnson is to open a new garage in Fulda, Minn.

Stafford Noble has bought the St. Mary's Auto Garage, St. Mary's, O., from August Schierenbeck.

The Orland Garage, Orland, Cal., has been purchased by Thomas and Roscoe Scribner.

Bunn & Goembel is a new firm that has opened a garage in Pipestone, Minn.

The Twyman Motor Car Company, Columbus, O., agent for the E-M-F and Flanders, has opened a branch in Dayton, O., at 224 North Main street. This will enable the company to handle the local Dayton business to a better advantage than formerly, and also give improved service to the dealers in Montgomery and surrounding counties.

H. R. Polk, Des Moines, Ia., has purchased the automobile business of the Cunningham Automobile Company from William R. Cunningham and will hereafter conduct it under the name of the Central Iowa Motors Company, handling American and Hupmobile cars for the state.

The Hub City Vulcanizing Works has been established in Sheboygan, Wis., by George N. Putnam and M. Bachanz.

William R. Cunningham, who sold the American Automobile Company, Des Moines, Ia., to H. R. Polk, is to establish a second hand car business under the name of the Western Automobile Clearing House, in connection with which he will operate a garage and repair shop.

The Sterling Motor Car Company, Indianapolis, Ind., has moved into new quarters at 320-322 North Delaware street, where it is better able to display its line of Paige-Detroit and Firestone-Columbus cars. The change was made necessary by the rapidly increasing business of the company

W. S. Sanderman, known as "Sandy" to his many friends in and around Boston, has started in business again, having opened a garage at 59 Boylston street, Cambridge, near Harvard square.

The Knickerbocker Motor Car Sales Company, which was recently organized with W. M. Botto, formerly of the Abbott-Detroit Motor Company of New York, as general manager, is handling the Havers Six-44 in one of New York's finest salesrooms, in the Winter Garden building. The company is the sole distributor for the Havers cars for eastern New York and Fairfield county, Conn.

The Alexandria Garage has been opened in Amityville, N. Y., by Richard G. Evento, at Bayview avenue and South County road.

Charles Chance, Eastport, Me., has purchased some water front property and intends to remodel it into a garage which he will conduct in connection with his launch business.

Benjamin Ward, Brockton, Mass., has expanded his repair shop on Clinton avenue by the addition of a complete welding and brazing equipment.

G. W. Jocelyn has purchased the tire repair shop of J. A. Peltier & Sons, 471 High street, Holyoke, Mass., and is conducting it in conjunction with his bicycle business.

Charles E. Ball is the latest addition to the automobile supply houses of Newark, N. J., having opened a store at 351 Halsey street.

A. B. Craven, Kellogg, Ia., is to handle the Maxwell and Case cars, and is building an addition to the Holdsworth Wagon Shop in which he will house the two lines.

Floyd Ellet, Mediapolis, Ia., has opened a garage and repair shop and is carrying a line of supplies, as well as operating a vulcanizing plant. He is located in the building formerly occupied by Johnson's livery stable.

The Atchison Motor Company, Atchison, Kan., has been formed by E. J. Donnelly and W. Y. Alkire, and has just taken possession of a modern garage at Ninth and Commercial streets.

Claude Younger, Louisville, Ky., has taken the agency for the E-M-F and Flanders. A salesroom and office have been secured at 916 South Third street.

John H. Duffy has opened an establishment in New Orleans, La., where he is conducting a general automobile sales and repair business.

The International Motor Company, Baltimore, Md., is installing its equipment in the new five-story building at 30 South Hanover street, and will soon be ready for business.

Joseph B. Johnson, Tampa, Fla., has taken possession of the new garage and repair shop which he had built, and is now ready for business.

The Dale Taxicab Service, the first taxicab operator in Des Moines, Ia., has opened a new garage and has its fleet of machines in full operation.

The Chapman-Love Auto Company, Washington, D. C., agent for the King car, has secured permanent quarters at 1312 14th street, N. W.

D. H. Sloan & Son, Lakeland, Fla., has taken the agency for Penn, Case and Maxwell cars, and has opened a salesroom in the Peacock building.

E. E. Barry, Washington, D. C., is remodelling his granary at 13th and W streets into a garage. An electric elevator is to be installed, and the building will be equipped with the most modern improvements.

T. L. Jackson, the Washington, D. C., agent for Stevens-Duryea cars, has moved into new quarters at 14th and R streets.

F. L. Butman of Glendale, Cal., has moved to Pomona and opened an agency for the Metz car at 145 East Pearl street.

E. J. Montgomery, the Brooklyn, N. Y., agent for the Stutz, has moved his establishment, including the salesroom and service department, to 1289 Bedford avenue.

T. Earl Allaman, 4268 Olive street, St Louis, Mo, has been appointed manager of the Federal Tire Agency which was recently established in St Louis to succeed the Petty Tire & Rubber Company, the former agent for Federal tires.

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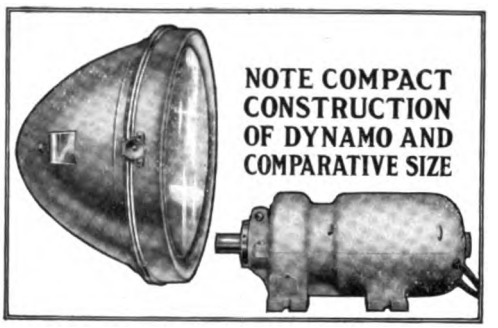
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The only ball bearing that takes load from any direction with equal efficiency.

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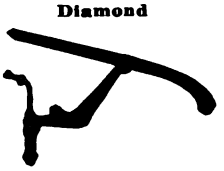


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and Jewel

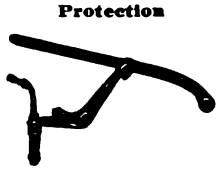
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The Peerless Motor Car Co.
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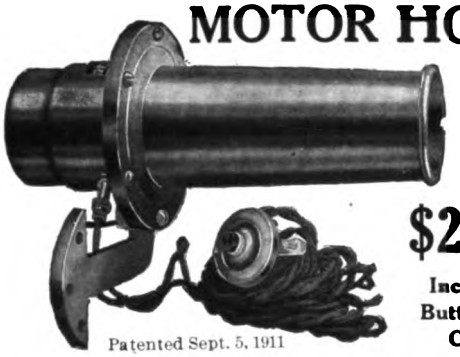
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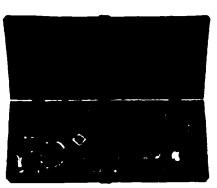
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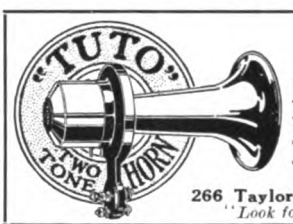
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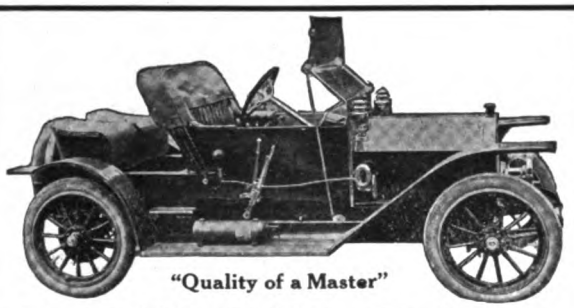
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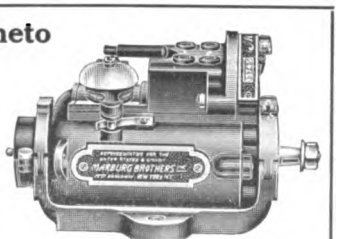
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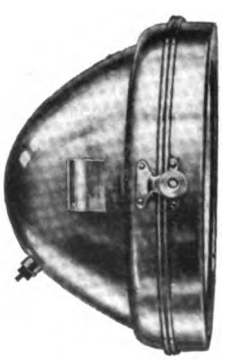
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The outfit complete, which is all you need, consists of:



1 pair of complete Head Lamps.
2 Tungsten Bulbs. Size of Bulb, 2 1-16 in. diameter.
12 feet Wire, all soldered to lamps.
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Choice of either straight body or bullet-shaped lamps.

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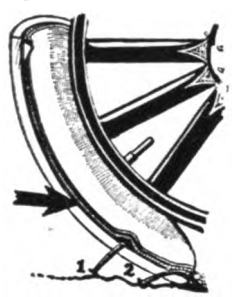
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Made in all sizes.
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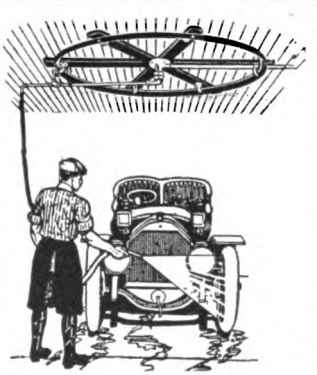
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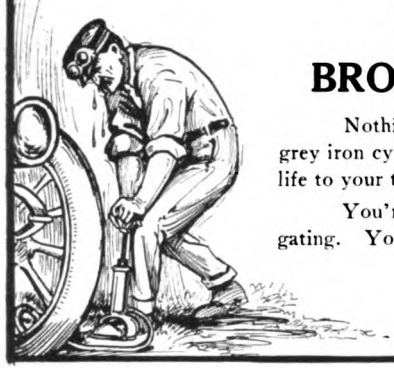
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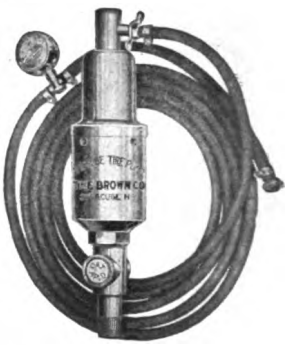
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It's because they are equipped with

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The term "shock absorbers" does not fully describe the "J. M."—they not only *absorb* all jolts and jars, but they actually *prevent* them by holding the rear wheels to the ground.

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Write on your business letterhead for booklet D and full information. Mention the name, model, weight, and width of rear springs of the car you run.

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If your tank holds more than 20 gallons, extra markers will be inserted as ordered.

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Send Express or Postoffice money order. Stamps accepted.

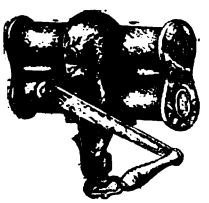
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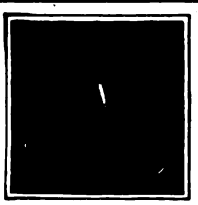
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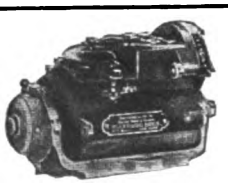
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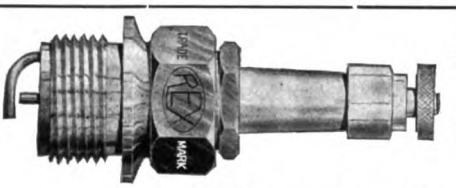
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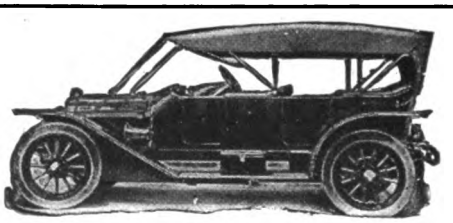
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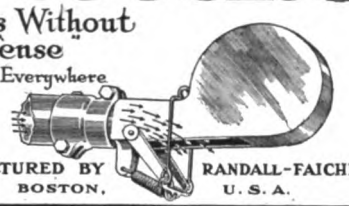
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Refineries: Georgetown, Ky.; Lawrenceville, Ill.

Haws, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 899 Boylston St., Boston.

Kellom & Co., Chas. F., 113 Arch St. Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.

Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York Lubricating Oil Co., 116 Broad St., New York. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle, Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.

New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York City (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York City.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston, Mass.; 605 Brown Bros. Bldg., Philadelphia, Penn.; 154 Exchange St., Bangor, Me.; 406 Hitchcock

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CLASSIFIED BUYERS' GUIDE---Continued

Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

Wolverine Lubricants Co., 80 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

OIL AND GREASE PUMPS, GUNS, ETC.

Randall-Faichney Co., Boston, Mass. (B-Line.)

PATCHES.

Liberty Rubber Co., Orange, N. J. (Cementless.)

PUMPS, TIRE.

Brown Co., The, Syracuse, N. Y., (Brown Impulse.)

Hawthorne Mfg. Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

RADIATORS.

Eureka Auto Parts Mfg. Co., 3100 Olive St., St. Louis, Mo. (Eureka.)

RIMS — REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittlesey Demontachable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

RUBBER CEMENT.

Liberty Rubber Co., Orange, N. J. (Liberty Patching.)

SELF-STARTERS.

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland, O. (L B A)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")
Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York City.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Delta Mfg. Co., Bloomfield, N. J.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Mac-Kae Manufacturing Co., Boston, Mass. (Mac-Kae.)

Progressive Mfg. Co., The, Torrington, Conn. (Black Eagle.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York City (Rex.)

Splitdorf, C. F., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPEEDOMETERS AND RECORDING DEVICES

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

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CLASSIFIED BUYERS' GUIDE---Concluded

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St. Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1197 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia, Penn.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims — Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17 1-2 Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator.) See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.

Leather Tire Goods Co., Suspension Bridge Station, Niagara Falls, N. Y. (Woodworth treads, repair boots and emergency stops.)

Liberty Rubber Co., Orange, N. J. (Treadmend and Everstick.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRE REPAIR OUTFITS.

Liberty Rubber Co., Orange, N. J. (Mend-Do and Rubber-Mend.)

TIRES—SOLID AND COMMERCIAL TYPES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS FOR AUTOMOBILES.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York City.

TRUCK BODIES.

Lynch Manufacturing Co., Hammond, Ind.
Branches: East Chicago, Ind.; South Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Mfg. Co., 1756 Cranston St., Providence, R. I.

TURNTABLES FOR PUBLIC AND PRIVATE GARAGES.

Canton Foundry & Machine Co., Canton, O. (Universal.)

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Garage and Individual.)
Branches: In all principal cities.

WASHING DEVICES FOR GARAGES.

Perfect Mfg. Co., Albany, N. Y.

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.

Cutter, George A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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"INVADER" GEAR OIL

"Puts Noisy Gears to Sleep"



INVADER GEAR OIL is a heavy, dark fluid lubricant, designed for the lubrication of sliding gear transmissions and differential gears. It can also be used for front gears where a heavy lubricant is required, if the case is tight and separate from the crank case.

This oil possesses peculiar properties which make it invaluable as a lubricant for gears. It contains no foreign matters, such as ground cork, sawdust, etc., but is 100% oil. It is stronger and more serviceable than any other lubricant made. Being free from water and chemicals, it will not foam in the gear case when running or allow the bearings to rust when idle.

Invader Gear Oil being a fluid lubricant it is only necessary to fill the case sufficiently to allow the gears to dip. It is not necessary to pack the case full, as is customary when grease is used. It faces the gears with a coating which is practically indestructible, thereby preventing wear and reducing *noise* and friction to a minimum. A trial will convince the most skeptical that "**Invader**" Gear Oil is the only practical and economical gear lubricant.

Sold in 10 lb. square cans, lithographed; 25 and 50 lb. wooden jacketed cans, special top; barrels and half-barrels

CHAS. F. KELLOM & CO., 113 Arch Street, Philadelphia; Branch: 719 N. Broad Street

NEW ENGLAND BRANCH, 284 Columbus Ave., BOSTON, MASS.

MOTOR TRUCK

A MONTHLY MAGAZINE DEVOTED TO THE INTERESTS OF THE COMMERCIAL VEHICLE FIELD

Gives in Every Issue Information of the Highest Value Bearing Directly Upon the Various Features Which Enter Into the Systematic Study of Transportation Methods.

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AUTOMOBILE JOURNAL PUBLISHING COMPANY

TIMES BUILDING, PAWTUCKET, R. I.



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Is an economy that counts with every Auto owner.

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Will actually save from 50% to 90% Tire and Tube repair bills. **$1.00.** No heat required—only willing hands and a MEN-DO Outfit.

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LIBERTY RUBBER CO.

ORANGE, N. J.

Complete Instructions for Repairing Chassis Components

All parts of the motor vehicle, exclusive of the power plant, are considered in a comprehensive manner. Details restoration of all types of clutches, transmissions, driving systems, steering gears, etc.

A B C of Motor Car Chassis Maintenance & Repair

By Victor W. Page, M. E.

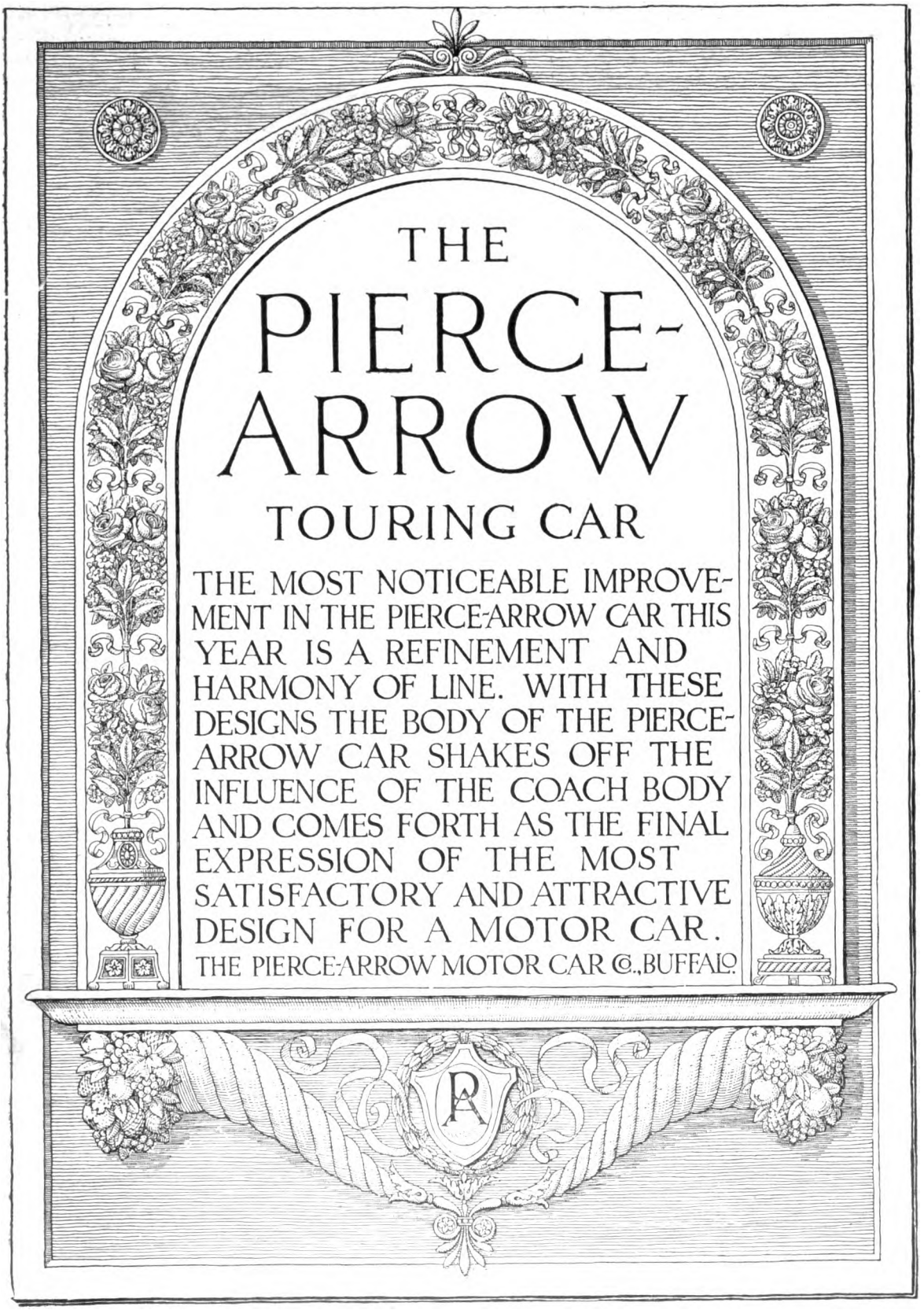
More practical information in this book than in others selling for many times the price. Contains over 50 illustrations and charts.

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The Automobile Journal, Times Bldg., Pawtucket, R. I.

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The Standardized Specialized Print Has 100% Value to READER and ADVERTISER

Despite Flamboyant Statements by Publishers, Despite Criticism by Their Representatives, It Is an Uncontroverted Fact That the Only Motoring Magazines to Gain in Advertising Patronage During 1911 Were Three Specialized Publications.

Of These Three the AUTOMOBILE JOURNAL Was Second. All Others Showed a Loss.

Aside from Service Wagon Magazines, Promotive of Highway Transportation, Only Owners' Prints Made a Gain.

Those That Lost Heaviest Were Generally the Oldest Established.

The Contents of Any Magazine Is the Basis by Which to Judge Its Merits, Its Policy, and the Character of Its Readers.

The Magazine That Is Devoted to Any One Class of Readers Must of Necessity Be Specialized. It Requires Years of Endeavor to Obtain Recognition. Only Value of Contents Can Retain Subscribers and Advertising Patronage.

All Successful Publications Are Recognized by Positively Established and Clearly Defined Policies. Changes Are Evidence of Weakness or Failure. To Gain a New Clientele Must Necessarily Mean the Sacrifice of the Old.

The AUTOMOBILE JOURNAL Is Promotive of the Use of the Pleasure Motor Car. Its Readers Are Owners.

The MOTOR TRUCK Is Promotive of the Service Wagon and Its Utility. Its Readers Are Business Men.

The ACCESSORY and GARAGE JOURNAL Is Devoted to the Motor Vehicle Industries and the Trade Generally. It Is a Trade Print for the Manufacturer and the Trade.

AUTOMOBILE JOURNAL PUBLISHING COMPANY

Times Building **Pawtucket, R. I.**

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VOL. XXXIII. No. 9

AUTOMOBILE JOURNAL

$1.00 the Year.
10 Cents the Copy.

PAWTUCKET, R. I.

June 10, 1912

Who recommended your lubricating oil? *That is vital.*

AUTOMOBILE lubricants are like automobile parts.

They must fit the car they are used on.

The correct oil cannot be determined by simple tests. Most motorists must depend on advice.

Dealers who handle Gargoyle Mobiloil can give you the specific recommendations of the Vacuum Oil Company—the recognized leaders in lubrication.

We supply them with a guide chart. The chart was prepared after a careful analysis of every American car and practically every foreign make. It will show you the correct grade of lubricating oil for your car (summer and winter). A copy will be sent you on request.

In power-engineering circles these recommendations from us would be accepted as authoritative. You may feel assured that, in quality, the oils specified on the chart set a world standard.

They are put up in barrels, half-barrels, and in 5 and 1 gallon sealed, white cans.



The oils (refined and filtered to remove free carbon) are named:

Gargoyle Mobiloil "A."
Gargoyle Mobiloil "B."
Gargoyle Mobiloil "D."
Gargoyle Mobiloil "E."
Gargoyle Mobiloil "Arctic."

All are branded with the Gargoyle which is our mark of manufacture.

Mobiloil

A grade for each type of motor.

If oil saves power, it follows that one oil saves more power than another.

VACUUM OIL COMPANY, Rochester, U. S. A.

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Our 1912 Catalog, the Largest and Most Complete Catalog of the kind, containing 256 Pages, is Now Ready for Distribution. The Circulation is Limited to ONE HUNDRED THOUSAND Copies. It will be mailed to any one on request.

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Concerns that offer Large Discounts make it their practice to INFLATE LIST PRICES and then offer Large Discounts, which are somewhat misleading. We have seen a catalog in which a certain spark plug is illustrated, "PRICE $2.50, OUR PRICE $1.00," while THE STANDARD LIST or RETAIL PRICE for the same spark plug as illustrated in Our Catalog and advertised by the manufacturer is $1.00 each. Their CUT PRICE Therefore Is Not Lower Than OUR LIST PRICE.

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The Largest Auto Supply House in America

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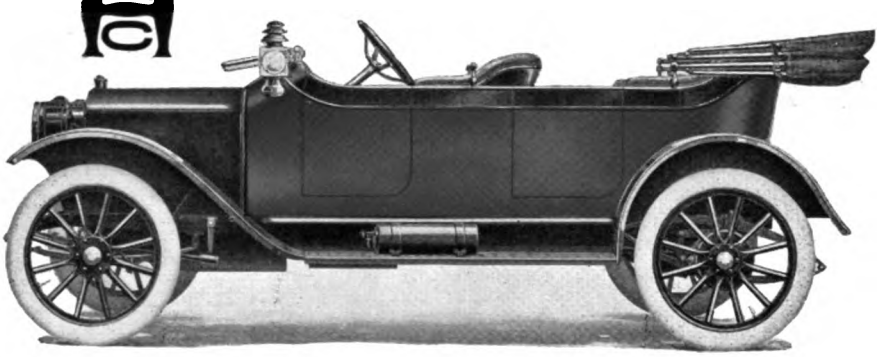
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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

R-C-H

DEALERS who are considering the contract question for the coming season will do well to note carefully the construction and equipment details of the R-C-H.

For the measure of a dealer's success is the number of people he can satisfy with the car he sells.

And the R-C-H covers, far more completely than any other car at near its price, every requirement of the average motorist.

If you will think over what your own customers require in a car, you will see that this is so.

"Twenty-Five"

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32 x 3½ tires, demountable and quick detachable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy Curtains, adjusted in an instant, making the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

STANDARD MODEL

$850 F. O. B. DETROIT

Top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

STANDARD MODEL

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

General R-C-H Specifications

Motor—4 cylinders, cast en bloc—3 1-4 inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

OUR output for the coming year—30,000 cars—will enable us to provide for a country-wide distribution—something we were unable to do with a smaller production this season.

In every county there are prospective R-C-H buyers. It is pre-eminently "the greatest car for the greatest number." It will interest more classes of people than any other car we know.

So we urge that dealers everywhere get in touch with us at once. With R-C-H quality, price, factory co-operation and publicity back of him, an aggressive dealer should find the R-C-H representation the most successful of his career.

R-C-H CORPORATION, 107 LYCASTE STREET Detroit, Michigan

BRANCHES: Atlanta, 548 Peachtree St.; Boston, 563 Boylston St.; Buffalo, 1225 Main St.; Chicago, 2021 Michigan Ave.; Cleveland, 2122 Euclid Ave.; Denver, 1520 Broadway; Minneapolis, 1206 Hennepin Ave.; New York, 1989 Broadway; Philadelphia, 330 No. Broad St.; Detroit, Woodward and Warren Aves.; Kansas City, 3501 Main St.; Los Angeles 1242 S. Flower St.; Walkerville, Ontario, Canada.

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A KIND OF COMPETITION WHICH HURTS EVERYBODY

NO reputable manufacturer condemns honest competition. He has only kindly feeling for a worthy competitor whose activity puts zest into the race for business.

Honest competition benefits everybody. It safeguards quality, regulates prices and promotes sales, helping thereby the consumer, the dealer and the manufacturer.

There is another kind of competition which comes out of the gutters of the business world and is obnoxious and harmful to everybody.

It is based on a falsehood and fostered under the protection of a misappropriated trade name.

It is the competition of imitators, who misappropriate to their own use the name of a standard product.

NON-FLUID OIL is a name which instantly inspires confidence in the motorist who is considering lubricants.

It is a name which for fifteen years has been a standard of quality for lubricants.

It is a name which the trade recognizes as the exponent of a tremendous demand in the motoring world.

But it is a name which is outraged by imitators who unload their low grade lubricants under its protection.

Your confidence, Mr. Dealer, is betrayed when you are induced to stock an imitation of NON-FLUID OIL. You need not look beyond the price you are asked to pay to be convinced that you cannot offer your customers quality in these cheap impostures. A request for NON-FLUID OIL is inspired by a comfortable feeling of security. It knows no doubts or misgivings. The confidence of your customer is betrayed if he is sold anything but the genuine product.

You are told, Mr. Motorist, by over seventy manufacturers of motor cars that NON-FLUID OIL is the most efficient and most economical lubricant you can use. All generations of motor cars have been lubricated with this product. You want it, but you must be sure of its genuineness, because of numerous imitations which even your dealer may sell you without knowledge of the deception.

This concerns you vitally, Mr. Car Owner

The next time you purchase lubricants ask for NON-FLUID OIL, but see that you get the orange colored can; be sure it bears the registered trade mark



TRADE MARK NON-FLUID OIL REGISTERED IN UNITED STATES PATENT OFFICE



and that it shows the name of the
ORIGINATORS AND SOLE MANUFACTURERS

NEW YORK & NEW JERSEY LUBRICANT CO.

165 Broadway, New York

CHICAGO, 1430 Michigan Ave. PHILADELPHIA, 1416 Vine Street.

Pacific Coast Distributors—HUGHSON & MERTON—Los Angeles, San Francisco, Portland, Seattle.

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National

Wins 500-Mile International Sweepstakes Race

Time, 6 hours, 21 minutes, 6 seconds. Average 78.72. miles per hour

Lowers record by 4.11 miles per hour.



From the Factory thro' the Race-Test Comes the National Car You Sell

Seven Passenger Touring Car

What this Race Proves to Dealers

THE most popular and talked about car to day is the National. Thousands upon thousands of people will look for National dealers, because they are eager to see and ride in the car that has again demonstrated its superiority over all others.

A dealer can rise no higher than his car—and a car can rise no higher than its source—the factory Consider then that the real victory of this race is the victory of the National factory that can build such wonderful cars.

Racing is but a part of the manufacturing process, where we test and perfect our cars for the comfort, safety and service of our customers.

The successful dealer will write us at once for our distributors' proposition and Series V Book. It is the 1913 style book and authority on motor cars.

(Long stroke motor, 4 7-8x6) Four models, $2600 to $3000

National "40," Indianapolis

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The NATIONAL STARTER

Securely Founded Upon Right Principles

OF ALL types of starters today on the market none is more simple and direct in its action than the **National.** Dependent upon no other source of energy than that derived from a simple pressure of the foot it is free from all the trouble connected with starters operating on the acetylene gas, electric, compressed air and spring principle. It is built on a trouble-proof, mechanical principle, the efficiency of which has been proved in actual test 100 per cent perfect.

In point of safety the **National** proffers to motorists not only all the security of starting from the seat, but also the insurance against the dangers which of necessity are connected with starters which operate on an explosive principle. You will never blow out a cylinder head or set your car on fire if your starter is a **National.**

Certainty of starting is the **NATIONAL** watchword—100 times out of 100 today, tomorrow, and 5 years from now. Its efficiency is flawless—100% perfect. It will start your car regardless of whether your gas tank is empty or full, your storage batteries fresh or exhausted. You don't have to tinker with a switch, a pump, a handle or a gas distributor *before* you start. One operation—that of simply pressing the dash pedal—is all sufficient to get any car under way at any time.

NATIONAL ECONOMY exhibits itself to the motorist by an absence of upkeep expense and repair bills. *There are no charges for gas or electricity.* It costs nothing to operate a **NATIONAL.** It never requires the services of a mechanic to make it work. It never necessitates having the motor decarbonized. ¶ No bills accumulate on these scores—you pay for your **NATIONAL** but *once.*

The Starter Complete, attached to car, $50.

WRITE FOR INFORMATION

Energetic Dealers Wanted Everywhere

The National Gas Engine Starter Co.

30-32 N. DEARBORN STREET, CHICAGO, ILL.

SIMPLICITY SAFETY CERTAINTY ECONOMY

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This Rembrandt "Mill" Sold for $400,000

Cost is *one* thing and value is *another*. *Efficiency* has a measurable price. *Art* is worth what the *purchaser* can be made to *pay*.

The Stewart Speedometer is not an art object, but a mechanical device built for a practical *purpose*. If you are a connoisseur in "objets de virtu," buy the Stewart because of its *beauty*. It is *surprisingly* handsome and *adds* a distinguished touch to *any* car.

But if you are a hard-headed, money counting, value demanding, sensible, logical, hard-pan automobile owner, buy the Stewart because *it makes no mistakes*. It counts *every inch* of travel and records *every second* of time. The rest *can't* be best; the *sale* is the test and the Stewart is on *four* cars out of *five*.



Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

Magnetic principle — jewel bearings — wearing parts hardened and polished; open dial, large figures, easily read; absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft, drop forged swivel joint, noiseless gears.

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STEWART & CLARK MANUFACTURING CO.
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"Thirty" Semi-Touring
$1500

Every Inch a Car

No car can equal KisselKar comfort without equalling the wheel base.



60 H. P. "Six" 7 passenger
Touring $3000

EXTRA liberal wheel base permits the generously deep seats, and unusually roomy tonneaus which give an emphatically upper-class character and rare riding comfort to the KisselKar. With the liberal wheel base bridging the inequalities of the road, the big wheels, big tires, shock absorbers and deep seat upholstering absorbing road vibration, the KisselKar has an easy riding comfort which is approached by only a few American cars.

Another special advantage to the KisselKar owner, is KisselKar service. The KisselKar service organization, maintained by the manufacturer, with service-centers at principal points in America, extends the completest service to every owner of a KisselKar, minimizing running cost, retarding depreciation, and aiding to the fullest motoring enjoyment.

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Branches and Agencies

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, LOS ANGELES, MINNEAPOLIS, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburg, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and other principal points throughout the United States.

"Thirty"	$1500
"Forty"	$1850
"Fifty"	$2350
60 H. P. "Six"	$3000

Big line of commercial vehicles—1 1-2 to 3, 4, 5 ton Trucks, Delivery Wagons, Fire Department Apparatus, Etc.

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COES

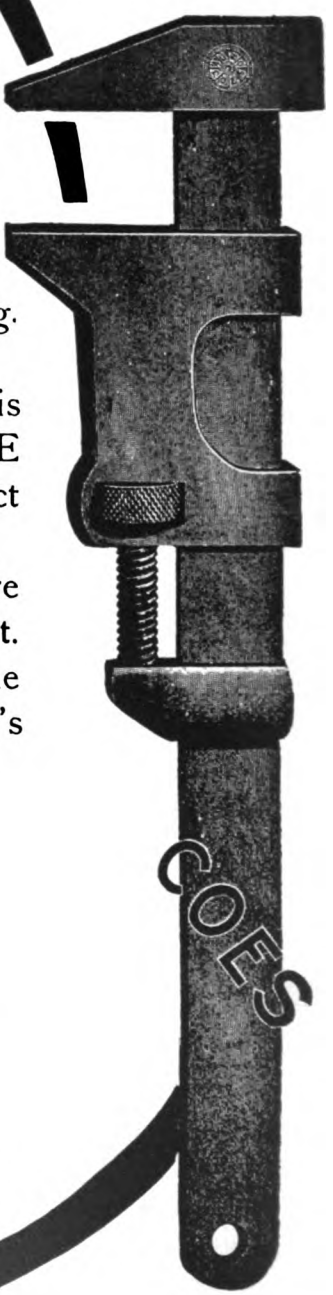
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.



Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
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Our Average Profit on No-Rim-Cut Tires is 8½%

Last year our average profit on No-Rim-Cut Tires was 8½ per cent. Every penny we got, save a profit of 8½ per cent, went into size and quality.

That in a factory with the largest output and most modern equipment ever known in this industry. That in a business with fluctuating materials, on a tire that's guaranteed.

10 Years Spent Getting Ready

Goodyear No-Rim-Cut tires now hold the top-most place. They far outsell all rivals.

The success of this tire is a sudden sensation. But we began to perfect it 13 years ago.

We started with the idea that he who gives most will get most.

So we surrounded ourselves with the ablest experts we could find. And we told them to secure the maximum mileage without any regard to expense.

It was years before we approached tire perfection. It was ten years from the start before tire buyers realized what the Goodyear concern had done. Then came this avalanche of trade.

Rim-Cutting Ended

We found a way to end rim-cutting—a method controlled by our patents.

We examined thousands of ruined old-type tires, and we found that 23 per cent had been rim-cut. By ending this trouble---at vast expense---we saved tire users that 23 per cent.

In seven years' experience with No-Rim-Cut tires there has never been an instance of rim-cutting.

Adding 25 Per Cent to the Mileage.

Then we found that extras added to cars were overloading tires.

So we made these tires—No-Rim-Cut tires—10 per cent over the rated size.

That meant 10 per cent more air—10 per cent added carrying capacity. And that, with with the average car, adds 25 per cent to the tire mileage.

These two features together—No-Rim-Cut and oversize—for tens of thousands of users have cut tire bills in two.

Investigate These Tires

In view of these momentous tire facts, don't you think, Mr. Tire Buyer, that you ought to investigate Goodyear No-Rim-Cut tires?

GOODYEAR
AKRON, OHIO

No-Rim-Cut Tires

With or Without Non-Skid Treads

Our 1912 Tire Book ---based on 13 years of tire making---is filled with facts you should know. Ask us to mail it to you.

THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio.

Branches and Agencies in 103 Principal Cities.

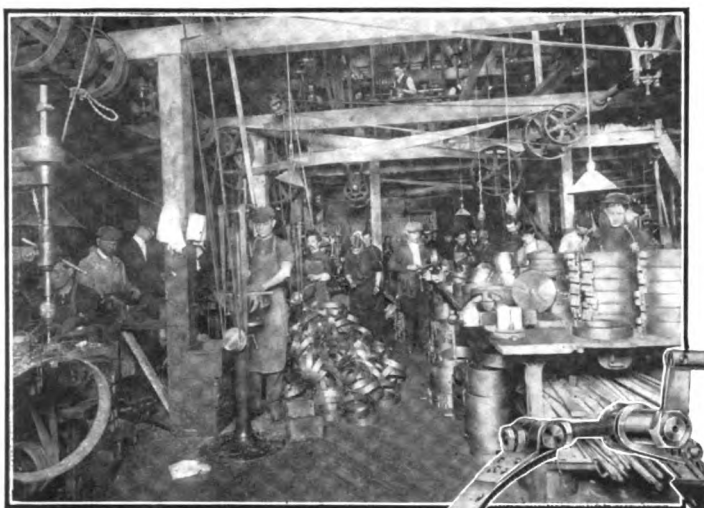
More Service Stations Than Any Other Tire.

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits.

Main Canadian Office, Toronto, Ont. (640) **Canadian Factory, Bowmanville, Ont.**

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The Largest Brake Business In Our History



DUPLEX EXTERNAL BRAKES

The remarkable demand for DUPLEX and RAYMOND brakes has resulted in a phenomenal increase in our business. At present we are operating our entire plant at maximum capacity. We have also rented additional space and added new machinery in an effort to keep ahead of our orders. Every effort is being made to supply the demand for our products.



"THERE'S A REASON"

Manufacturers, motorists and dealers have come to regard us as the foremost brake builders in the industry. Our designs have always led the field. Our workmanship and material is recognized as the best.

We not only supply DUPLEX and RAYMOND brakes complete, but we also manufacture large quantities of brake bands, lined, in accordance with special specifications. We recently received an order for 20,000 lined bands, demonstrating the remarkable demand for our products. We are pre-eminently brake specialists. Our customers include the better manufacturers throughout the industry. Dealers and owners always look to us when having brake troubles.



Our long years of experience, our service, our expert engineers and above all, our excellent facilities have proven our right to be known as—

The Leading Brake Builders of America

Write for descriptive literature. Send your specifications---whether for one or one thousand brakes. We'll be glad to serve you. Also remember that we make RAYBESTOS Brake Lining and GYREX---the Mixer.

THE ROYAL EQUIPMENT COMPANY

422 Housatonic Ave., BRIDGEPORT, CONN.

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Your New Car Must Have

ELECTRIC LIGHTS

OR YOU ARE
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1905 LAMPS WON'T DO ON A 1913 CAR

Don't let your neighbor surpass you with his Electric Lighted Car.
A CAR STRICTLY UP TO DATE CONTAINS AN

ELECTRIC LIGHTING BATTERY

(Class A)

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ELECTRIC LIGHTING GENERATOR

Class A Batteries are for ELECTRIC LIGHTING
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NEW PRICE LIST IN EFFECT OCTOBER 1, 1911, Cancelling all former price lists

The 8-DAY HIGH GRADE "BOSTON" AUTO CLOCKS

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST—PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices.—A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

The 8-Day High Grade "BOSTON" AUTO CLOCK For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.

If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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Polarine Oil

IS A

Standard Oil Product.

Polarine Oil for motor car lubrication has been produced as the result of long experience in the manufacture of oils for every use. Before being put on the market, it was subjected to most exhaustive practical tests.

It made good! Bob Burman used it when he broke the world's record ***for speed.*** The two big "Ocean-to-Ocean" tours (Premier and the Raymond & Whitcomb-Garford) both used it last year. ***It established a record for endurance.***

The sales of this product are phenomenal. Thus far this year, on its merits, and without extensive advertising, the sales of Polarine have exceeded all estimates. Here are its qualifications:

It burns cleanly, leaving practically no carbon.
It does not thin out at any speed or heat.
It feeds freely in cold weather.
It forms a lasting film on wearing surfaces, thus reducing friction and wear.

A good oil costs but little more than a cheap oil and adds years to the life of a car. We believe Polarine to be the best automobile oil yet produced.

We unhesitatingly recommend Polarine to every motorist.

Polarine Oil is sold in one and five gallon cans.
Insist on original packages. Booklet on request.

For Sale Everywhere

STANDARD OIL COMPANY OF NEW YORK

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Overland

PRICE is the pivotal point in any automobile transaction A man expects quality although his better sense may tell him he is taking a long chance at the price.

Our Model 60 Overland sells at $1200.

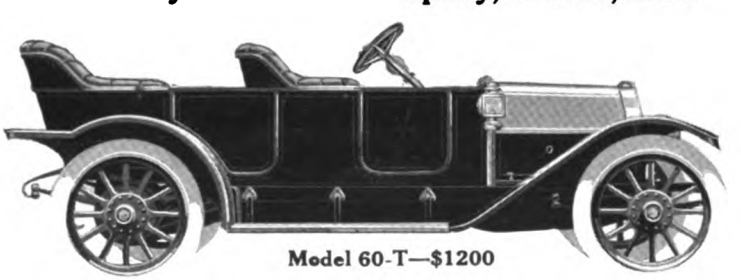
We want to thoroughly imbue you with the confidence that this Model 60 is sold at a lower figure than any other similar car, but not at a price which jeopardizes the value—a price which might make quality—a doubtful proposition.

Only a duplicate of the Overland factory could produce a car at $1200 of similar capacity, power, silence, speed and comfort. The Overland plants have no duplicate in size or efficiency.

Model 60 is the car you should investigate. It will prevent you paying $1500 for the same value.

Write for book K-46.

The Willys-Overland Company, Toledo, Ohio

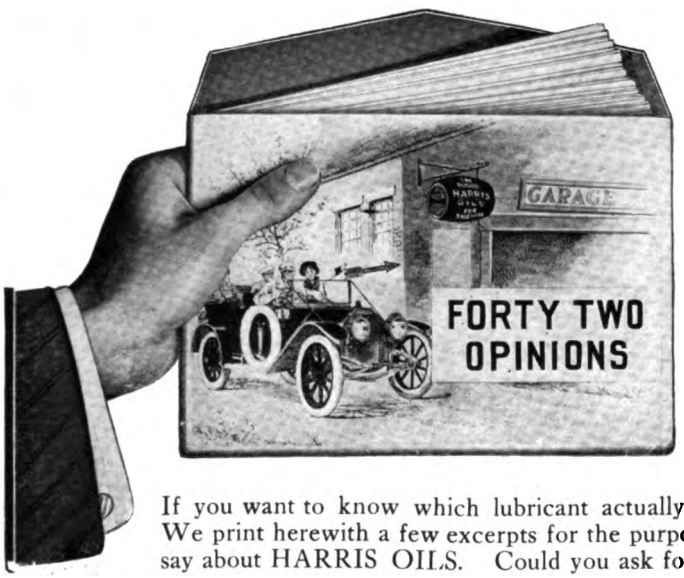


Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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Undeniable
Evidence Regarding
The Quality Of



HARRIS
TRADE MARK—REG. U.S. PAT. OFF.
OILS

We have prepared a handsome portfolio containing 42 fac-simile letters from users of HARRIS OILS.

If you want to know which lubricant actually is best, read these commendatory letters. We print herewith a few excerpts for the purpose of giving you an idea of what the users say about HARRIS OILS. Could you ask for higher indorsement?

"We tore down one car (Maxwell) lately that had been run for two years and we found there was no carbon in cylinder at all. We are so well pleased with your oil that you may ship us 2 barrels light oil by freight at once, as we are almost out of it."
McFADDEN AUTO COMPANY.

"Regarding the Harris Gasoline Engine Cylinder Oil wish to say we have been using this oil for the last five years and it has been giving us perfect satisfaction."
MITCHELL AUTOMOBILE CO.

"One of our customers, who was formerly in charge of repair department, has used this oil in his Packard car, and states it is the best oil he has ever used."
THE HOLCOMB COMPANY.

"Far superior to any other oil that we have ever used on Chalmers automobiles. We have had opportunity to really find out the merit of this oil by comparison with others, and we would not hesitate to say that it will run longer with less trouble from carbon than any other oil."
THE McDUFFEE MOTOR CO.

"Your superheated steam cylinder oil is giving perfect satisfaction. All the Stanley Steamer owners we sell this oil to will use no other kind of oil."
LACKA. VULCANIZING CO.

"Even your competitors claim only to have as good as Harris Oil. It is a pleasure to sell the class of products you produce."
GARAGE EQUIPMENT CO.

"We have averaged fully 3000 miles on Ford cars to one cleaning out of the carbon, this we believe you will readily agree with us, is so far beyond any results obtained by any ordinary oil on the market that there could not even be a comparison, we have had Ford's go as high as 4400 miles before it was necessary to clean out the carbon and the condition of the motor at the time of cleaning the car was easily good for another 1000 miles."
OTTUMWA AUTO CO.

"Beg to advise you that we use Harris Oil for our Locomobiles and have always found it satisfactory."
S. C. LOWE SUPPLY CO.

"We sell and use Harris Oil exclusively for the reason that it gives us greater satisfaction and seems to be better adapted for use in Gasoline Engines and severe service than anything we have tried, and we have tried about everything on the market."
EMERSON & ORNE.

"For the past eight or nine years, this office—The Peerless Motor Car Company of New England—has used Harris Oils almost exclusively for motor lubrication. During this time we have always received the very best of service from your Company and its representatives."
PEERLESS MOTOR CAR CO. OF N. E.

"After enjoying several years of constantly increasing business, selling Harris Gas Engine Oil and also giving the same severe tests under all conditions, we can only speak with the highest praise for Harris oils.
We are agents for the Overland, E-M-F, Flanders and Brush cars and would say that the oil works perfectly with any of the above."
MANLEY HDWE. CO.

Send For This Folio.

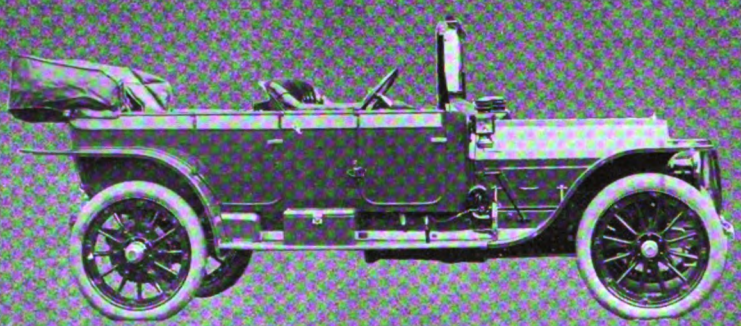
You owe it to yourself and your car to find out which lubricant possesses the highest quality. These letters are interesting. Write for the complete folio. We'll be very glad to send it.

A. W. HARRIS OIL COMPANY

326 S. Water St., PROVIDENCE, R. I. 143 No. Wabash Ave., CHICAGO, ILL.

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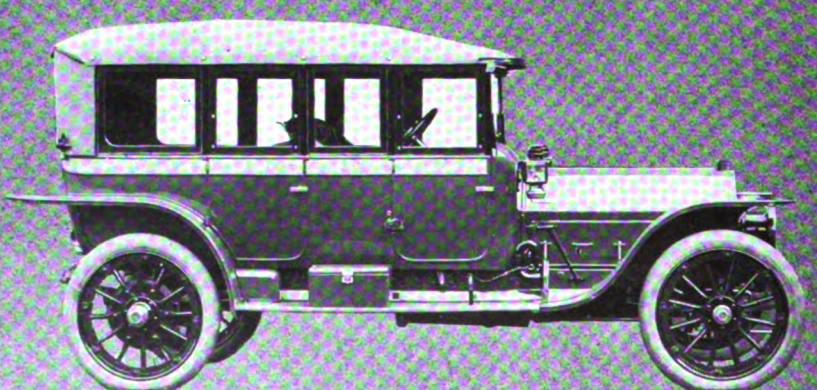
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

SPRINGFIELD METAL BODY CO.,
SPRINGFIELD, MASS.



SPRINGFIELD, MASSACHUSETTS.

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The 25-Year Car

By R. E. Olds, Designer

I have spent 25 years in building automobiles. All I have learned is embodied in Reo the Fifth.

This splendid car, in every detail, marks the best I know.

If any man can build a car better he is a better man than I.

My Limit

The steel in this car is all analyzed to know it accords with my formulas.

The gears are tested in a crushing machine with 50 tons' capacity.

The carburetor is double heated—with hot air and hot water.

Roller bearings—Timken and Hyatt—take the place of ball bearings.

Tests and inspections, in every step of the making, are carried to extremes.

The margins of safety are much larger than usual.

The wheels are large, the tonneau is roomy, the car is over-tired.

The body finish consists of 17 coats. The lamps are enameled. The engine is nickel trimmed.

The upholstering is deep. It is genuine leather, filled with hair.

Inside and outside, regardless of cost, here's the best car I can build.

Center Control

Reo the Fifth has my new center control. All the gear shifting is done by moving this lever less than three inches in each of four directions.

Both brakes are operated by foot pedals. There are no side levers, so the entrance in front is clear.

The driver may sit, as he should sit, on the left hand side.

The Little Price

The initial price of $1,055 is too low to continue, in my estimation. It is based on maximum output, on minimum cost for materials. I believe that it must be advanced.

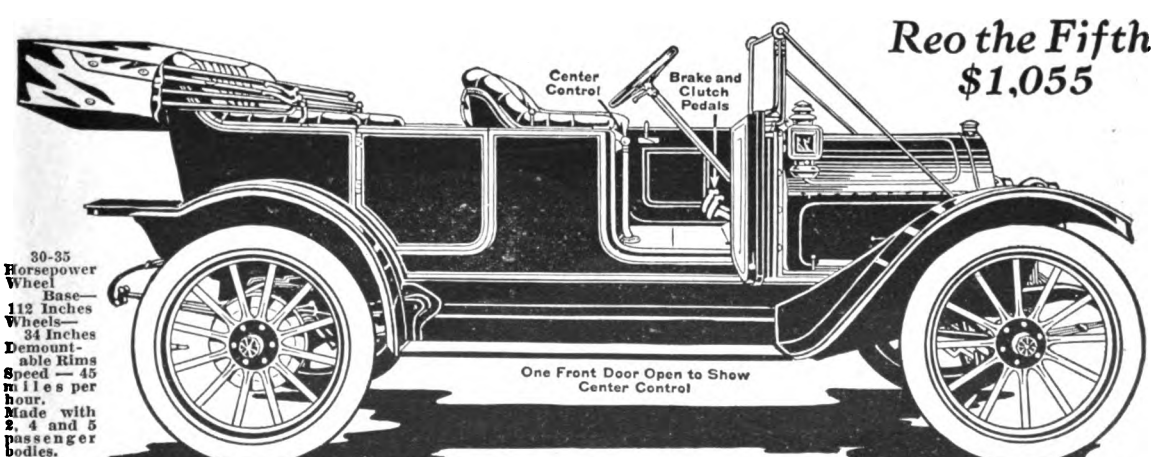
While it continues, no car on the market begins to give for the money as much as does Reo the Fifth.

Ask for our books, giving all the details, picturing all the bodies. We have dealers in a thousand towns. Address

R. M. OWEN & CO. General Sales Agents for

REO MOTOR CAR CO., Lansing, Mich.

Canadian Factory, St. Catharines, Ontario



Top and windshield not included in price. We equip this car with mohair top, side curtains and slip-cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $20 extra

(61)

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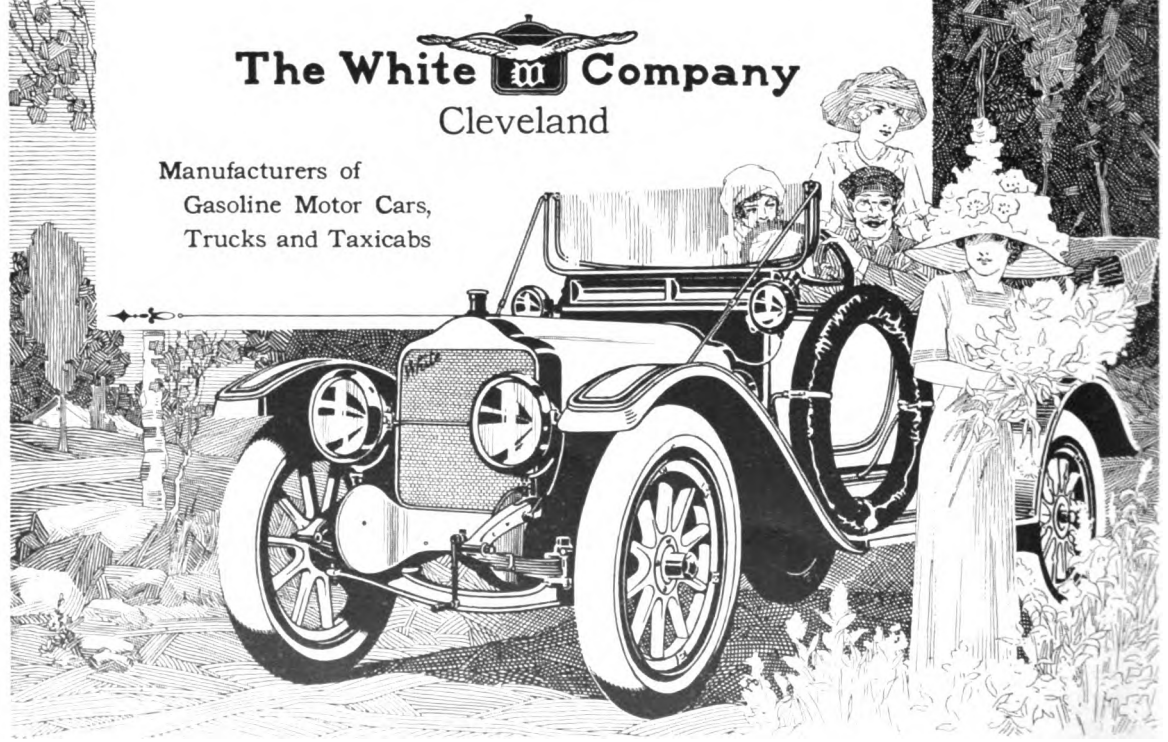
The realization of the car you would build for yourself is more than fulfilled in the White self-starting Six.

Its White electrical starting and lighting system, combined with the logical left-side drive, makes it possible for the first time in motor car history, to reach the driving seat, start and light the car without stepping into the roadway.

Carefully built and beautifully finished, a ride in this car will convince you that its design, for comfort, convenience and mechanical perfection is supreme in the art of motor car construction.

The White Company
Cleveland

Manufacturers of
Gasoline Motor Cars,
Trucks and Taxicabs



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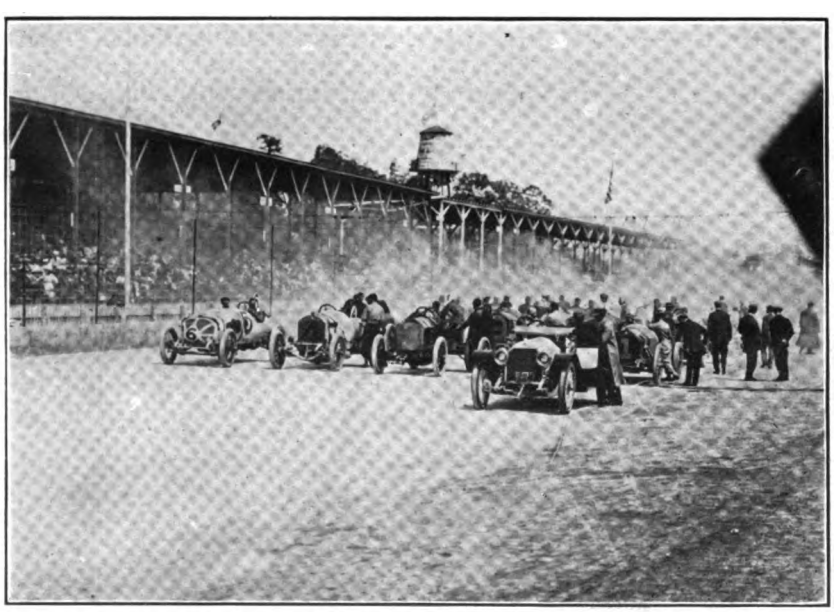
THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 9 JUNE 10, 1912 Price $1.00 the Year

DAWSON WINS IN A NATIONAL.

De Palma's Mercedes Fails Within Sight of the Goal in Second Annual 500-Mile Race at Indianapolis---Many New World's Records.

JOSEPH DAWSON, driving a National car, made by the National Motor Vehicle Company, Indianapolis, Ind., using Michelin tires and rims, Splitdorf magneto, Bosch plugs, Schebler carburetor, and Monogram oil, won the second annual international sweepstakes race for 500 miles on the Indianapolis speedway, Memorial Day, the time being 6:21:06. The average speed was 78.72 miles an hour. Last year's race was won by Ray Harroun in Marmon, his time being 6:42:08—an average of 74.59 miles an hour.

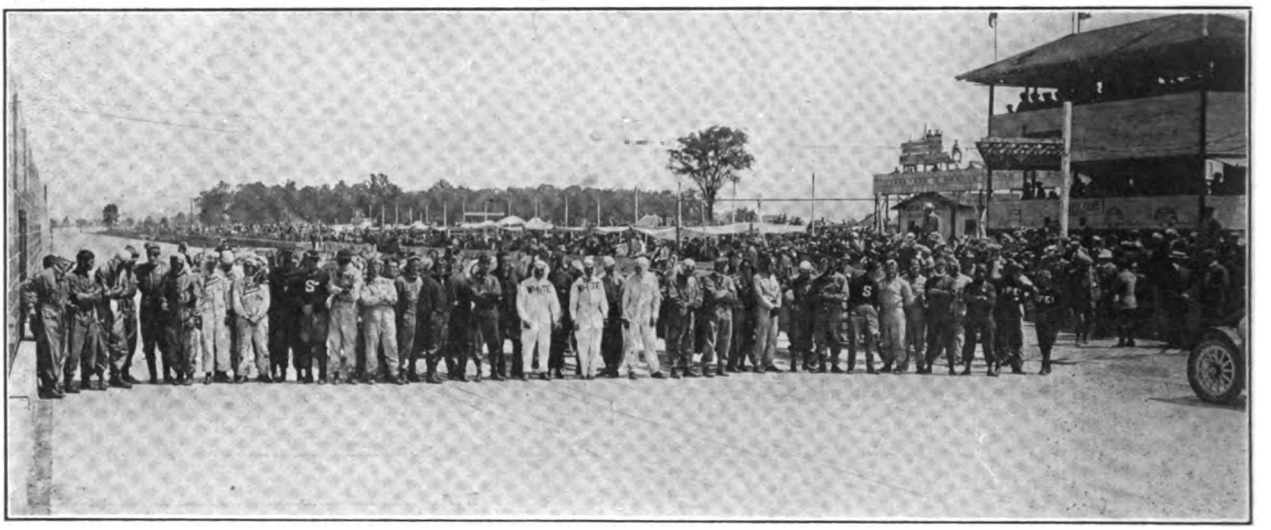


Line-Up of the Cars for the Grand Parade at the Start of the Second Annual 500-Mile Race on Indianapolis Speedway.

Never was there a better indication that the race is not always to the swift. Ralph De Palma, in a Mercedes, took the lead in this event on the third lap, and created new speedway records practically throughout the contest, only to come to a dead stop on the 199th lap. Dawson, who had been in second place throughout a large portion of the race, quickly took advantage of De Palma's misfortune and finished 10 minutes ahead of his nearest competitor. It was a remarkable exhibition of the consistent running and staying qualities of the National car. Something must be said as well of the generalship displayed by Joseph Dawson. He is an Indianapolis boy, who always heretofore has been seen at the wheel of Marmon cars. In last year's race he finished in fifth place with a car of that make. It was during 1910, when just 21 years of age, that Dawson first came into prominence driving his Marmon car to first place in five of the biggest victories of the year. Most of his driving has been without stop. However, in this event he relinquished the wheel to Donald Herr, an old National driver, for about 90 miles.

Second place went to Teddy Tetzlaff in the Fiat

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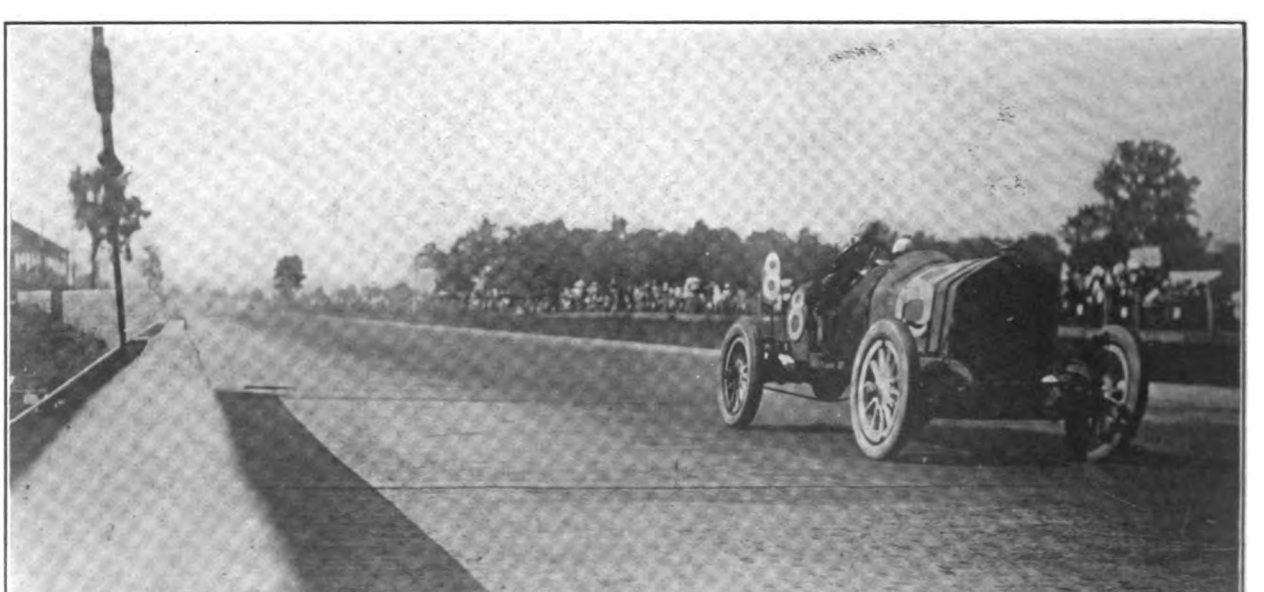


Drivers, Relief Drivers and Mechanicians Who Took Part in the Second Annual International Sweepstakes Event at Indianapolis, Memorial Day.

with which he won the recent Santa Monica road event. His machine was shod as before with Miller tires, and the rims were of the Dorian make. His magneto was a Bosch; the spark plugs, Bosch, and the carburetor, a Fiat. The Fiat's time was 6:31:40. To Caleb Bragg, Tetzlaff's relief driver, belongs the honor of first placing the car in second position, he having pushed Dawson out of it for a time about the 260th mile.

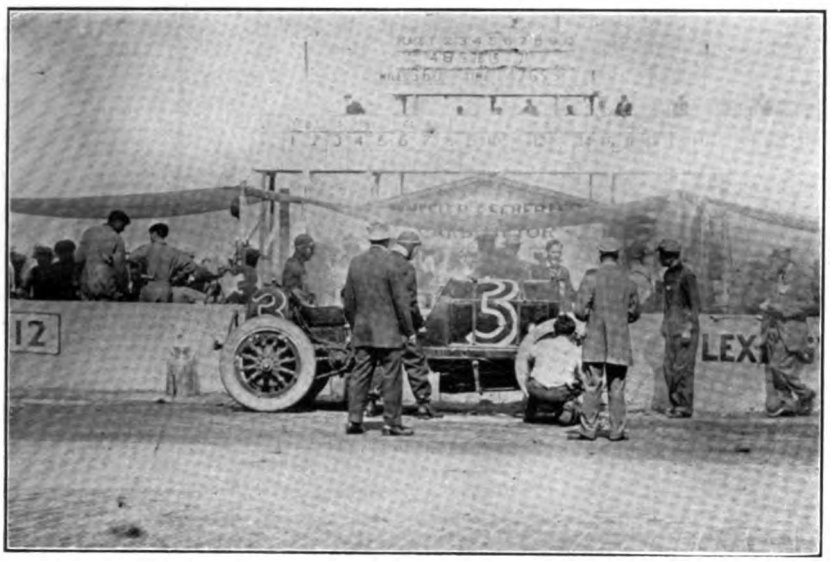
Perhaps the most surprising result of the day was the driving of Hugh Hughes, who finished third with the little 30 horsepower Mercer. His time was 6:33:09, and that he was able to complete 500 miles within less than two minutes of the time required by the high powered Italian made Fiat, speaks volumes for the product of the Mercer Automobile Company, Trenton, N. J. There were four machines equipped with wire wheels in the event, and of these one was the Mercer. The wheels were imported, being of the Rudge-Whitworth manufacture, and were shod with Michelin tires. Bosch magneto and plugs and Rayfield carburetor also were employed.

Of the 27 cars entered, but 24 started, and of the latter but nine finished. Ralph Mulford in a Knox was still running when the race was called off. It follows that of the 12 prizes, but 10 were awarded, the rest reverting to the speedway management. The tabulated results are shown herewith.



Joseph Dawson in the National 8, Finishing in First Place, Creating a New Speedway Record, and Winning $35,000 in Prize Money.

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Teddy Tetzlaff in Fiat 3, Winner of Second Place, at the Pits.

Car	Driver	Relief	Time
1—National,	Dawson,	Herr	6:21:06
2—Fiat,	Tetzlaff,	Bragg	6:31:29
3—Mercer,	Hughes,	Kittrell	6:33:09
4—Stutz,	Merz,	Knipper	6:34:40
5—Schacht W.	Endicott,	H. Endicott	6:46:28
6—Stutz,	Zengel,	Knipper	6:50:28
7—White,	Jenkins,	Fuller	6:52:38
8—Lozier,	Horan,	Ainslie	6:59:38
9—National,	Wilcox,	Rader	7:11:30
10—Knox,	Mulford,	none	———

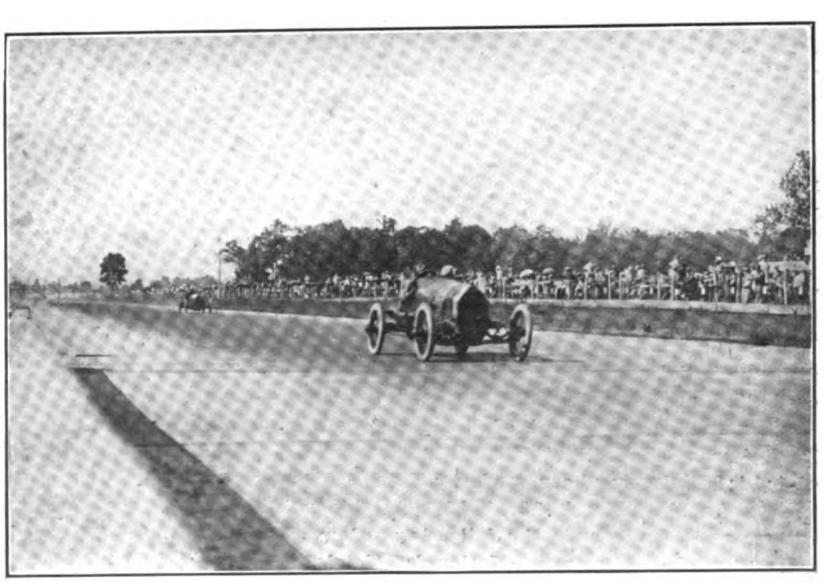
In the matter of accessories: Michelin tires were fitted to all of the cars in the above table, with the single exception of the Fiat. Splitdorf magnetos took the first, fourth, fifth, sixth and ninth prizes; Bosch magnetos secured the second, third and 10th, and a Mea magneto, the seventh. Bosch plugs were used on all of the cars to finish, while the Knox employed Red Head plugs.

Schebler carburetors took the first, fourth, fifth, sixth and ninth awards, and the Rayfield, the third, eighth and 10th. The Fiat and White utilized vaporizers produced by the car manufacturers. Monogram oil was used by all of the cars which finished except the second and last, which employed Oilzum. An accompanying table gives the detailed equipment of the competing cars, so far as it can be secured from the drivers or manufacturers.

Seventy-five thousand people saw the race, as against approximately 70,000 in 1911. Last year 8000 cars were parked in the space reserved for them while this year there were nearer 12,000. The field was limited to 30 entrants, and only 24 started, whereas last year, there was no limitation and some 40 machines were sent away. There were a few accidents this year, but no one was seriously hurt, and taking it all in all, it was one of the best exhibitions of motor speed that ever has been witnessed in this country or abroad. Already, it is being freely predicted that next year's event will see the entry of a large number of foreign cars driven by foreign men.

As last year, the opening was in the nature of a triumphal procession. In the lead was Carl G. Fisher, president of the Indianapolis speedway, in a Stutz as pacemaker. In the first line were Anderson, Stutz 1; Zengel, Stutz 2; Tetzlaff, Fiat 3; De Palma, Mercedes 4, and Hearne, Case 6. The second line was made up of the following: Wishart, Mercedes 7; Dawson, National 8; Wilcox, National 9; Knight, Lexington 10, and Dingley, Simplex 12. Then came Jenkins, White 14; Burman, Cutting 15; Frayer, Firestone-Columbus 16; Liesaw, Marquette-Buick 17, and W. Endicott, Schacht 18. In the fourth row were: Mulford, Knox 19; Hughes, Mercer 21; Horan, Lozier 22; Marquette, McFarlan 23, and Ormsby, Opel 24. Last of all were: Matson, Lozier 25; Merz, Stutz 28; Bruce-Brown, National 29, and Disbrow, Case 5.

Once around the 2.5-mile track they went in parade formation—and then they were off. Tetzlaff was leading before a quarter of the distance had been covered on the first lap of the race. He finished this lap in 1:43.49. De Palma was second; Wishart, third; Dingley, fourth, and Dawson, fifth. Again they went

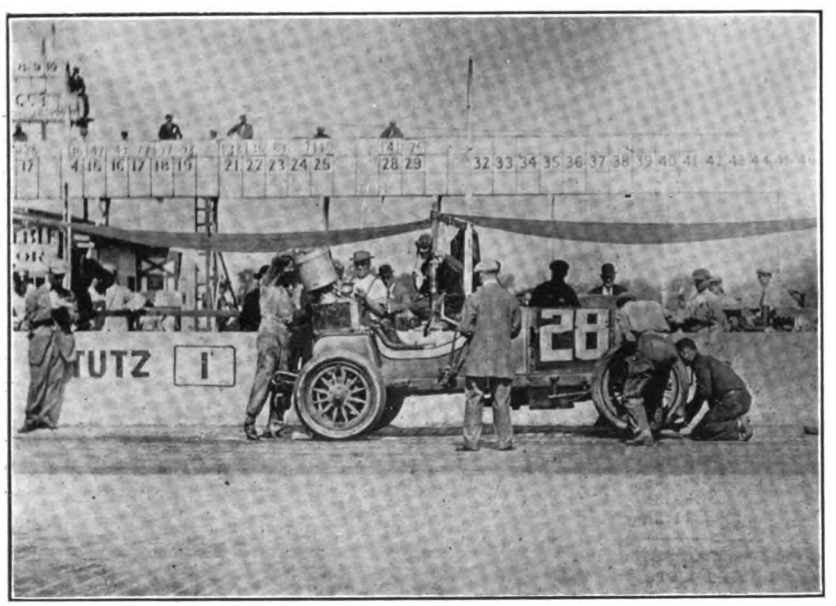


Hugh Hughes Finishing in Third Place with the Mercer 21.

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around the track, and Tetzlaff still had the lead, although De Palma and Wishart were crowding him closely. Dawson and Wilcox were close behind them.

On the third lap both De Palma and Wishart passed Tetzlaff, the former in the lead. Wilcox went into fourth place. On the fourth round, the position of the two leaders was unchanged, but Bruce-Brown in the third National was in third place. Tetzlaff was fourth, and Wilcox fifth.



Charles Merz in the Stutz 28, Who Disputed Hughes' Right to Third Award.

For 25 miles they raced in practically the same position. At this point, it was De Palma, Wishart and Bruce-Brown, followed by Mulford and Tetzlaff. The time for the distance was 14:38. In the very next lap, however, Bruce-Brown pulled into second place and was close behind De Palma. Wishart was third, and Mulford fourth. Wilcox's National halted on the 12th lap, and Burman replaced him in fifth place.

At the end of 50 miles, De Palma and Bruce-Brown were contending for first place, with the former in the lead. Mulford was in third place, and right behind him were Dawson and Tetzlaff. The time at this point was 36:39.

Sixty miles was covered by De Palma in 43:59, with Bruce-Brown still in second place. At 70 miles, it was De Palma, Tetzlaff and Dawson. At 80, De Palma was followed by Dawson and Mulford, and the distance had been covered in 58:33. De Palma covered 82.5 miles during the first hour.

A new world's record of 1:13:01 was set up by De Palma at the end of 100 miles, the former mark of 1:14:29.2 having been made by Tetzlaff in a Lozier at Los Angeles, March 19, 1911. At this point the drivers and cars were in the following order: De Palma, Mercedes; Dawson, National; Tetzlaff, Fiat; Wishart, Mercedes; Anderson, Stutz; Frayer, Firestone-Columbus; Merz, Stutz; Burman, Cutting; Hughes, Mercer; Marquette, McFarlan; Mulford, Knox; Zengel, Stutz; Jenkins, White; Farr, Marquette-Buick; Horan, Lozier; Matson, Lozier; Endicott, Schacht; Dingley, Simplex; Wilcox, National. Last year's time for 100 miles was 1:18:22.

At 120 miles, it was De Palma, Dawson and Tetzlaff, the time being 1:27:26. At 140 miles, the three leaders were in the same position, the time being 1:41:52. Another new world's record was passed at 150 miles, De Palma covering the distance in 1:49:00, while Bruce-Brown in a Fiat took 1:57:15 a year ago.

Three cars had been withdrawn at this time. Marquette in the McFarlan went off the track on the 63rd lap, but neither the driver nor mechanician was injured. In the 80th lap, Anderson's Stutz ceased to be a contender. Herrick's Case which was being driven by Whallon at the time, also went out of the running.

Both De Palma and Dawson stopped for tires on the 180th mile. At 200 miles, De Palma's time was 2:24:46, as against Bruce-Brown's 2:39:28 of last year. De Palma was leading the entire field by a lap at this point, with Tetzlaff second and Dawson third. The rest were in a long string.

Soon afterward, Hughes' Mercer ran out of gasoline and he and his mechanician were forced to push it down the track to the pits for another supply. This should be remembered in considering the fact that he finished in third place, less than two minutes behind the Fiat.

De Palma turned 250 miles in 3:03:34, while Bruce-Brown's best of 1911 was 3:17:34. For the second time, Dawson's National and De Palma's Mer-

DETAILS OF EQUIPMENT

No. Car and Driver	Cyl.	Bore	Stroke	H.P.
1—Stutz, Anderson	4	4.750	5.50	36
2—Stutz, Zengel	4	4.750	5.50	36
3—Fiat, Tetzlaff	4	5.000	7.50	70
4—Mercedes, De Palma	4	5.120	7.09	..
5—Case, Disbrow	6	4.375	5.00	100
6—Case, Herrick	6	4.375	5.00	100
7—Mercedes, Wishart	4	5.120	7.09	90
8—National, Dawson	4	5.000	6.25	40
9—National, Wilcox	4	5.000	7.50	40
10—Lexington, Knight	6	4.125	5.25	72
12—Simplex, Dingley	4	5.750	5.75	50
14—White, Jenkins	6	4.250	5.75	43
15—Cutting, Burman	4	5.218	7.00	100
16—Firestone-Columbus, Frayer	4	5.000	5.50	40
17—Marquette-Buick, Liesaw	4	4.500	5.00	32
18—Schacht, Endicott	4	4.750	5.50	36
19—Knox, Mulford	6	4.800	5.50	50
21—Mercer, Hughes	4	4.375	5.00	30
22—Lozier, Horan	4	5.375	6.00	46
23—McFarlan, Marquette	6	4.250	5.00	60
24—Opel, Ormsby	4	4.500	6.87	32
25—Lozier, Matson	4	5.375	6.00	46
28—Stutz, Merz	4	4.750	5.50	36
29—National, Bruce-Brown	4	5.000	7.50	40

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cedes needed new shoes at the same instant, and started again practically together. The following had ceased to prove contenders at this point: Bruce-Brown's National, Ormsby's Opel, Hearne's Case, Frayer's Firestone-Columbus, Knight's Lexington, Marquette's McFarlan, Anderson's Stutz, Liesaw's Marquette-Buick, Disbrow's Case and Wishart's Mercedes.

De Palma was three laps ahead at 300 miles, which he covered in 3:43:21, as against 4:01:25 for Harroun in 1911. The drivers, their positions and number of laps at this point, follow: De Palma, 120; Dawson, 117; Burman, 117; Tetzlaff, 115; Hughes, 114; Merz, 112; Horan, 111; Jenkins, 111; Endicott, 111; Zengel, 109; Wilcox, 102; Matson, 100; Dingley, 97; Mulford, 83. About this time, Dingley's Simplex caught on fire at the pits, but the flames were extinguished with chemicals, and he was soon in the running again.

Burman and his Cutting were strong competitors from the 300th to the 395th mile. Burman, Dawson, Tetzlaff and Merz were exchanging places frequently, although De Palma was too far ahead to mind it at all. At 350 miles, De Palma's time was 4:19:35.

It was on the 390th mile that Burman made a brave attempt to win a lap over Dawson, who was by this time nearly six minutes behind De Palma. For some reason, the big Cutting failed to make the turn as its driver had expected. The car overturned, but the two occupants were picked up only slightly injured. Burman insisted upon watching the completion of the race from the pits. Tetzlaff immediately resumed the third position.

At 400 miles, De Palma's time was 4:56:34, as compared with Harroun's 5:23:15 of last year. The drivers, their position and number of laps at this point were: De Palma, 160; Dawson, 156; Tetzlaff, 153; Merz, 151; Hughes, 149; Jenkins, 147; Endicott, 146; Horan, 144; Knipper (Stutz), 143; Wilcox, 137; Mulford, 109.

At the end of 420 miles, it was De Palma, Dawson and Tetzlaff. It was the same at 440 and 450. Here De Palma's time was 5:35:32. He had gained a fifth lap over Dawson. At 460 miles, Wilcox lost some time at the pits, because of trouble with his gasoline feed pipe. De Palma covered this distance in 5:43:14. He drove 475 miles in 5:58:06.

At the end of 480 miles, it looked very much as if there were little hope for Dawson and his National. Second place was expected, and the men in the National pits had begun to resign themselves to this result. Suddenly, there was decided change in the situation. On the lap which began the 491st mile for De Palma, his car began to feel the sustained strain,



Joseph Dawson at the Wheel of the Winning National.

or at least the engine seemed to do so. He covered one lap at low speed, while Dawson passed him twice.

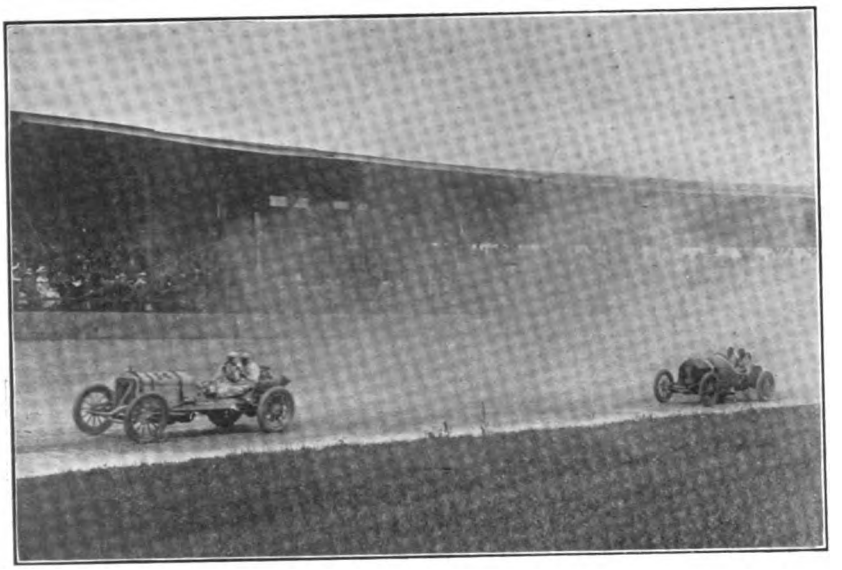
With less than five miles to go, the Mercedes limped around the track to back stretch, whence De Palma and his mechanician did their best to push it into the pits. With a little more than one lap between him and the first prize, De Palma was forced to see the others pass him one after the other, again and again. Less than five miles separated him from $35,000.

The crowd went wild. It mattered little to them that a man's heart was breaking, albeit De Palma's

ON CARS TAKING PART IN INDIANAPOLIS 500-MILE RACE.

Gear Ratio	Tires	Rims	Magneto	Plugs	2 sets	Carburetor	Oil
2.2—1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	Monogram
2.2—1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	Monogram
2.2—1	Miller	Dorian	Bosch	Bosch	Yes	Fiat	Oilzum
.....	Michelin	Michelin	Bosch	Bosch	...	Rayfield	Monogram
2 —1	Michelin	wire wheels	Splitdorf	Red Head	Yes	Rayfield	Monogram
2 —1	Michelin	wire wheels	Splitdorf	Red Head	Yes	Rayfield	Monogram
2.5—1	Michelin	Michelin	Bosch	Red Head	Yes	Rayfield	Monogram
1.6—1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	Monogram
2 —1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	Monogram
2 —1	Michelin	Michelin	Splitdorf	Red Head	Yes	Schebler	Polarine
2 —1	Michelin	Michelin	Splitdorf	Red Head	Yes	Simplex	Monogram
2 —1	Michelin	Michelin	Mea	Bosch	...	White	Monogram
1.7—1	Firestone	Booth	Remy	.....	Yes	Rayfield	.....
2 —1	Firestone	wire wheels	Remy	Red Head	Yes	Schebler	Polarine
2.2—1	Michelin	Michelin	Remy	Red Head	...	Rayfield	.....
2.5—1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	.....
1.9—1	Michelin	Michelin	Bosch	Red Head	Yes	Rayfield	Oilzum
2.5—1	Michelin	wire wheels	Bosch	Bosch	Yes	Rayfield	Monogram
2 —1	Michelin	Michelin	.....	Bosch	...	Rayfield	Monogram
2 —1	Michelin	Baker	Splitdorf	Red Head	Yes	Schebler	Polarine
.....	Michelin	Booth	Bosch	Red Head	...	Rayfield	.....
.....	Michelin	Michelin	.....	.....	...	Rayfield	.....
2.2—1	Michelin	Michelin	Splitdorf	Bosch	...	Schebler	Monogram
2 —1	Michelin	Michelin	.....	.....	...	Schebler	.....

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John Jenkins in White 14, Leading William Endicott in Schacht 18.

habitual smile never left his face. Mrs. De Palma was in New York throughout the race, and at the end of every 25 miles, someone in the pit telegraphed her husband's position. At 475 miles, she had learned that De Palma was leading the field, almost eight minutes ahead of Dawson. At 500 miles, she read the message that told her her husband's fondest dreams had been shattered in sight of the goal.

But the crowd did not know this. They did not care. A moment before they were cheering De Palma on to victory. Now they cheered, perhaps just a little more fervently, for Dawson. It was a patriotic crowd. De Palma's car was of German manufacture. Dawson's National was not only an American machine, but a product of Indianapolis. Flags were flying, hats were in the air—it was by far the most exciting finish that has greeted any automobile race in this country. Dawson drove twice around the track after receiving the checkered flag, in order to dispel any possible doubt as to the distance he had covered.

After the race was won, Dawson stopped only long enough to receive the congratulations of his friends, then went straight to the home of his parents, Mr. and Mrs. Chase F. Dawson, 2828 North Illinois street. "Mother, I won!" he exclaimed, as he entered the door, $35,000 richer than when he left in the morning. Half an hour later he was in the Y. M. C. A. swimming pool.

The $35,000 was made up of the $20,000 prize awarded by the speedway management and $15,000 in accessory prizes. Tetzlaff's share of the main prize was $10,000: Hughes, $5000; Merz, $3500; Endicott, $2500; Zengel, $2000; Jenkins, $1500; Horan, $1400; Wilcox, $1300; Mulford, $1200. Tetzlaff and Hughes also will receive substantial additions in the way of accessory awards.

It is only fair to state that the awarding of third place to Hughes in a Mercer was contested by the Stutz team, and particularly by Merz, who finished in fourth place. Referee A. R. Pardington gave out the figures as set forth here as official, May 31, the day following the race. It is not stated definitely whether the protest will be forwarded to the contest board of the American Automobile Association, which has final jurisdiction over such matters. So far as the official time is available, the position of the drivers and cars at each 50-mile period, based upon the position of the leader was as follows:

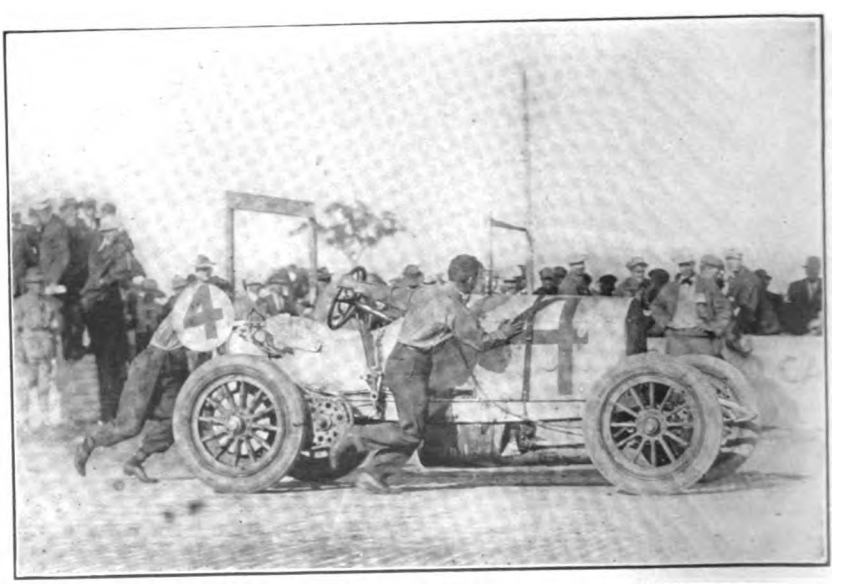
Fifty miles—First, De Palma, Mercedes; second, Bruce-Brown, National; third, Mulford, Knox; time, 36:39.

One hundred miles—First, De Palma, Mercedes; second, Dawson, National; third, Tetzlaff, Fiat; time, 1:13:01.

One hundred and fifty miles—First, De Palma, Mercedes; second, Dawson, National; third, Tetzlaff, Fiat; time, 1:49:00.

Two hundred miles—First, De Palma, Mercedes; second, Tetzlaff, Fiat; third, Dawson, National; time, 2:24:46.

Two hundred and fifty miles—First, De Palma, Mercedes; second, Dawson, National; third, Burman,



Ralph De Palma and His Mechanician Trying to Urge the Mercedes 4 into Action Again on the Fatal 199th Lap.

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Cutting; time, 3:03:34.

Three hundred miles—First, De Palma, Mercedes; second, Dawson, National; third, Burman, Cutting; time, 3:43:21.

Three hundred and fifty miles—First, De Palma, Mercedes; second, Dawson, National; third, Burman, Cutting; time, 4:19:35.

Four hundred miles—First, De Palma, Mercedes; second, Dawson, National; third, Tetzlaff, Fiat; time, 4:56:34.

Four hundred and fifty miles—First, De Palma, Mercedes; second, Dawson, National; third, Tetzlaff, Fiat; time, 5:35:32.

Five hundred miles—First, Dawson, National; second, Tetzlaff, Fiat; third, Hughes, Mercer; time, 6:21:08.

The entire story of the Indianapolis race cannot be written, however, without mention of the graceful act of the Bosch Magneto Company, New York City. As Ralph De Palma, whose Mercedes was equipped with a Bosch instrument, stood on the deck of the Kaiser Wilhelm der Grosse, awaiting the hour of its departure from the Hoboken pier, A. H. Bartsch, advertising manager of the company, on behalf of President Otto Heins, presented him with a "consolation prize" of $250.

This was real sympathy in concrete form, and De Palma was greatly surprised. He goes to France, accompanied by David L. Bruce-Brown, where they will be at the wheels of Fiat cars in the Grand Prix later this month.

S. C. A. T. WINS TARGA FLORIO.

The seventh annual Targa Florio race over the Tour de Sicily, Italy, was held May 26-27. Four American cars, three Fords and an Overland, were entered, and one of the former secured sixth place. The distance was 632 miles, covering some of the hill sections of the country, and the result was as follows:

Car	Driver	Time
1	S. C. A. T., Scipe	23:37:19
2	Lancia, Garretto	25:07:38
3	Fiat, Gloradano	25:41:04
4	Deutz, Moraes	25:52:08
5	Fiat, Lopez	26:57:37
6	Ford, Fracassi	27:12:43
7	Lancia, Olson	27:24:26
8	Fiat, Trombetta	29:45:20

NATIONAL RELIABILITY TOUR.

Detroit has been selected as the city from which the annual national tour for the Glidden, Anderson and A. A. A. trophies will start. The concluding portion of the trip will be from Memphis to New Orleans, although the details concerning the first part of the itinerary have not been decided upon by the special committee, consisting of Col. Frank M. Joyce, Minneapolis; Lewis R. Speare, Boston; John A. Wilson, Franklin, Penn.; W. E. Metzger, Detroit, and W. E. Moyer, Des Moines. The date for the tour has not been selected, but it is expected that it will be held some time in October.

PABST BLUE RIBBON TROPHY.

Col. Gustav Pabst, president of the Pabst Brewing Company of Milwaukee, has presented the Milwaukee Automobile Dealers' Association a new cup for the medium car race held in connection with the Vanderbilt Cup event, to be known as the Pabst Blue Ribbon trophy. It will be turned over to the Motor Cups Holding Company, which has jurisdiction over the custody of the Vanderbilt and Grand Prize awards. It has not been definitely determined whether the Pabst prize will be offered for American made cars alone, or thrown open to the manufacturers of the world. The deed of gift provides that the cup shall carry with it a cash award of $2500 to the winning driver.



COMING EVENTS.

June.

June 11-13—Reliability tour, Washington, D. C.
June 15—Track race, Brighton Beach, N. Y.
June 20—Algonquin hill climb, Chicago, Ill.
June 20-22—Reliability run, Portland, Me.
June 23—Track meet, Laurel, Del.
June 25-26—Grand Prix, Dieppe, France.

July.

July 3-5—Track events, Belle Fourche, S. D.
July 4—Track events, Petersburg, Ind.
July 4-5—Track events, Taylor, Tex.
July 4-6—Beach events, Old Orchard, Me.
July 5-6—Road race, Tacoma, Wash.
July 6-7—Reliability run, Chicago, Ill.
July 9-24—Four-States tour, Indiana.
July 15—Reliability tour, Wisconsin.

August.

Aug. 8-10—Beach races, Galveston, Tex.
Aug. 23-24—Road races, Elgin, Ill.

September.

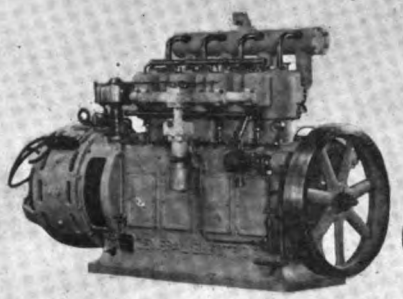
Sept. 2—Speedway meet, Indianapolis, Ind.
Sept. 7—Track meet, Hamelin, Minn.
Sept. 9—International aviation race, Chicago, Ill.

October.

Oct. 7-11—Reliability trials, Chicago, Ill.
Oct. 12—Track events, Salem, N. H.

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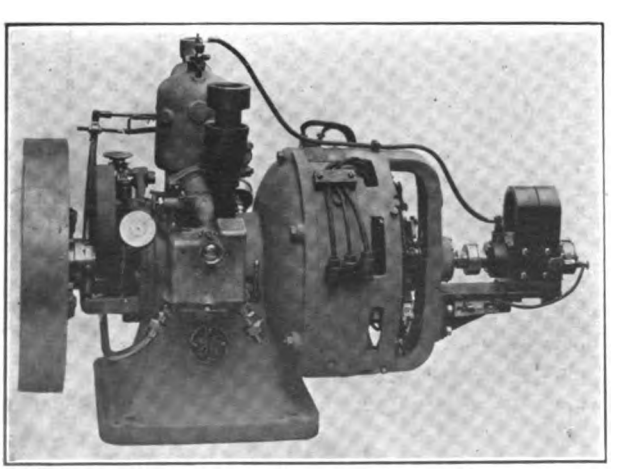
Gasoline-Electric Sets Generating Current for the Garage and Repair Shop.



ALTHOUGH the development of the internal combustion motor may be attributed, to a certain extent, to the automobile, its industrial value was early made manifest, and today it is utilized wherever a small power plant is required. It has replaced older forms of energy, such as some types of water wheels, wind mills, etc., and even in some instances, steam. Its convenience is an established and accepted fact, as the gasoline engine may be operated as little or as much as desired, needing no other attention than fuel and lubricant. Its economic value lies in that by simply throwing a switch and turning a lever, power is developed instantly, and when not in operation no expense is involved.

Power Equipment Important.

Throughout the country the mechanically propelled vehicle is supplanting the horse drawn, both for pleasure and commercial purposes, and the rapidly increasing number of these in service affords opportunity for the establishment of garages and repair shops for their care and maintenance. Where these are located outside the zones of the central service station, the question of power is an important factor, inasmuch as it is essential that the equipment be complete to comply with the peculiar requirements of the business. In order to meet competition the garage and repair shop must include those facilities which make for reliable and prompt service, and it is reasonable to presume that the country resident will insist upon the same attention as may be obtained in the city.



Depicting One Kilowatt Gasoline-Electric Generating Set Which Develops a Direct Current at a Steady Voltage.

Energy for operating the lathe, drilling and milling machine, compressor, water pump, etc., can be supplied by the gasoline engine, but the repair industry necessitates more or less night work. This brings up the question of proper lighting facilities. Unlike some trades, the mechanical features of the automobile require an efficient portable light. The kerosene or acetylene lamp is not suitable owing to the danger of even a small amount of gasoline being ignited by the naked flames, creating considerable damage if not total destruction of the property.

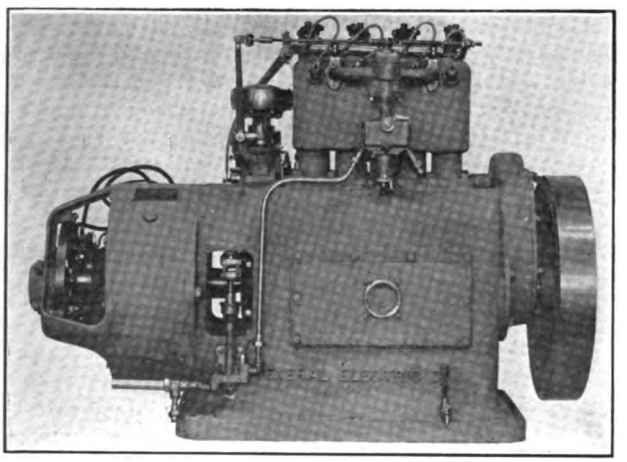
Advantages of Electricity.

The advantages of electricity in the garage are legion. Not only is an excellent and safe light obtained but the current may be utilized for numerous purposes. It may be employed to operate a portable drill, polishing machine, air compressor, machinery, etc., and in addition the commodity has another important value in that a desirable trade may be built up in the charging of electric vehicles and storage batteries. Ignition batteries are generally employed with the motor car and the garage which is compelled to send its customer's batteries to the city for recharging receives but little recompense thereby, to say nothing of the delays and danger of injury during the transportation of the current containers.

It is only natural to presume that the garage situated beyond the zone of the central station would attract a desirable clientele if equipped with adequate facilities for the charging of electric vehicles, as it is obvious, for instance, that many summer residents would utilize electric carriages were means obtainable for charging.

The early attempts to couple the gasoline motor to the generator were not satisfactory, owing to the special conditions demanded of the unit. An efficient

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Three Kilowatt Generator Is Operated by a Four-Cylinder, Four-Cycle Motor and Furnishes 2400 Candlepower.

gasoline-electric set requires a direct or shaft drive with speed sufficiently high and with impulses frequent enough to produce the even turning movement absolutely essential to steady voltage. The motor also should be so governed as to insure the maintenance of uniform speed on both fixed and varying loads. Other necessary features are: Economical fuel consumption; high electrical efficiencies at the rated capacity of the set, with a minimum of decrease in efficiency and increase in fuel a kilowatt at slightly underloads, and ability of the unit to carry an overload without undue overheating of the generator.

Application of Service.

The United States government was one of the first to demand a unit to meet the above requirements and to conform to these as well as the demand for a lighting equipment for an installation beyond the zone of the central station, the General Electric Company, Schenectady, N. Y., began experimentations, which resulted in the manufacture of the gasoline motor driven electric generating sets illustrated herein. These are designed for the specific purpose of supplying the best quality of service where electricity is not otherwise available.

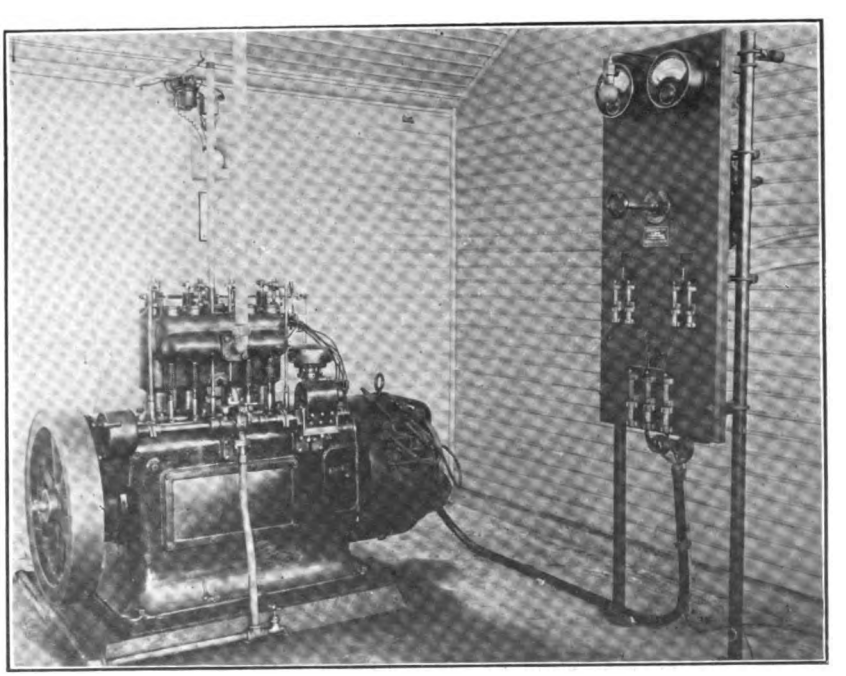
These units may be employed to supply current for charging electric vehicles, and ignition or lighting batteries; to operate the machine equipment of the garage, and to light it as well. They are constructed in four sizes, ranging from one to 25 kilowatts and with the exception of the smallest the gasoline motors are of the four-cylinder, four-cycle, water-cooled type. The one kilowatt set has a single-cylinder, two-cycle engine, with three-inch bore and stroke.

The operation of these outfits is exceedingly simple. To start the set the ignition current is switched on and the engine cranked. Mounted upon an extension of the engine shaft is the armature of the generator, and as it begins to revolve between the poles of powerful magnets, the cutting of the invisible lines of magnetic force between these poles by the copper conductors of the armature produces an electric current by a process called induction. This is collected from the commutator by means of brushes and is transferred over the wire circuit, where it is always ready to be utilized for light, heat or power, or it may be stored in a battery.

As these small power plants are installed beyond the limits of the central station and expert attendance, it is important that the materials be of the very best quality, and the design, simple. The motors built by the General Electric Company are accurate in design and standardization, being constructed in accordance with the best engineering judgment and highest mechanical skill at the service of this company. Years of experience in producing gasoline motors and generators for railroad service on rural lines and for government service, have been reflected in the result, and absolute reliability and simplicity are features emphasized.

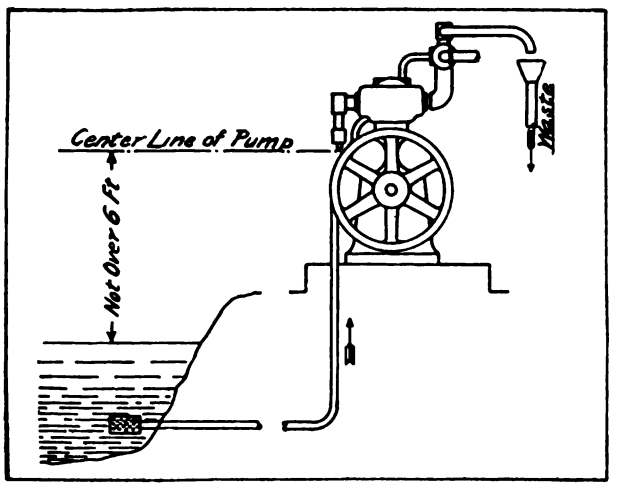
Control of Motor Speed.

The lighting engine must operate evenly and smoothly at all loads, for any variation of speed, however slight, will be noted immediately by a flickering of the lights. Variations of speed not easily noted on a speed indicator will appear prominently



Showing Installation of Generating Set in Private Garage, Including Switchboard and Automatic Clock Cut-Out.

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Installation of Cooling System Where Water Is Taken from a Lake or Pond.

upon the lamps. To insure steady and even operation the sets are provided with a centrifugal governor, located in the flywheel, this being so constructed that it is very sensitive and capable of responding instantly to changes in loads. It limits the variation in the speed of the motor from no load to full within four per cent. which, with the design of the generator, insures constant voltage.

The four-cylinder motors of the three, five and 10 kilowatt sets are cast en bloc, that of the larger size having cylinders cast singly. The bore and stroke dimensions are 2.5 by five, three by six, five by six and 7.25 by 7.5, respectively, and the speed revolutions a minute are 800, 750, 600 and 560. The cylinders are of a special high grade, close grained, gray iron, carefully machined and ground to size, as are the pistons. The engine base is a substantial one-piece casting, suitably designed for the requirements of the various sizes, and liberal inspection plates permit of easy access to all working parts. The crankshaft is a high grade, specially treated steel forging, accurately ground to size and is supported in two, three or five babbitt bearings according to size of the motor. The camshaft is also of high grade material and the cams are drop forged and pinned. All connecting rods are dropped forged and fitted with removable babbitt filled bearings. All exhaust valves are located on the side, but the position of the intake members is varied, the three and five kilowatt sets being fitted with valves in the head while the larger motors are of the T head type.

Components of Motor.

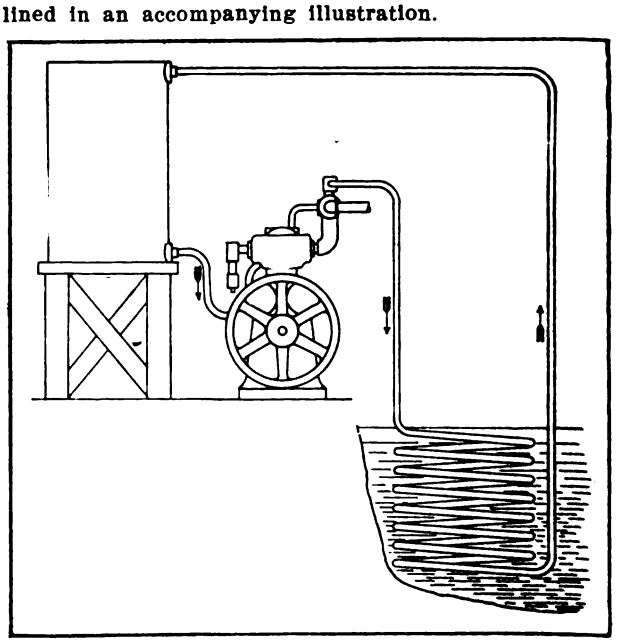
The carburetor is of the General Electric constant level type to which the fuel is delivered by a pump integral with the engine. The motors are not restricted to the use of gasoline, however, as kerosene, natural or illuminating gas may be utilized, by the substitution of a mixing valve. The 25, 10 and five kilowatt sizes are provided with a General Electric low-tension magneto and induction coil while the three kilowatt is equipped with a high-tension magneto. The intermediate sizes are started directly on the magneto, although batteries may be employed if desired. Forced feed lubrication is employed on the 10 and 25 kilowatt sets, with splash on the smaller sizes, an exception being noted with the one kilowatt, which being of the two-cycle type, is lubricated by mixing the oil with the fuel.

The single-cylinder motor is a two-cycle, three-port type with throttle valve located in the transfer port between the crankcase and cylinder. The same high grade material and workmanship are incorporated in the design and the set has all of the efficient qualities of the larger units. The sets require but little floor space and the generator is mounted directly upon the engine shaft and enclosed in a compact frame.

Cooling Methods Outlined.

All motors are water-cooled and the method of supplying the fluid to the jackets varies according to the location of the unit and available supply of water. The one kilowatt engine is fitted with the thermo-syphon system, utilizing a cooling tank having a capacity of about .80 gallons. Where the amount of water available is limited, the fluid may be cooled by a motor driven blower set forcing air through a gilled tube radiator. This is the standard equipment furnished for the United States army.

Where a constant supply of cold water is to be had the amount essential to cool the motor properly is about seven gallons a minute, when operating the larger set under full load and proportionately less for the smaller outfits. Where the motor is not more than six feet above the level of the water, as in the case of a pond, lake, creek or ocean, the fluid may be lifted directly by the gear pump on the engine and discharged from the jackets into a waste pipe as outlined in an accompanying illustration.



Depicting Method of Cooling Gasoline Motor Generator.

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Where the height is greater than six feet, an auxiliary motor driven pump may be utilized, or a submerged coil of pipe, the top of which is connected to the discharge pipe on the engine utilized. The lower end of the coil leads to a small expansion tank on a level with the motor, or a trifle above. Another pipe from this container is connected to the gear pump. In this method the height of the engine above the water does not affect the operation of the pump, as it is practically a closed and balanced circulating system. The method of cooling is regulated according to local conditions and the company points out that these cannot be complied with until known.

Construction of Generator.

The generator utilized in connection with the motors is a General Electric multi-polar continuous or direct current machine designed especially to meet the requirements of the set. The field winding is compound and compensates for the drop in engine speed between no load and full, thereby maintaining a constant voltage through the entire load range of the set.

The armature of the generator is direct connected to the crankshaft of the gasoline engine and is supported in a ball bearing at the "outboard" end. Continuous current generators of all standard voltages can be furnished and alternating current members for special voltages are made upon special order. The 125-volt direct current generator, however, is considered standard equipment.

Lamp Loads.

The one kilowatt set is capable of supplying a total of 800 candlepower in General Electric Mazda lamps or 40 20 candlepower Mazda lights. The three, five, 10 and 25 kilowatt sizes furnish 2400, 4000, 8000 and 20,000 candlepower, respectively. The Mazda lamps supply approximately three times as much light as the carbon members with the same amount of current, and are important factors in the system, inasmuch as they reduce the power required to one-third.

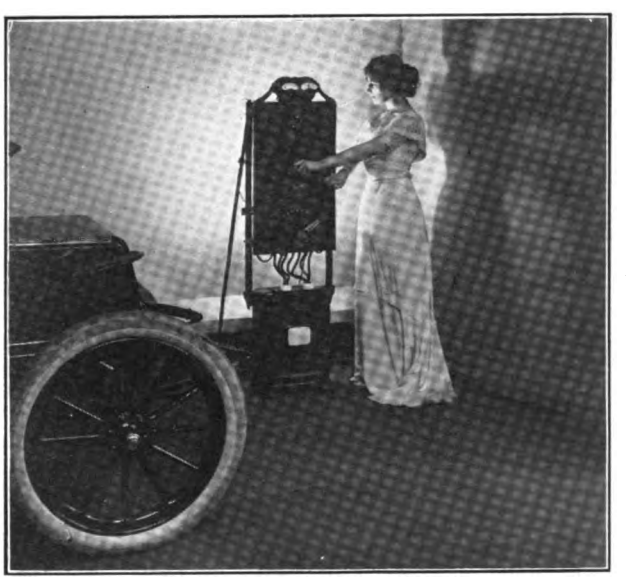
A large number of these gasoline-electric generating sets have been installed by the company in private garages attached to country estates as well as at the sea shore and in the mountains where current cannot be secured from a central service station. In these days of refinement the city business man is loth to be deprived of the comforts of the city while sojourning at his summer residence and with a generating set the annoying inconveniences, such as poorly lighted houses, inadequate water supply, etc., are eliminated.

Electric motors operated from the generating sets can be utilized to drive domestic and farm appliances contributing to the comfort of the residents. By including a pump in the water circuit a plentiful supply of fluid may be pumped to the storage tank and the level of the latter may be maintained automatically. Motors may also be employed to operate vacuum cleaners, as well as laundry machinery. These sets are capable of supplying adequate current for cooking while a number of devices of surprising utility and variety may be operated throughout the house. These also include heating apparatus.

Charging Apparatus.

The installation of a gasoline-electric set makes possible the utilization of the pleasure or commercial electric vehicle, outside the usual so-called electric field, as with a controlling panel and rheostat the batteries may be provided with energy. The controlling panel is equipped with fused switches, ammeter, voltmeter, and polarity indicating lamps, for controlling one or more circuits as desired. It is also provided with brackets for wall mounting.

The charging rheostat may be placed under the controlling panel or on the wall adjacent, so as to take up minimum space and insure the utmost convenience in controlling the current. The device is enclosed by an easily removable sheet metal cover, which effectually prevents accidental contact with live



Charging the Electric Vehicle in the Private Garage with Current Supplied by Generating Set.

parts of the circuits. The function of the rheostat is to prevent a heavy rush of current through the batteries when the latter are connected to the source of supply, as well as to regulate the flow of the electricity. The panel is equipped with circuit breaker, fused switch and reliable instruments and is also provided with pipe supports for mounting. With such an arrangement it is claimed that the electric vehicle may be charged easily, the operation involving no labor whatsoever.

Relative to the costs of installation and operation the General Electric Company points out that as with automobiles, so it is with generating sets, the one that can be purchased for the least money is not usually the least expensive in the end. If figured on the basis of dollars a cubic foot occupied or dollars a pound, or even dollars a kilowatt output, the sets are high priced, but on the basis of dollars a unit of relia-

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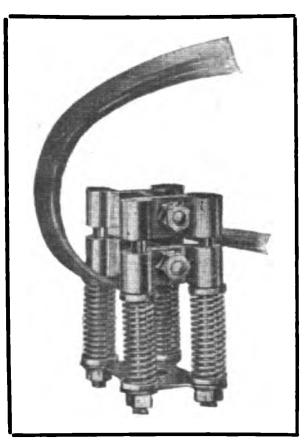
bility the prices are no higher than one would expect for an article of this nature. The cost includes all accessories to the generating apparatus but not auxiliary apparatus, such as switchboards, fuel and water tanks, batteries, etc.

In estimating the cost of operation of such a plant the company calls attention to the fact that all items of expense should be considered, such as repairs, cost of attendance, depreciation, cost of suitable building etc., as well as that of fuel and lubricant. The higher the quality of the apparatus, the lower will be the items of repairs and depreciation; the more automatic the operation of the apparatus, the lower the cost of the attendance; and the more compact the design, the less the cost of installation and space occupied.

In figuring the cost of fuel, account should be taken of the fact that any gasoline engine driven set will supply more electrical output a gallon of fuel consumed when operating at its normal rated load, whereas in most cases apparatus of this nature is usually operated at only a fraction of its full capacity. Therefore, a piece of apparatus that will operate at but slight increase of fuel consumption a unit of output and fractional loads, is more economical than one that will consume practically as many gallons of fuel an hour on small as on full loads. The General Electric motors are so designed that a reduction of load results in a definite decrease of fuel consumed, the amount of fuel a kilowatt output increasing but little as the load is reduced.

VELVET AUXILIARY SPRINGS.

Motor car springs which provide comfortable riding qualities on smooth and level highways may jar and jolt the passengers when the machine is operated over rough roads at varying speeds. To eliminate all vibration and shock these stresses must be absorbed in such a manner that there is no recoil.



Velvet Auxiliary Spring.

A device which has been tested and thoroughly tried out is the Velvet auxiliary spring for which George Sumner, Inc., New York City and Boston, is distributor. This differs from the usual form of shock absorber construction inasmuch as the rear of the car is practically suspended by eight elastic coils which are so designed that there is no side sway.

As outlined in an accompanying illustration, it will be noted that two sets of block members are employed, one of these being bolted to each portion of the spring. One set of blocks slides freely up and down on studs over which are fitted the auxiliary springs and a plate is utilized to space the studs properly and to prevent binding.

The lower ends of the stud members are equipped with adjusting nuts, these permitting the regulation of the tension of the springs as desired. It is pointed out by the maker that no violent recoil is possible with the Velvet auxiliary springs as the downward and upward movements are equally compensated. They may be attached easily in a few minutes, as boring or special fittings are not required.

INTERESTING DIXON BOOKLET.

The Joseph Dixon Crucible Company, Jersey City, N. J., importer and manufacturer of graphite lubricants, has issued in booklet form, an interesting essay from the forceful pen of Elbert Hubbard, entitled, "Joseph Dixon, One of the World Makers." Mr. Hubbard refers to Mr. Dixon as "a man whose work has profoundly influenced civilization, yet strangely enough, a man of whom the world at large knows little." The tribute to the founder of the Dixon company is of particular value to those who are familiar with the graphite products made by it. The edition is limited and copies may be had only upon application to the company.

RESULTS AT SALEM, N. H.

J. H. LeCain of Boston, driving a Stutz car, won the 50-mile race at Rockinwgham park, Salem, N. H., June 8, the events being postponed from Memorial Day on account of the weather. Harry F. Grant in a Berkshire car was the only other driver to finish. Seven machines started. LeCain's time was 54:20.2.

Grant's Berkshire won the 20-mile event, finishing ahead of Harry Cobe in a Jackson, in 25:12.8. The 10-mile event was taken by J. F. Esleeck in a Lexington, his time being 10:22.6. John J. Kingsley in a Thomas won the five-mile for amateurs; time, 5:51.8. G. C. Jessop in a Buick took the professional five-mile race; time, 5:37.4.

LENOX ANNUAL MEETING.

At the annual meeting of the board of directors of the Lenox Motor Car Company, Boston, June 3, a vote of thanks was tendered to Frank A. McClasky, the treasurer, for his work as general manager during the past year, and he was unanimously re-elected to that position. Among several important matters which were decided upon were the following: Declaring the regular semi-annual dividend to stockholders of record; the production of a six-cylinder Lenox car for 1913, and the erection of a larger plant. A committee was chosen for the purpose of selecting a site for this factory, and it is hoped that the company will be in its new home by Jan. 1.

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Tarvia

Preserves Roads
Prevents Dust~



Connecticut Avenue Bridge, Washington, D. C. Roadway Built with Tarvia X.

The Passing of Plain Macadam

"In these days of progress it is a misdemeanor bordering closely on crime to put an old style macadam pavement on a public road."—*Chicago Tribune.*

WITHIN the last ten years the character of traffic on our roads has changed completely A large part of it is now motor traffic and the wheels instead of simply rolling over the road *tear up the surface.*

The driving wheels of an automobile revolve several more times to the mile than front wheels of the same size, showing the existence of a certain amount of slip, and accounting clearly for the rapid deterioration of brittle macadam surfaces under such traffic.

Deterioration means dust. It also means frequent renewals of the surface at great expense. Obviously, the way to prevent deterioration and to lower maintenance charges is to make the road surface proof against the shearing action of driving wheels.

This can be accomplished by the use of Tarvia, which re-enforces the surface, giving it a plasticity and tenacity which will enable it to resist automobile traffic.

Tarvia was the first bituminous binder on the American market and conforms to universal European experience. It is made in three grades—"Tarvia X" for road and pavement construction, "Tarvia A" for surfacing, "Tarvia B" for dust prevention and road preservation.

Our expert advice is at the disposal of any one interested. Illustrated booklets regarding the Tarvia treatments free on request to nearest office.

BARRETT MANUFACTURING COMPANY

New York, Chicago, Philadelphia, Boston, St. Louis, Kansas City, Cleveland, Cincinnati, Minneapolis, Pittsburgh, New Orleans, Seattle, London, Eng.

The Paterson Mfg. Co., Ltd.—Montreal, Toronto, Winnipeg, Vancouver, St. John, N B., Halifax, N. S.

TRADE B MARK

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CASE AS PATHFINDER.

M. C. Moore and a Case car started June 2 from Milwaukee, Wis., on the pathfinding trip for the annual reliability contest for the Sentinel trophy, under the auspices of the Wisconsin State Automobile Association. The tentative route follows: First day, Milwaukee, Racine, Kenosha, Burlington, Lake Geneva (noon), Elkhorn, Delvanan, Beloit; second day, Beloit, Janesville, Milton, Fort Atkinson, Jefferson, Lake Mills, Madison (noon), Prairie du Sac, Sauk City, Baraboo; third day, Baraboo, Kilbourn, Portage, Rio, Columbus (noon), Beaver Dam, Waupun, Fond du Lac, Oshkosh; fourth day, Oshkosh, Neenah, Menaska, Appleton, New London, Clintonville (noon), Shawnee, Green Bay; fifth day, Green Bay, Kewaunee, Two Rivers, Manitowoc, Sheboygan (noon), Sheboygan Falls, Port Washington, West Bend, Cedarburg, Milwaukee.

MAHIN TAKES LARGER QUARTERS.

The Mahin Advertising Company, Chicago, well known in the automobile and kindred industries, has been forced to secure larger quarters, those previously occupied in the American Trust building, which were engaged in January, 1907, having proved altogether inadequate to take care of the rapidly increasing business of the concern, although an additional floor was secured in 1910. The new offices are in the Monroe building, Michigan avenue and Monroe street, where 50 per cent. more room will be at the disposal of the various departments. The offices of the company are: President, John Lee Mahin; vice president, William H. Rankin; secretary, H. A. Groth.

MAINE ROAD BOOK.

The Maine Automobile Association has issued a neat little book of 48 pages, containing valuable information concerning the roads of that state, as well as the automobile laws. In addition to the text matter, a new and original road map, measuring 15 by 20 inches, accompanies the book. The road mileages are arranged after the manner of a railroad time table, and this plan is expected to meet with decided favor among motorists. The book may be secured by those who contemplate touring in Maine, by addressing Secretary John C. Scates at Westbrook, Me.

CATARACT TIRE GUARANTEED.

The Cataract Rubber Company, Buffalo, N. Y., which was organized about a year ago, is placing in the market a guaranteed tire, in the production of which a liberal use of the finest Para rubber and selected Sea Island cotton plays a prominent part. The maker has given the Cataract tire every test, and it has been abundantly indicated that the consumer is certain of securing a service of 6000 to 8000 miles. Branch offices have been established in a number of cities, included among which are Boston, Mass., and Providence, R. I. The officers are: President, William J. Bullock; first vice president, Samuel J. Greene; second vice president, George N. Steere; treasurer, Francis M. Adams; secretary, Edwin P. Dodge. The concern is capitalized for $500,000. The manager of the Boston branch, which is located at 1002 Boylston street, is I. C. Emery.

CHURCHWARD ADDRESSES Y. M. C. A.

Alexander Churchward, consulting engineer for Gray & Davis, Amesbury and Boston, Mass., maker of Gray & Davis lighting systems, gave an illustrated lecture on the subject of "Lighting the Motor Car by Electricity," before the Boston Y. M. C. A. automobile school, May 24. In order to present the subject in a thorough and comprehensive manner, an 1913 Peerless car, fully equipped with Gray & Davis lighting dynamo, was utilized. This lecture was a special event, although forming a portion of the regular course for this school.

HOPEWELL BROS. BRING SUIT.

Alleging infringement of its patents covering the construction of the Hopewell tire cases, granted to E. B. Hopewell and A. H. Kinder, the Hopewell Bros., Newton, Mass., has brought suit against the Linscott Supply Company, Boston, for selling spiral spring tire cases.

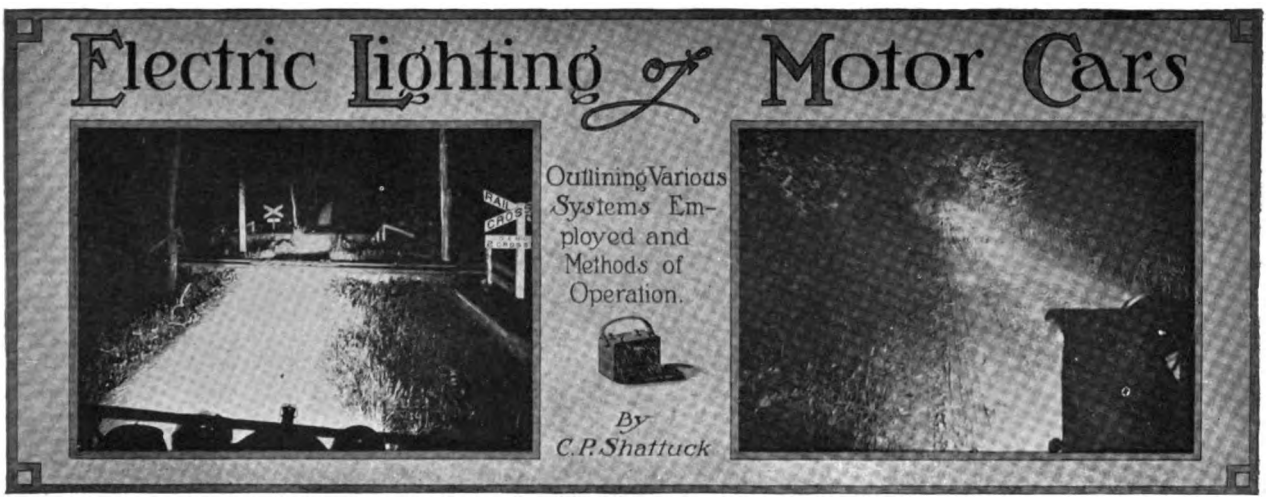
BUILD ROAD FOR TOUR.

Public-spirited citizens in the northern part of Arizona have just finished building a stretch of road, over 70 miles in length, for the especial use of an automobile tour, which will traverse country heretofore accessible only to pack animals. When this contest was first suggested, it was the intention of men in Phoenix to drive their cars to Grand Canyon by a rough route, following the lines of the Santa Fe railroad. The citizens of Ash Fork objected, realizing that their town was missing a fine chance of showing itself to advantage.

Accordingly, a committee of Ash Fork citizens told the Phoenix people that they would guarantee a more direct route by way of that town. They commenced work with pick and shovel, meeting a similarly public-spirited party of road builders from Grand Canyon, who had laid out the second half of the trail.

The tour, for which the road was built, is the first of its kind, including as it does, over 60 Studebaker cars, nearly all of which are owned in Phoenix, the Arizona metropolis. People over the entire state are becoming enthusiastic over the arrangements, however, and owners of E-M-F and Flanders cars, living in other cities than Phoenix have asked for an opportunity to join the party.

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Part IX—The Deaco System.

COMBINING the functions of a dynamo and magneto, the Deaco made by the Detroit Electric Appliance Company, Detroit, will appeal to motorists who desire a lighting system which is compact and simple, and easily installed. The dynamo is self-contained; that is, the device regulating the current is located within the housing of the instrument which is operated at the same speed as the crankshaft of the gasoline motor. The other components of the system include the usual switch, storage battery, lamps and wiring.

The Deaco dynamo was designed by expert electrical engineers who have had many years experience in the construction and application of magnetos and dynamos and after much experimentation and elaborate tests the present device was placed upon the market and adopted as standard equipment by several manufacturers of pleasure automobiles. The features and advantages emphasized of the system are: Simplicity, operation at very low speeds, high efficiency, positive service irrespective of condition of battery and impossibility of burning out.

Compactness a Feature.

The dynamo utilized for electric lighting only is very compact, being 10 inches long, 6.125 wide and 7.375 high. Its weight complete with regulator, etc., is 35 pounds. It has two fields, a permanent magnetic and an electro-magnetic. Three compound horseshoe magnets of a high grade German material form the permanent pole pieces. Auxiliary fields are mounted upon these magnets as depicted at Fig. 58, illustrating the Deaco combined magneto and dynamo which will be described in sequence.

The armature is of the drum wound type and the sizes and amount of wire are so figured that no energy is lost through heat, as the Deaco is guaranteed against burning out. The armature shaft is of liberal dimensions and rotates in high grade ball bearings mounted at each end of the shaft. Drive may be by silent chain, gears or belt and both the lighting dynamo and combined dynamo and magneto may be driven either clockwise or anti-clockwise, according to the design of the power plant of the motor car on which it is installed. When the design with the magneto ignition system is utilized, it is essential that the drive be positive in order to provide for accurate timing.

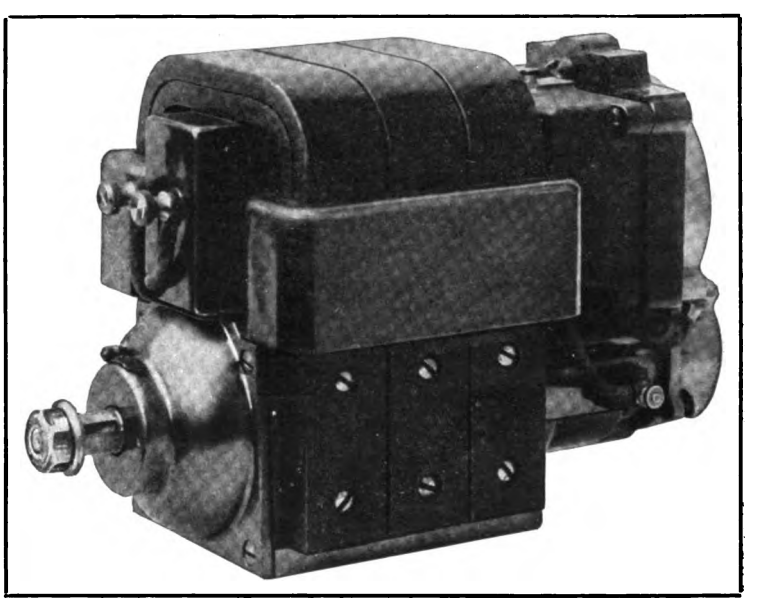


Fig. 58—Deaco Dynamo-Magneto, Which Operates at Motor Speed and Which Is Noticeable for Simplicity and Compactness.

Deaco Regulator.

A feature of the Deaco system is the patented device which maintains the amperage of the current developed by the dynamo. It is entirely automatic in its operation and strictly electrical, and by it the stor-

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age battery is charged at the proper rate regardless of the speed of the motor. All variations of car speed from six miles an hour to the maximum, do not

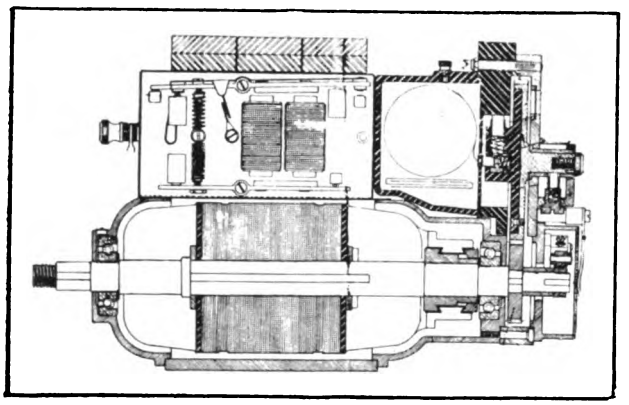


Fig. 59—Sectional View of Deaco Dynamo-Magneto Showing Location of Components.

change the amperage of the current flowing to the battery which is floated on the line.

With all mechanical generators it is important that some method of regulating the electricity be employed, when the device is utilized to charge a storage battery. Too high a rate is injurious to the current container while too low does not charge the cells properly. If the generator be designed to supply the proper charging current at low speeds it is obvious that with the automobile operating at from 30 to 50 miles an hour, for instance, the amount of electricity will be abnormal and both the battery and generator will become affected. This may be said to be due to the fact that the amperage delivered under constant voltage varies almost directly with the speed of the car.

Voltage Constant.

The Deaco dynamo operating without the regulator develops six volts at from 250 to 1500 revolutions, but the amperage varies from one to 18. At 500 revolutions a minute it develops seven amperes, and when the regulator, which is adjustable, is set for this amperage, no more current is produced by the dynamo even when the latter operates at higher ratios.

Components of Regulator.

The device controlling the current is depicted at Fig. 59, which presents a sectional view of the dynamo-magneto. It will be noted that the regulator comprises two electro-magnets which operate two armatures. The latter are pivotally mounted and between the ends are two springs the tension of which returns the armatures to normal position after their movements. Mounted on the ends of the armature members are contact points which make certain connections when regulating the current, this control being entirely automatic.

The two electro-magnets are in series with the line, so that their pull varies according to the flow of the current. The value of this current is regulated by the spring tension which is adjustable. The action of the regulator is illustrated by the series of four diagrams depicted at Fig. 61, these showing the connections in each of the respective positions of the regulator.

The first position shown at A is that in which the magnetic and electric fields are combined, the fields F F being of such polarity that they strengthen the magnetic members. This is the position of the regulator connections corresponding to low speed.

Control of Current.

As the speed of the automobile increases, and that of armature of dynamo as well, the combination of the two fields would be productive of too much current, and in order to keep the amperage at the required point the electro-magnetic field is cut out entirely, the current being supplied by the permanent magnets. A further increase of speed results in a corresponding increase of current and at a certain number of revolutions of the armature the electricity developed by the permanent magnets is too strong.

When a predetermined speed is reached the electric field is reversed and a small amount of current allowed to flow through it. This tends to weaken the permanent magnetic fields, reducing the output of current. Only a small amount of current is passed because resistance R has been introduced in the field circuit at this juncture. A still further increase in speed results in the automatic introduction of resistance. This is accomplished by allowing the full amperage to flow through the field coils, but in a direction which will further weaken the permanent magnetic fields.

It is pointed out that it is impossible to demagnetize the permanent magnets, for the reason that when the speed of the armature decreases the regulator device will become operative, resuming its normal position where it gives a strong field in the correct direction and tends to remagnetize the permanent magnets.

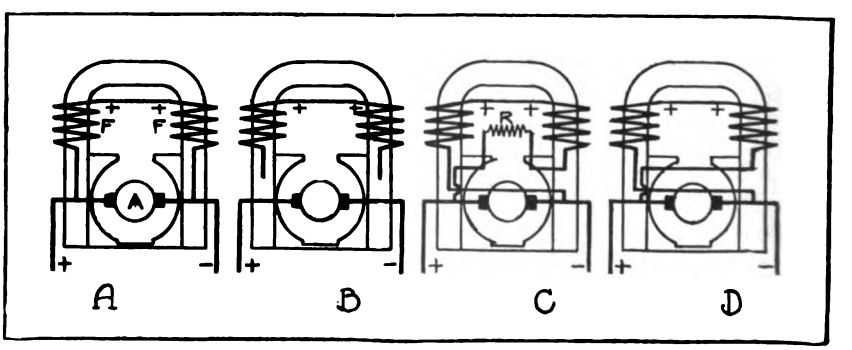


Fig. 60—Diagram Showing the Four Progressive Changes in Generator Connections.

As previously explained, the regulator is necessary

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to maintain the amperage at a stated quantity, and although the maximum output is considerably greater, the device can be set so that eight amperes are gen-

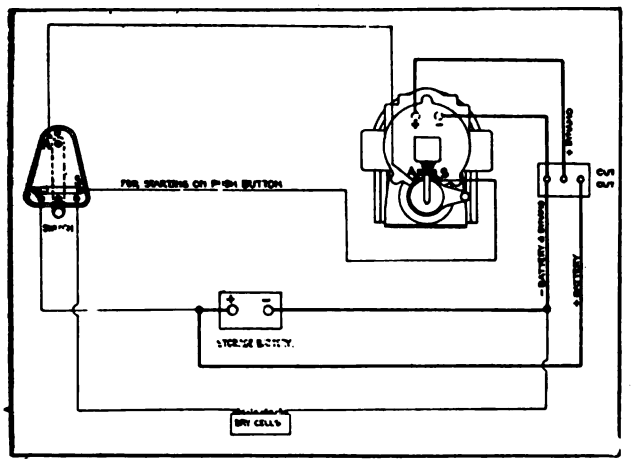


Fig. 61—Wiring Diagram of Dynamo Operating in Right Hand Direction.

erated at the slow speed of 750 revolutions a minute and no more current will be produced with a subsequent increase of the speed of the motor car. The regulator can be adjusted to deliver any predetermined amount of current.

When set to develop eight amperes at 750 revolutions a minute with the voltage remaining constant at six volts, the following results are obtained: Two hundred and fifty revolutions, .25 ampere; 350, two amperes; 450, 3.8 amperes; 550, 5.2 amperes; 650, 6.6 amperes; 750, eight amperes; 1000, eight amperes; all over 1000, eight amperes.

This curve gives current in amperes delivered to the storage battery, but does not show the actual current generated by the dynamo. The regulator in action at certain stages consumes an additional 1.5 amperes through the field winding in strengthening the field magnets. For special conditions where a lesser or greater amperage is desired the exact amperage can be obtained by a simple adjustment in the regulator.

The Regulating Device.

The regulating device is very compact being enclosed in a dust and oil proof housing which is located above the armature casing and between the permanent magnets. Two substantial terminals, plainly marked so that the positive and negative poles may be noted easily, are attached to the housing. Current is collected from the armature by two substantial brushes which are accessible and being constructed of a high grade material make for durability.

To prevent the battery discharging through the dynamo a special switch is furnished by the maker and it is installed to disconnect the dynamo from the battery when the motor car engine is inoperative. The switch is designed to operate in conjunction with the ignition switch and the Detroit Electric Appliance Company supplies one suitable for the member on the machine, and which controls both the ignition and dynamo.

When the dynamo is in service the battery is floated on the line and furnishes all the current that is utilized up to a predetermined number of amperes. If more than this amount is required it is supplied by the battery. If less is used the surplus is stored in the battery. All current generated during the day time, when the lamps are not lighted, is absorbed by the battery which is always charged at a safe rate and in condition to supply current for many hours when the dynamo is inoperative.

The wiring of the Deaco system is very simple as will be noted by the diagram depicted at Fig. 63. The heavy lines denote No. 12 stranded hard braid wire and the fine lines indicate No. 16. The use of double or twin wire is recommended wherever possible and all connections should be well soldered and taped. It is essential that in making connections from the dynamo to the cut-out and thence to the battery, that the diagram be followed in the matter of polarity.

Ignition System.

Reference has been made to the ignition system utilized in connection with the dynamo and this device is illustrated at Fig. 58. When it is considered that the device supplies current for ignition as well as lighting, its compactness will be appreciated. When the ignition feature is incorporated it is essential that the dynamo-magneto be driven at crankshaft speed and

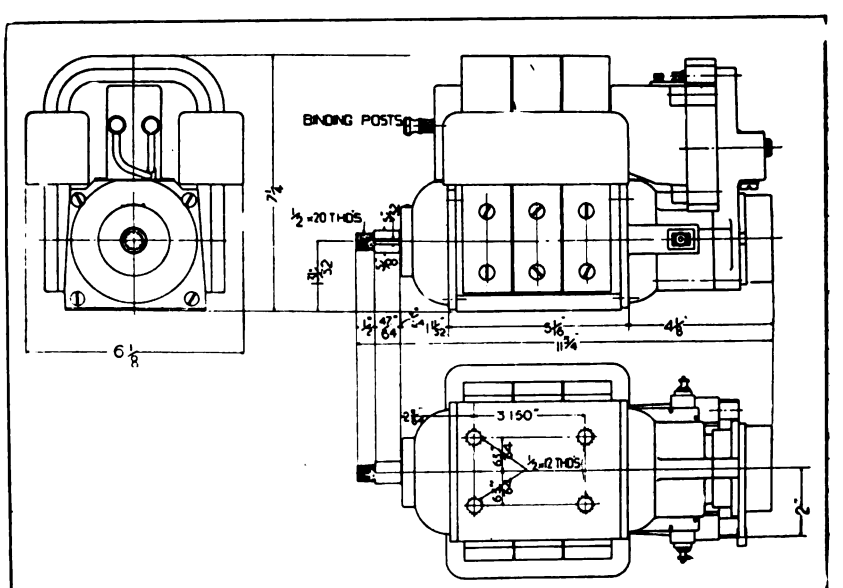


Fig. 62—Dimensions of Dynamo Which Is Slightly Larger Than the Usual Ignition Magneto.

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by gears or silent chain to insure accurate timing.

The ignition mechanism is attached opposite to the driving end of the shaft and includes a high-tension distributor and breaker box, the latter being movably mounted and allowing for variable ignition. Current is collected from the armature of the dynamo and built up or strengthened, then led to the distributor, thence to the respective plugs of the motor.

The magneto supplies a hot spark at all speeds and the motor may be started from the switch by pressing a push button. Dry cells may also be utilized as will be noted by the wiring diagram presented at Fig. 61, which outlines the method of incorporating the batteries when the dynamo is operated to the right.

Construction and Material.

In the construction of the lighting dynamo and dynamo-magneto, the company utilizes the best material obtainable and each part is fitted carefully by the most experienced workmen. All working parts are enclosed and protected from dust, oil and foreign elements. Each assembly is inspected and the completed dynamos tested carefully. On the test stand the device developed the fact that when operating at 500 revolutions a minute it lighted a group of lamps aggregating 38 candlepower, and that even at 325 revolutions a good light was given.

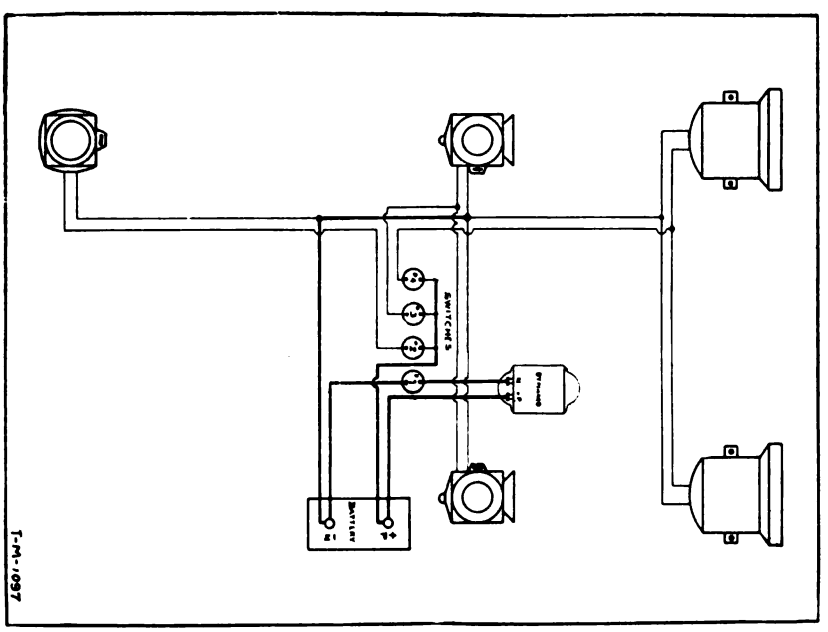


Fig. 63—Wiring Diagram of Lighting Dynamo, Outlining the Connections of Generator, Storage Battery and Switches.

Provision is made for a group of lights consisting of two head, two side and tail, although circuits for a trouble, speedometer or other lamps may be incorporated. A feature of the Deaco system is that through the adjustment of the regulating device to obtain a predetermined amperage, the number of electric lights and their lighting capacity may be increased over that of ordinary systems.

(To Be Continued.)

TAMPA CLUB HAS NEW HOME.

The Tampa Automobile and Golf Club, Tampa, Fla., is now occupying a new home some seven miles from the city on the Rocky Point Road. It is built of reinforced concrete in the mission style, and is valued at $30,000. Golf links which cost $20,000 surround the house.

INVENTOR OF EXPLOSIVE MOTOR.

Word comes from Paris that Fernand Forest, the inventor of the explosive or internal combustion motor is living in poverty, and that an appeal has been made in his behalf to the French government for aid. He was decorated in 1910 with the cross of Legion of Honor, so that some recognition has been taken of his contribution to the world, but like many inventors, lack of business instinct prevented him from realizing on his invention, so that today, with his large family he is living in much poorer circumstances than some of the mechanics employed in the factories which his motor has made possible.

In 1881, one of Mr. Forest's first explosion motor was given a place in the Museums of Arts-et-Metiers in Paris, and since then the engine has changed somewhat in form, but not in principle. It was not, however, until 30 years later that any official recognition was given, when the Knighthood of the Legion of Honor was bestowed upon him. Calling attention to these facts, G. Du Mourier, president of the Association of Small Fabricants and Inventors, has appealed to the government for financial recognition of the services of Mr. Forest, and it is expected that definite action will be taken immediately.

NEW MINNESOTA ASSOCIATION.

The Minnesota Valley Scenic Highway Association has been formed at Belle Plaine, Minn., and is to work for the proposed 100-mile road from Mankato to Minneapolis. Part of this road has been constructed and is of the clay type. The 12 miles from Mankato to Madison Lake is in use.

The Remy Electric Company, Anderson, Ind., is enlarging the chain of service stations which it is conducting. The Frey Auto Company, Buffalo, N. Y., has been appointed the service station for Buffalo and vicinity, while the Rogers Auto & Supply Company, Columbus, O., also has been added to the list.

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SCIENCE AND THE AUTOMOBILE.

So much has been heard about the scientific methods of the German manufacturers and so little, comparatively, about the factory science of the American firms that many people will be surprised to learn of the great part that it plays in the manufacture of the American automobile, as told by J. H. Newmark of the General Motors Company, Detroit. He recently described the scientific department of his company and emphasized the skill and care that goes into the product of the constituent concerns.

The company maintains a research department which is claimed to be the most exhaustive institution of its kind in any automobile factory. In this everything that goes into the cars is carefully tested, no matter how small or trivial, from cotter pins and nuts to frame members. So thorough is the work of the department and so detailed the results which are kept, that the director, Claude E. Cox, is able to give the full pedigree of every article, from grease to rear axles, used in the plant.

The department keeps in touch with modern engineering methods and with current practise in motor car construction in this country and abroad. A testing laboratory is maintained, with machines for testing all materials. Some, for testing the tensile strength of steel, are powerful enough to exert a pull of over 100 tons, and are used in testing axle material.

At present, this department, with the chemical laboratory, is developing a new steel which is expected to establish a new standard of strength and at the same time lessen the cost of production. Severe tests are being given it, chemical as well as physical, all the work being kept carefully secret until such time as the steel is ready for use.

One of the most interesting features of the department is the museum. Here is carefully kept a sample of everything tested, with the results. There are carburetors, rods of steel, nuts, bolts, cable, magnetos, oils, greases, and all the many parts of the automobile. The oil department is especially valuable, for by examining the samples of lubricants after they have stood for a time the qualities are revealed, enabling the claims of manufacturers and salesmen to be substantiated.

The records of the General Motors Company are carefully kept, consisting of blue prints of every car made, with catalogues and specifications for the different years, which, with the samples, places full information of any car conveniently at hand, for the use of the company and its subsidiaries.

AUTOMOBILE ENGINEERS.

Joseph Tracy, the well known automobile engineer, and Henry F. Donaldson, have associated themselves as automobile engineers, and have taken new offices in New York City at 1786 Broadway, corner 58th street. The two men will undertake consultation, research and development work, and conduct design and construction tests in the laboratory and on the road.

WOMEN ENJOY THE REO.

The successful automobile of today is that which makes its appeal to the women of the family. This by no means applies exclusively to the matter of appearance, because the modern woman is quite as capable of understanding the mechanical features of the car as her husband. Practically all manufacturers recognize the truth of this statement, and it has left its impression upon the work of the designing and construction departments of most concerns.



Party of New York Women and Children Enjoying a Spring Ride in Reo.

One of the concerns which has paid particular attention to the desires of women in this regard is the Reo Motor Car Company, Lansing, Mich., maker of Reo cars, for which R. M. Owen & Co., New York City, is general distributor. An accompanying illustration shows one of these machines in the hands of a party of women and children enjoying one of the few really spring-like days of the present season along Long Island sound in Westchester county, New York.

The Mais Motor Truck Company, Indianapolis, Ind., is to build an addition to its factory which will increase the floor space by 20,000 square feet. It is expected to be completed in about a month, and that several new models will be announced when it is placed in full operation. The present factory has been working night and day to keep up with orders, and the addition was needed to relieve the congestion.

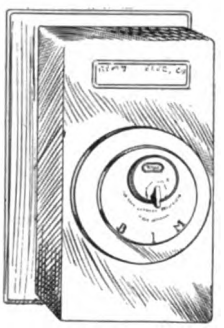
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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

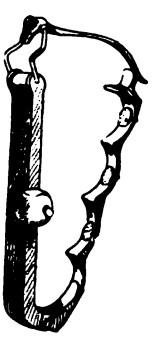
The Blackburn Lock Switch has been brought out by the Blackburn Specialty Company, 1132 Prospect avenue, Cleveland, O., and offers a means of locking the ignition circuit so as to prevent the operation of the car. The device is very simple, the idea being that of substituting for the usual ignition key and socket which is so easily manipulated, a Yale lock of the pin and tumbler type. The key of this lock acts as the ignition plug for turning the switch from "off" to "battery" or "magneto" or vice versa, and when it is removed the switch cannot be turned with any but the proper key. This gives as much security in locking the automobile as in locking the front door of the house. The switch cover cannot be removed even if unscrewed, until after the key has been inserted and turned to the releasing point. When the switch is mounted on a coil, it is impossible to short circuit the wiring.

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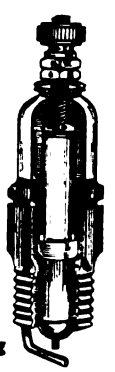
The Bair Top Holder is being placed on the market by the Auto Specialties Manufacturing Company of Chicago and is a device for holding the top bows rigidly together when the top is down. This prevents rattling and undue distortion of the bows, and is such an advantage that it is already standard equipment on a number of cars. It is made in two sections, hinged together at the bottom so that when the clamp at the upper end is loosened the holder opens, and allows the bows to be raised. The small hand lever attached to the clamp enables it to be manipulated easily and without delay. One side of the device is provided with a clamp and set screw for attaching to the side of the car. The hinged section which is provided with sockets to hold the bows is so made of steel covered with leather that the bow is not scratched or marred, and the leather seam in the covered bows is not injured.



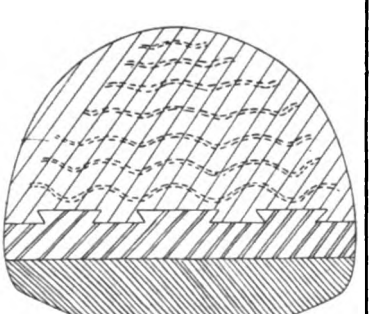
Blackburn Lock Switch



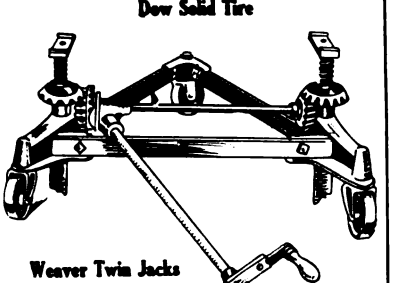
Bair Top Holder



Sturdy Spark Plug



Dow Solid Tire



Weaver Twin Jacks

The Sturdy Spark Plug is made by the Sturdy Manufacturing Company, 2637 Michigan avenue, Chicago, and is marketed in sets for four and six-cylinder cars, the set consisting of the requisite number of plugs with an extra one in a leather case for tool box. A feature of the construction is that the main porcelain is suspended against the bushing in such manner as to permit the upper spring washers to take up the contraction and expansion caused by the cooling and heating of the engine. In cleaning there are practically only two units, as the bushing unscrews from the shell, and in replacing it is drawn down to the shoulder with no possibility of cracking the porcelain. The plug is guaranteed against everything but abuse.

★

The Dow Tire is a new type of solid tire which has been invented by Alexander Dow, 104 West 42nd street, New York City, and has as its distinctive feature a number of layers of fabric embedded in the rubber. The idea of this construction is to prevent the tearing of the tire, and confine the loss of rubber strictly to what might be called legitimate wear. Rubber when enclosed offers great resistance to compression, and therefore the alteration of a tire under load is distortion. This free distorsion is permitted in the Dow tire by the fabric being corrugated, and as these corrugations run diagonally with the circumference of the tire, provision is made for both lateral and circumferential distorsion. Elasticity of the fabric along the crests of the corrugations is taken care of by laying the fabric with the diagonal of the weave in line with the crests.

★

Weaver Twin Jacks are made by the Weaver Manufacturing Company, Springfield, Ill., and are a combination of lifting jack, turntable, truck and tire rest. As may

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be seen, the device consists of a triangular wheeled frame supporting two jack members, both operated by a crank through bevel gears. By it the front or rear axle of a car may be raised clear at one operation, and the car pushed where desired on the jack wheels.

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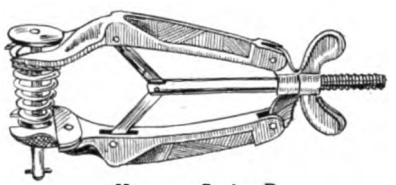
The Kraemer Spring Remover is made by the United States Compass Company, Cedarburg, Wis., and is a simple tool for releasing valve springs. The construction and method of operation is easily understood from examination of the illustration. The jaw is adjustable and may be set in a few seconds to fit any size motor, large or small. When the tool is in place with the two jaws at opposite ends of the spring, turning the thumb screw on its threaded rod draws the jaws together and thus compresses the spring, enabling the valve and then the spring to be removed. The spring is held compressed by the device, enabling both hands to be used in removing the valve.

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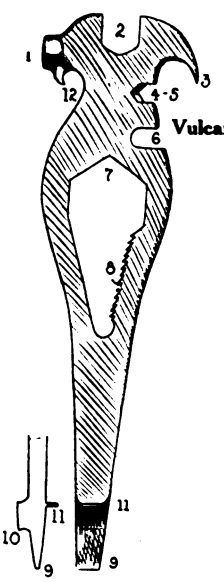
The Vulcan Auto Tool is being placed on the market by J. H. Williams & Co., Brooklyn, N. Y., and is a combination tool which should be of especial value to automobilists. It is drop forged and tempered, and in its canvas cover forms a handy hip pocket companion, as it is not bulky or unduly heavy. The various parts are used as follows: 1, hammer; 2, tire lug wrench; 3, cotter pin puller; 4, gas tank wrench; 5, insulation scraper; 6, air tank wrench; 7, spark plug wrench; 8, alligator wrench; 9, 10, 11, cotter pin spreader and three screw drivers; 12, bottle opener.

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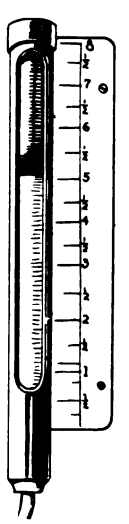
Rudell's Gasoline Register is made by the California Novelty Art Company, 618 South Olive street, Los Angeles, Cal., and, as its name indicates, registers the amount of gasoline in the tank. It is not dependent for its operation upon floats, springs or compression parts which may wear and get out of order. It is simple in construction and may be attached in less than 20 minutes. Its advantages are obvious. It enables the driver to see at all times the amount of gasoline unconsumed, and in buying affords a check on the accuracy of the garage measures. It makes it unnecessary to take up the seat and put a dirty stick in the tank to see how much gas remains. The device is nickel plated, and may be attached where desired on the dash or elsewhere. It may be attached by screwing to the tank outlet, or by putting a T in the gasoline line.



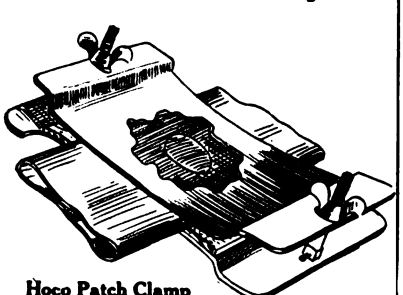
Kraemer Spring Remover



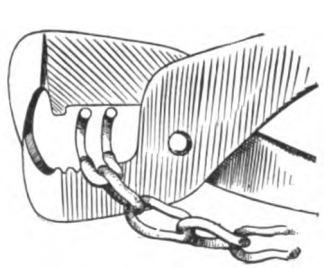
Vulcan Auto Tool



Rudell Gasoline Register



Hoco Patch Clamp



Necessity Tire Chain Tool

★

The Hoco Inner Tube Patch Clamp will be appreciated by motorists who have made repairs on inner tubes. It is made by Hoeft & Co., Chicago, and will fit any tube. In repairing a tube with a patch, pressure on both is desirable, as it spreads the cement and aids the vulcanizing agent thoroughly to bind and incorporate the two surfaces, making them homogeneous. Motorists on the road, realizing this sometimes adopt ingenious expedients to secure this pressure, as for instance, sitting on the patch, placing a board and a miscellaneous collection of tools on top, etc. With the Hoco patch clamp this is unnecessary. Thumb screws draw together the two plates between which the tube is held, applying a firm pressure through the spring metal of which the back is constructed. The device will take any tube, and is made of steel, nickel plated. The weight is 24 ounces.

★

The Necessity Tire Chain Tool is manufactured by J. N. Macdonald & Co., Wethersfield, Conn., and is being distributed by T. F. Russell & Co., of Boston. As its name implies, this is a device for repairing tire chains. The jaws are of a special construction, and by means of the instrument the hooked ends of the chain links may be forced apart easily, or compressed just as readily. Those who have tried to repair tire chains with pliers, chisels, screw drivers, and other tools not at all adapted to manipulate the heavy

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wire links of which the chain is made, will thoroughly appreciate this tool, which renders repairs easy and enables them to be effected in a short time.

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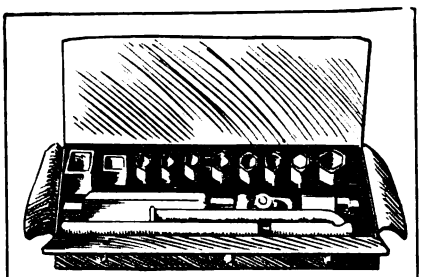
The Ray Socket Wrench is being manufactured by the Packer Auto Specialty Company, Chicago, and distributed by the Fulton-Grubb Company, 1146 South Michigan avenue. It is made in two sets, the smaller being illustrated. With the wrench comes a complete line of sockets made of pressed steel, cold drawn and case hardened, an assortment of screw drivers, a universal joint, permitting the use of the wrench at any angle up to 90 degrees, one long and two short extension bars, and a long socket for use on spark plugs, enabling their removal without cracking the porcelain. The wrench itself is of the ratchet type practically noiseless in operation, nickel plated and polished, and with the use of the various sockets and attachments it is possible to get into almost any place, no matter how difficult of access.

★

The Rekar Automatic Starter is made by the Rekar Automatic Starter Company, Sixth and Market streets, San Francisco, and provides means whereby a charge of acetylene gas is introduced into the motor cylinders and then fired, to start the motor. The starter consists of a controller which is attached to the dash, from which piping leads the gas to the cylinders. Pushing the rod on the controller admits the gas to the cylinders and affords a mixture to be exploded by the usual spark.

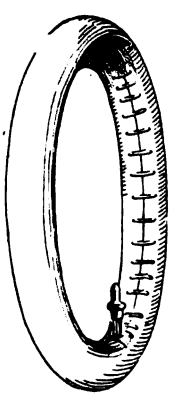
★

The Brownie Liner, made by the States Manufacturing Company, 1029-35 West Adams street, Chicago, will be appreciated by motorists who have had experience with punctures and blow-outs. As its name indicates, it is a liner to go between the tire casing and the inner tube. It is claimed that it will prevent 90 per cent. of the punctures and all of the blowouts,

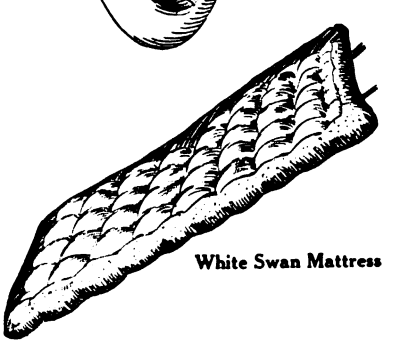


Ray Socket Wrench

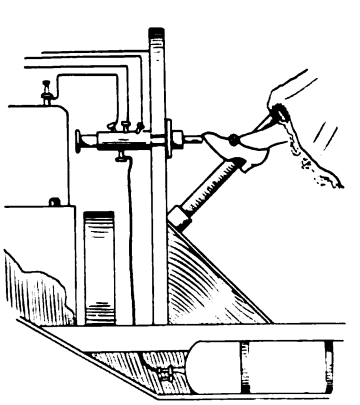




Brownie Inner Liner



White Swan Mattress



Rekar Starter

thus enabling new tires to make 10,000 miles. It consists of what is virtually an extra casing of very tough fabric which is neatly laced around the inner tube. The fabric is almost impenetrable, it being practically impossible to drive a nail through it when attached to an inner tube. The casing is guaranteed, and comes in all sizes.

★

The White Swan Camp Mattress is made by the T. B. Burnett Company, Dallas, Tex., and should be of much service to motorists during the coming touring season, as it affords the comfort of a bed combined with portableness. It is made with heavy waterproof duck sides and bottom, so that it does not absorb moisture, or become cold and uncomfortable. It may be rolled up into a neat compact water tight bundle that can be carried conveniently in the automobile, a canvas bag being provided for this purpose. It is built up of 1400 layers of cotton felt, made from long staple Texas cotton, and is sterilized so as to be free from danger of disease. It comes in standard length of 6.5 feet and varying widths, weighing up to 25 pounds.

★

The Tri-Radiant Fixture is made by the Lenhart Manufacturing Company, 246 North Delaware avenue, Philadelphia, and is an attachment for acetylene lamps which enables three burners to be used. The fixture, as illustrated, bears the three burners on an arm, the two outside ones turned so as to present the broad surface of the flame to the surface of the mirror or reflector opposite it. The result of this construction is that a broad beam of light is projected from each side of the lamp, the illumination spreading wider than when only one central burner is employed. The light to the extreme right and left is as strong as at the centre, with no intermediate lines of darkness, and the illumination is held to be highly satisfactory. The broadness of the burner insures that all parts of

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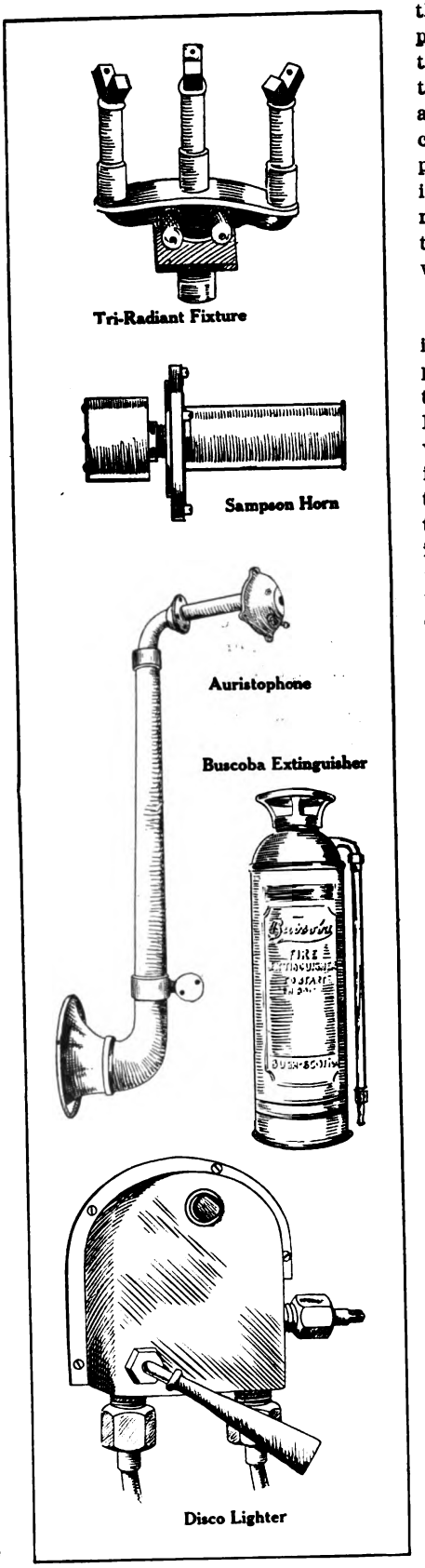
the road are covered, preventing accidents in passing cars or in running into them at curves. The light covers a greater angle than one in which a car can be turned. The fixture is substantially made of brass, nicely finished and nickel plated throughout, and furnished with the best hexagon burners. These burners have a much smaller capacity than those ordinarily used, thereby cutting down the gas consumption. In fact the effect of the fixture is virtually to divert the gas which is usually sent to the central burner to the three burners and thus spread its illumination wider. Either one or both of the side burners may be turned off at will.

★

The Sampson Horn is a new style of this well known product of the American Electric Company, State and 64th streets, Chicago. It is of the torpedo type, and is designated No. 4, with a straight cylindrical projector of spun brass. It is an electrical horn, and requires little current, bein operated on four dry cells or a six-volt storage battery. The magnets are large and powerful, wound to a high resistance with enameled wire and therefore require a minimum of current. Sparking is reduced as low as possible and the mechanism is enclosed in a neat enameled iron case. This case is the same in all the horns, the projectors being interchangeable on it. Six types of projector or horn may be had.

★

The Auristophone is an electric speaking annunciator, made specially for automobiles by the H. G. Pape Electric & Manufacturing Company, Buffalo. It is similar in construction to the electric announcer in use in the large railway terminals, but is smaller and not so loud. It is adapted to be placed beside the chauffeur of a limousine car, with the transmitter attached to a cable in the inside of the machine. The convenience of this will be appreciated by those who have tried to make a chauffer understand sign language through the glass of the limousine partition or words shouted through an ordinary speaking tube. The apparatus is in effect a powerful telephone, and the receiver at the chauffeur's side repeats distinctly the words spoken into the small watch case transmitter. The wiring is simple, and the system requires only a six-volt storage battery or dry cells.



★

The Buscoba Fire Extinguisher is made by the Bush-Scott Company, 31 Woodward avenue, Detroit, and is of the liquid variety. It is of the conventional type, in which it is only necessary to turn it bottom up with a jerk to start the extinguishing fluid. It is tested to 350 pounds pressure, and is strongly constructed so that neither bottom nor top can be blown off, or the hose torn off. The metal is heavy Lake Superior cold rolled copper. The capacity of the extinguisher is three gallons, which is ample to take care of a good sized blaze. The liquid liberates carbon dioxide gas, which smothers the fire effectually.

★

The Disco Lighter is made by the manufacturer of the well known Disco self-starter, the Ignition Starter Company, Detroit. This ensures that it possesses the merits of the starter, and will be reliable in action. It is a system for igniting the gas headlights of a car from the seat, and consists of a dash controller, piping, single unit vibrating coil, wire, burners with spark gaps and all fittings. The controller is illustrated, and consists of a neat and highly polished bronze member which is screwed to the dash. Turning the handle of the controller to the left opens the valve and sends the gas to the lamps, while a pressure on the button at the top of the controller sends the current to the coil and produces sparks at the points of the burners, igniting the gas. The maximum flow of gas through the controller is regulated by a needle valve, preventing undue consumption of acetylene, and if desired the handle may be partly closed in cities to dim the lights.

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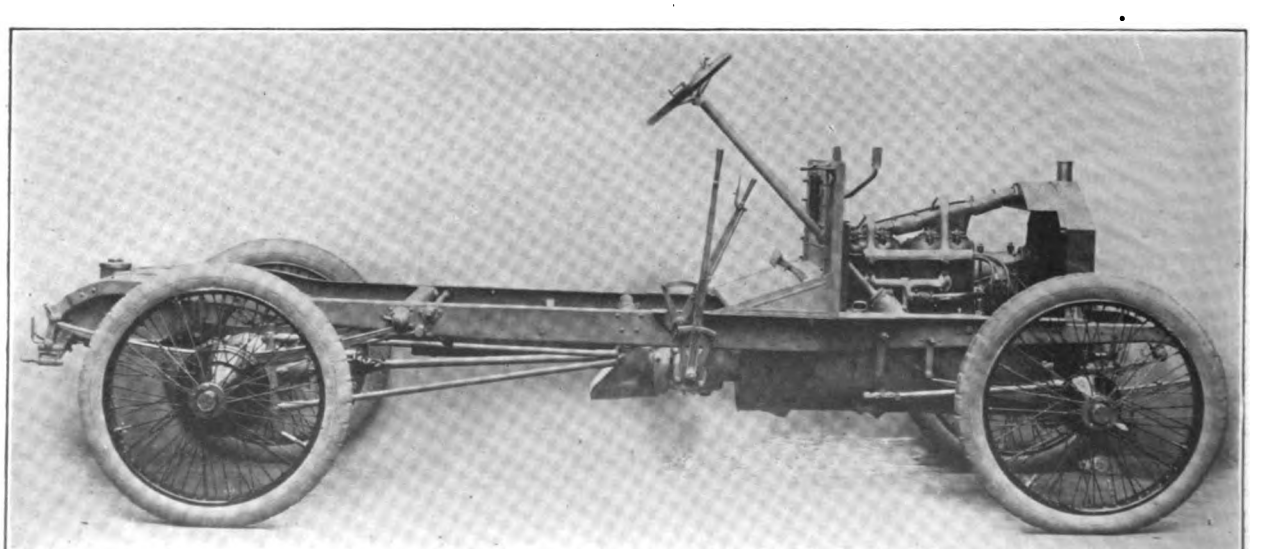
The 15 horsepower Napier Colonial model, made by S. F. Edge, Ltd., London, England, and shown herewith, is designed especially for use in countries where the road conditions are not regarded as of the best. This applies more particularly to the chassis, to which a number of body designs is fitted. That illustrated on another page is suggested for more general service, being a combination body, which may be utilized as an enclosed car for town use and as an open vehicle for long distance touring. The chassis construction in this and the other Colonial designs is especially strong and enduring.

Mr. Edge, who is more or less well known in America because of his prominence in driving Napier cars in contest work, has only recently returned from South Africa, a trip which he undertook for the purpose of testing out the new Colonial chassis under what may be termed the worst Colonial conditions. He reports that the result was quite as favorable as he expected, and he now offers this chassis as an ideal product for use in such parts of the world as Australia, New Zealand, Canada, Argentine, Brazil, Siam, India, China, etc. No doubt a brief description of its components will be received with interest in America.

The motor is a four-cylinder, water-cooled unit, with bore of 3.25 inches and stroke of five. The cylinders are arranged in pairs, with camshaft and all gearing entirely enclosed in a dust proof, oil tight case. The inlet and exhaust valves are all operated by one camshaft, and are interchangeable.

Particular attention is called to the fact that the flywheel is fitted to the front of the engine, as this is considered a matter of unusual importance. It will be understood that British motorists pay rather more attention to the matter of road clearance than is true on this side. Mr. Edge maintains that inasmuch as the flywheel is the lowest point of the motor, it should be so located that it will not catch on any projection in the road surface. Placing it at the front between the two forward wheels, it is claimed that it is lifted over obstructions at the same time the road members ride over them.

Lubrication is by gear driven pump, and the system is so arranged that equal distribution of the oil is



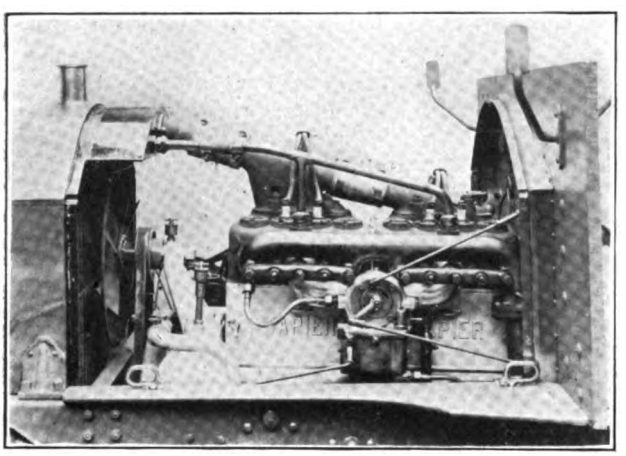
Chassis of the 15 Horsepower Napier Colonial Model, Recently Tried Out by S. F. Edge of England on a Tour Throughout South Africa.

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provided to all parts of the motor, regardless of whether the car is climbing steep grades or running on level ways. The system also includes a wire gauze strainer for filtration purposes. Grease cups are fitted to the spring shackles and other parts where necessary, it being maintained that oilers practically are useless in extremely warm countries.

Ignition is by high-tension magneto, gear driven and arranged so that the instrument may be detached readily. The carburetor is a special Napier design, fitted with a large wire gauze cover over the air inlet, so as to prevent the introduction of dust and other foreign matter. The temperature of the vaporizer can be regulated at will by means of a small tap, conveniently located, which controls the amount of exhaust gases passing through the pipe which enters the carburetor jacket at the left, as seen in an accompanying illustration.

Cooling is by the thermo-syphon system, employing a large and efficient tubular radiator. In addition to the pump shown in the front of the engine,

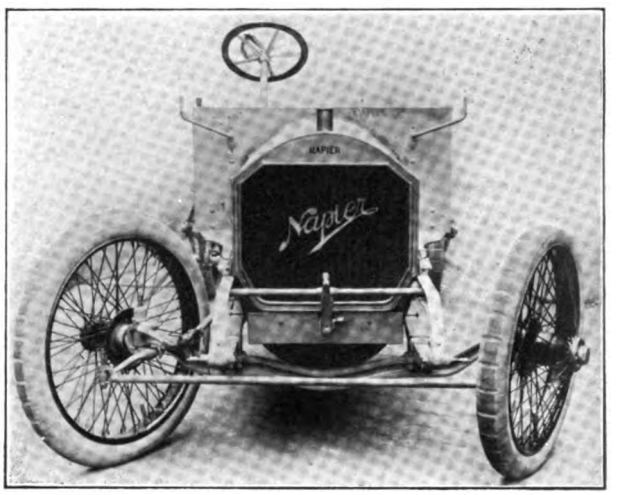


Carburetor Side of Napier Motor, Showing Neatness and Accessibility of the Design.

there is a very large water pipe leading into the extra water tank at the top of the radiator, and another from the side of the cylinders, insuring that the cooling fluid shall circulate freely around the valves. A light metal fan, made entirely in one piece, aids in the work of the radiator, while an extra air valve is fitted to the carburetor, this being controlled by a lever on the dash.

The clutch is of the metal-to-metal type, running in oil. The transmission affords three speeds forward and reverse with direct on the high. Two sets of brakes are fitted, one on the main shaft and the other on the rear wheel hubs. Springs are semi-elliptic, front and rear, extra long and flexible to give easy riding qualities.

As shown the chassis is fitted with detachable wire wheels, although wood members are supplied as standard. The rear view shows the 11-inch clearance, and this may be increased to 13 inches, by the use of larger sized wheels. It also will be noted that a trans-

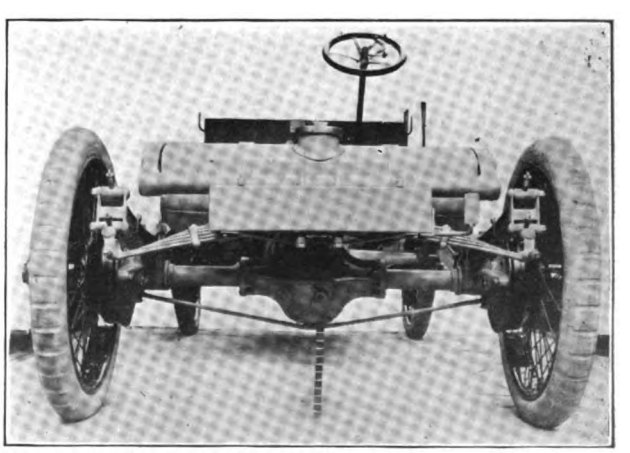


Front View of Napier Chassis, with Special Locking Gear for Making Quick Turns.

verse spring at the rear is designed to prevent the frame from becoming contorted as well as to provide greater comfort to the occupants of the car.

Mention also should be made of the gasoline tank, neatly applied at the rear of the frame. The fuel is forced to the engine under pressure by means of a direct driven air pump. The very strong rear axle is fitted with stay rods, a feature which has been incorporated for use over very rough roads. A specially low gear ratio enables the machine to travel over soft and sandy places, to ascend very steep hills and climb out of river beds.

The front view brings to notice the special steering lock, designed to enable the car to be turned in a very short radius, a condition which is highly important in some districts, where hairpin curves have to be negotiated in climbing mountain passes, etc. A specially strong front axle is employed, another point that is regarded as extremely important by the designer, inasmuch as it is anticipated that the car will be called upon to travel over roads on which the cen-



Back View of Napier Chassis, Presenting Road Clearance and Features of Construction.

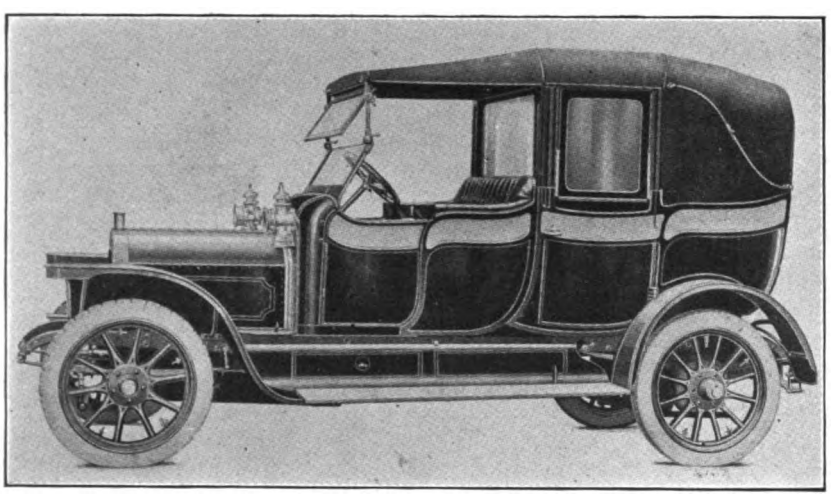
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tre is considerably higher than the wheel tracks and additional protection to the engine will thus become necessary.

Several body designs are available. For Colonial use the torpedo type is suggested. A doctor's two-seated coupe, capable of being used open or closed; a landaulet, cabriolet and touring phaeton, also are offered. That shown herewith is the cabriolet, and has been evolved to meet the requirements of those who want a perfect town carriage completely enclosed and free from draughts of any sort, yet possible of being utilized as an open car for cross country touring. The design is thoroughly in keeping with the British demand for something graceful and distinctive.

★

German motorists have decided to boycott the Duchy of Gotha and are advising tourists of their decision. This is one of the most picturesque portions of the Fatherland, but it is claimed that the authorities have imposed a new and wholly unwarranted road toll on motor cars. As a result of this action, the main route leading from Erfurt to Eisenach, one of the show places of Germany and where Luther translated the Bible, has been almost entirely deserted. Under ordinary circumstances there were from 60 to 70 automobiles to be counted over this course in a single morning.



Cabriolet Body Fitted to 15 Horsepower Napier Chassis, Affording Enclosed Car for Town Use and Open for Long Distance Touring.

★

In the recent gasoline consumption trials of the Herts County Automobile Club in England, the first and second prizes went to De Dion-Bouton cars, both privately owned and driven by their owners. The winner's consumption figured out at 48.7 miles a gallon, and it should be added that the machine is four years old. The winner of second place was eight years old.

★

Argylls, Ltd., of Alexandria, Scotland, whose product was described in the last issue of The Automobile Journal, is experiencing such extensive demand for its Argyll cars that its very handsome catalogue has been translated into Spanish, Portuguese and French. The company recently received the following from a correspondent in the south of Scotland:

"It may interest you to know that the little Argyll cab took an invalid from here, with the doctor and chauffeur, to Dumfries Infirmary to be operated on (a case of life or death), in 1:30:00. The distance is 52 miles. The trip was made without changing a gear, slowing down for the invalid on the rough parts of the road. I have never done it in the same time, not even with a 40 horsepower, six-cylinder."

★

Consul Church Howe of England reports that the Manchester district is second only to London in the facilities and opportunities for the sale of automobiles, and that London authorities have described Manchester as the world's best centre for the sale of commercial vehicles. American manufacturers are making steady progress in this field and agencies have been established for the Flanders, E-M-F, Mitchell, White and Overland, while the Ford Motor Company has a factory there where the motor parts, shipped from the United States, are assembled and finished cars produced. The plant has a capacity of 3000 to 4000 cars a year. A local paper commenting upon the situation, said recently:

"America is only a few days distance from England, and with the best of American methods of obtaining publicity it does not take long for the merits of a car to be made known to the English public. So far there does not seem to be any settled plan of campaign against them by the English makers. For a long time it was the practise of England to book the order and build the car afterwards. In America the firms build the car and create the demand. The public wants a smart looking, low priced car that will stand rough wear. The American machine is not the thoughtlessly designed, fragile looking article that we have been led to believe. If the British maker does not immediately rise to the occasion, the British agent and the buying public will, and when it is too late the wholesale trade will be the American's."

★

The public officials in Venezuela are constructing a road from near Maracay, a railroad station between Caracas and Valencia, northward to the coast at Ocumare, where some of the coastwise steamers now touch. When this new road is completed much cacao and coffee, which now goes by rail to La Guaira or Puerto Cabello, will be brought to Ocumare and taken by

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boat to one of the ports mentioned. The use of automobiles to transport these products is contemplated.

★

A noteworthy feature incident to the ceremonies of inaugurating the new sugar central at Bago, Philippine Islands, was the large number of automobiles present. There were no fewer than 30 owned by hacendades, who rode in for the occasion. Nothing could testify better to the prosperity that now exists in Negros.

★

The long anticipated motor mail service between Manchester and Birmingham in England has been inaugurated with three Belsize cars, made by the Belsize Motors, Ltd., Clayton, Manchester. The post-office authorities have entered into a three years' contract with the Auto Van Maintenance Company of Manchester, to run this road service, and figures have been obtained which prove conclusively that it will be far more economical than the older methods employed heretofore.

The type of vehicle utilized is shown herewith, this being the regular 28 horsepower, four-cylinder, three-ton chassis, fitted with a handsome and commodious red mail van body. Entrance to the rear is by means of a flight of steps, which automatically folds up when the doors are closed. These latter are locked and unlocked either from the inside or outside, as occasion demands. Inside the van is a guard's folding seat and hooks for mail bags, racks and all conveniences for handling the mail en route. Twin Pollack solid tires are fitted to the rear wheels and single in front.



Type of Belsize Motor Mail Van Recently Placed in Service Between Manchester and Birmingham, England.

The vehicles will run twice a day between Manchester and Birmingham, by way of Stockport, Macclesfield, Congleton and Stafford, and meet and pass each other between Stone and Stafford. Eight and one-half hours is allowed for the distance on each journey.

★

An indication of the growth of motoring in the Orange Free State, South Africa, is found in the recent organization of the Orange Free State Automobile Club.

★

A new step in the development of the motor omnibus in London is the introduction of the gasoline-electric car. The advantages claimed for this are "smoothness and silence in running, increased power of acceleration, decreased cost of running, maintenance and lubricants, and the durability of its system of transmitting the power from the gasoline engine to the driving wheels." The Great Western Railway Company is now making experiments with a gasoline-electric coach, which is an evidence of the competition that is now in progress between different power producing systems for both rail and road traction.

★

A writer in the Rhodesia Agricultural Journal, published in South Africa, speaks of the scope for steam plowing outfits to do useful and profitable work in Rhodesia and makes enthusiastic reference to the performance of a large eight-furrow American plow drawn by a single-cylinder 25 horsepower traction engine built by a firm in Gainsborough, England.

★

The municipality of Singapore, in the Malay peninsular, has ordered its fifth motor fire vehicle, and is claimed to be the first city in the Far East to have a fire department, completely motor equipped. The new car is fitted with a 55 horsepower engine and steel wheels. This latter innovation is said to have been the result of a distinct problem which has arisen with the use of wood. The humidity of the atmosphere is held to be the cause of the trouble and it is stated that one set of wheels entirely rotted away within four months.

★

After making exhaustive tests of the vehicles available for the purpose the city of Paris has ordered 46 motor sweepers from the makers of Renault and Laffly machines, and nine water wagons from the producers of Laffly and De Dion-Bouton cars. In the combined sweeper and sprinkler class no machine was found entirely satisfactory.

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USEFUL AUXILIARY SEARCHLIGHT.

One of the most important accessories of the motor car is good headlights and without suitable members night driving is anything but pleasure. With fixed lamps the highway is well lighted, but when curves are being described, the straight beams leave one side of the road in darkness. Then again, when touring over strange roads and the driver is not sure of his direction, the scrutiny of the signboard involves backing and changing the position of the machine unless the operator climbs out of his seat and resorts to the usual match to read the directions.

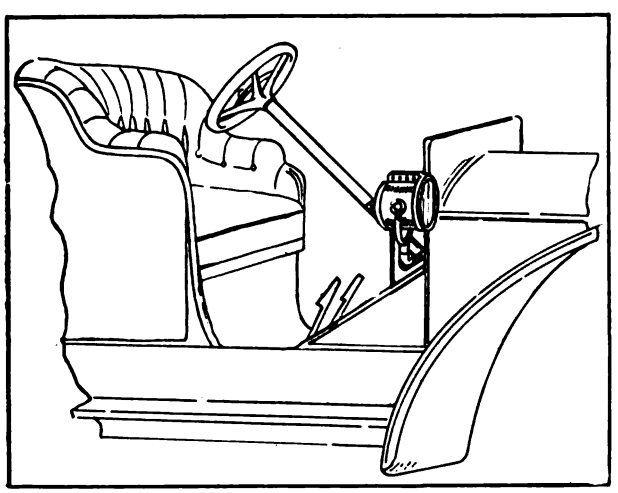


Fig. 1—Novel Method of Mounting Small, Movable Searchlight on Dash as Auxiliary to Lighting System.

Before the windshield became a part of the standard equipment the dash searchlight was very popular, and for an all around light it was far superior to the fixed lamps as rays could be directed in any direction and a first class lamp would light up the road in front as well as cover it completely. Fitting the dash type lamp is a more or less awkward operation when a glass windshield is employed, and for this reason it does not enjoy the popularity it deserves.

A novel method of attaching one of these, inasmuch as the device does not interfere in any way with the other accessories of the car, is depicted at Fig. 1, and was noted by the writer on a car the owner of which does considerable touring and over strange roads. As will be noted, the lamp is a small one but sufficiently large to project a strong beam and it has proved its worth on several occasions when the wrong road was taken and the road signboard was consulted.

The support consists of a piece of cold rolled steel which was bent to the shape illustrated and secured to the floorboard and dash. The extension was made to take the pivotal arm of the lamp which was connected to the main line of the gas tank by rubber tubing. Being equipped with a petcock the acetylene could be shut off or used as desired.

INFLATING TIRES.

It is surprising to note how very few owners of cars know how to inflate a tire properly; that is to pump tube up to the stated pressure. Out of curiosity, the writer has watched motorists pump up tires and kept a careful count of those who accomplished the work without considerable labor. He was surprised to discover that fully 80 per cent. of the pumps held as worthless were not so much to blame as the operator.

Inflating a tire should not require any great strength. The stroke of the pump should open the valve of the tube easily and allow the air to flow therein, and the tire should be pumped hard without undue exertion. Many times the owner will complain that the pump leaks. It may slightly, when the pressure becomes too great, but in most cases this is due to the fact that the tire valve is screwed down too hard, usually to prevent a leak.

To pump a shoe easily loosen this valve. Some air possibly may escape but this will not amount to anything. Then attach the pump and it will be found that it may be worked easily with one hand. After the shoe has been inflated, readjust the valve by screwing it down and test it for possible leaks.

Many times, screwing down the valve too hard destroys the rubber packing. A valve should be adjusted snugly, not too tightly, and if it leaks should be taken out and cleaned. A little dirt may prevent the valve from seating properly. Usually a suspected

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member is thrown away when a cleaning would make the device as good as new.

DUAL IGNITION WITH ORDINARY PLUGS.

The advantages of a dual spark in the cylinder of an internal combustion motor have been pointed out from time to time in these columns but the installation of such a system usually necessitates the use of a double pole plug. A method of utilizing single pole or ordinary plugs is outlined at Fig. 2, but the hint can only be employed where dry cells or a storage battery are used and where the coil is equipped with two secondary leads; that is, each unit must have two terminals for the high-tension cables. Usually one of these is employed for grounding or for conveying the ground circuit of the coil to the frame of the car or engine as, for instance, with marine motors.

Where such a coil is in service the ground connection wire is removed from the second terminal and an additional high-tension cable attached, this lead being carried to the second spark plug, screwed to any convenient point in the cylinder head but preferably as shown in the drawing in order to obtain the highest efficiency. It should be borne in mind in locating the extra plug that the further apart the two points of ignition are the better. The diagram depicts a method for wiring the low-tension circuit as well, but this need not necessarily be followed and the existing low-tension circuit need not be changed.

The second terminal, which is taken advantage of for multi-point ignition, is simply the other end of the secondary winding to that connected with the usual high-tension wire, and in coils where it is not exposed in this way the low-tension circuit is made use of to carry the high-tension ground circuit, usually by the way of the timer.

WHEN THE WATER BOILS.

Frequently, in exploring roads unknown to the operator, highways are encountered which preclude the use of anything but the second or low speed, because of their dangerous condition. If the day be warm and the water shows a tendency to heat it is an excellent plan to remove the radiator cap before steam is generated, as by so doing considerable water will be retained in the circulation system that otherwise would boil out through the overflow pipe. When steam is made it displaces a certain amount of water if the cap be on the cooler. By operating with the cap off the steam will escape into the open air and it will be found that the water will not boil nearly as quickly as under normal conditions.

LIGHTING OIL LAMP SUGGESTION.

The average motorist has experienced the difficulty of lighting the oil lamps when these members are exposed more or less to a draught. As a usual thing the match blows out before the blaze is kindled and as a result several matches are wasted, as well as much time. A simple method of facilitating lighting is to turn the wicks up about half an inch before applying the match. This allows the kerosene to work up through that portion of the wick which was compressed. It will be found that the lamps will light easily as there is plenty of oil in the charred end of the wick.

ELECTRIC LIGHTING HINT.

With the growing use of electric lighting on the motor car the average motorist is apt to neglect precautions observed with the acetylene system. Those who do considerable night driving usually carry an extra burner but the same drivers fail to make provisions for trouble with an electric lighting equipment.

An instance of failure of the lighting system was noted recently by the writer, who came upon a car on a dark highway and in a place many miles from the destination of the machine. The automobile utilized the magneto to supply current to the lamps and it was not equipped with a gas tank or generator, the headlights being designed strictly for electricity. Although the system gave excellent service, the inevitable happened—one of the lamps burned out. Not having an extra one the owner would have spent several hours running home at a low rate of speed had not a fellow motorist furnished light for both cars. Extra lamps should be carried carefully wrapped in cotton batting and so placed in the car that they will not be subject to undue vibration.

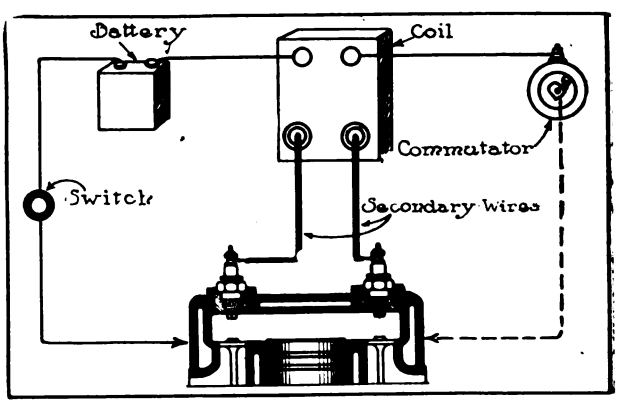


Fig. 2—Depicting Multi-Point Ignition with Single Pole Plugs.

PRESSURE FEED OILER TROUBLES.

Although gear driven oil pumps are employed largely with the modern car there are a number of older machines which are equipped with lubricating systems of the pressure feed design. This is an efficient system if properly cared for and kept clean, but as the flow of the oil depends upon the pressure in the tank and tight connections, it is obvious that a leak or a dirty check valve will cause faulty operation.

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The system is an exceedingly simple one and is entirely automatic in its operation, oil starting to flow when the pressure from the exhaust fills the supply tank. Fig. 3 depicts the components of the system, and connections, etc., likely to impair its efficiency are also outlined.

In the event of failure of the oil to drop in the sight feed glasses even when the motor is accelerated, or the adjusting screws are loosened to supply more lubricant, the various connections should be examined, starting first with the tank. The filler cap should seat securely and have a leather or other suitable washer. The connection at the tank and those of the leads to the glasses should be tested for tightness and if upon readjustment of these oil fails to materialize, the pressure feed pipe and its connections should be inspected.

Disconnect the pipe next to the check valve and with the motor running note if there is a pressure; that is, if the impulses of the exhaust can be felt upon the hand. If not, the nipple in the exhaust manifold

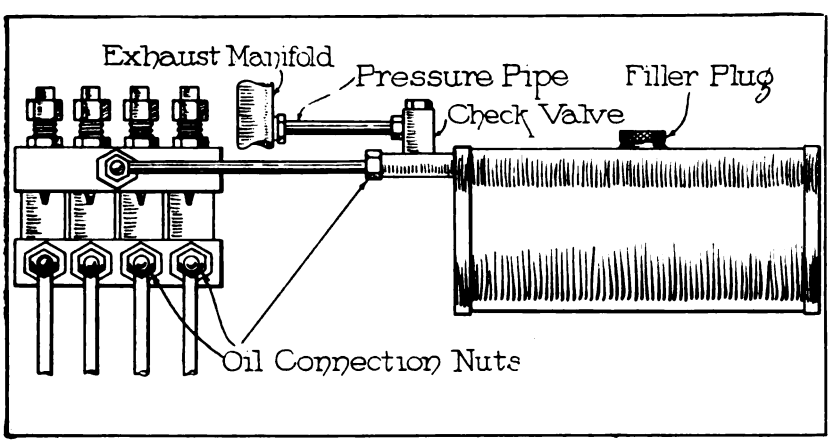


Fig. 3—Outlining Some of the Causes for Failure of Pressure Feed Oilers to Operate Correctly.

or pipe should be removed and cleaned. The nipple may be choked with carbon and soot. If considerable oil is fed to the motor, so that the exhaust smokes, the check valve near the tank is likely to be fouled. This should be taken apart and thoroughly cleaned, replaced and the engine again started for testing the pressure.

A simple method of quickly locating the fault of the system is to disconnect the pressure pipe at the tank and blow through the check valve member. If the tank and oil pipe connections be tight, oil will flow through the sight feed glasses and it will be obvious that the trouble is due to the exhaust not filling the tank with pressure.

Leaks may exist between the glasses and their holders and this is usually denoted by bubbling or leaking of the lubricant around the sight feed device. In disassembling and readjusting this member care should be exercised, as the glasses are broken easily. It may be tested for tightness by placing the fingers over the oil openings and blowing through the opening through which the lubricant flows from the tank. If a glass becomes broken while on the road the screw member should be turned down snugly shutting off the pressure, else the operation of the other feeds will be affected.

NEW FORM OF GOGGLES.

A new type of goggles has been brought out by an English concern, these being equipped with tinted glasses which exclude all the harmful and trying blue and violet rays and allow only the comforting pale yellowish green rays to reach the eyes. The strong, bright light when driving in an open car, causes a continuous contraction of the eyelid muscles, creating fatigue and headache, as well as exerting a harmful effect on the sight. Smoked glasses have been employed but many object to them owing to the depressing effect upon the wearer. The Chlorophylle glasses permit operation over white glaring roads without discomfort, as it is claimed that eyes can be kept wide open no matter how strong the glare.

GRINDING IN JETS.

Although the average motorist does not care to tamper with the jet of a carburetor, these members sometimes require grinding in. This is a delicate task and is best left to the expert repairman. If the jet require attention it may be ground in by using a small amount of brass polishing composition or jeweller's rouge made into paste. The needle should be rotated with a very light pressure and raised from time to time to allow the mixture to change position, as well as prevent scoring. Sometimes the throttle does not move easily, due to dirt or the metal corroding. This may be cleaned with a brass polish which will remove the incrustations, as well as foreign elements.

AN EMERGENCY RADIATOR REPAIR.

Many novel methods of making temporary repairs to a damaged radiator are noted but one of an unusual nature is given by a repairman who was sent to the scene of an accident to tow home a machine. The radiator was badly damaged and the repairman set about to make a temporary repair. A nearby farmhouse supplied a number of raw potatoes which were cut in two and the openings in the cooler filled. The latter held water so well that the motor was started up and the machine ran to the garage under its own power. Small leaks could be stopped thus, as the potato will retain its sealing qualities even if water in cooler becomes very warm.

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DETERMINING CHAIN LENGTHS.

The usual method of determining the chain length when the pitch, the centre distance, and the number of teeth on the two sprockets are known, is by a formula, but where this operation must be repeated many times a day, the time consumed is considerable. At Fig. 4 is shown an instrument designed and used by the Diamond Chain and Manufacturing Company, Indianapolis, Ind., by which chain lengths can be determined quickly by making three simple adjustments.

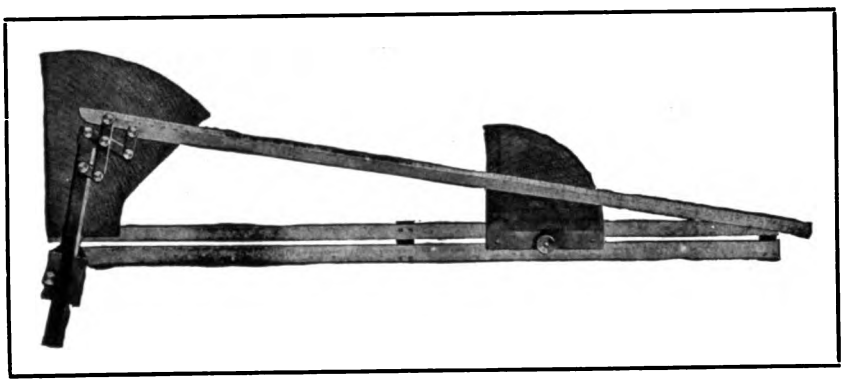


Fig. 4—Diamond Device Computing Chain Lengths by Three Adjustments.

The instrument in its simplest and cheapest form is shown in Fig. 5, where the parts are made of paper. The fixed scale C is laid off in half-inch divisions, each representing a distance equal to the pitch of the chain. On the movable scale E, each half-inch division represents a distance equal to two pitches—one for the upper half of the chain, and one for the lower. The circles on the sectors A and B are the pitch circles of one-inch pitch sprockets drawn half size. Points on the spirals are found by stepping off .5-inch chords on each of the pitch circles beginning at the horizontal radius to the left of C and to the right of F. Through all points one step removed from the horizontal radius, a curve is drawn and marked No. 2. Through all points two steps removed, a curve is drawn and marked No. 4, and so on. The number of any spiral represents the number of chain links from the point where it crosses a given circle to the corresponding point on the lower half of the circle.

As an example, in the use of the .75-inch instrument, let the distance between the sprocket centres be 15 inches, the pitch .75-inch, and the number of teeth on the large and small sprockets, 72 and 36, respectively. Divide the centre distance by the pitch. The result is 20, which is the centre distance in terms of the pitch. Set the sector A at this figure on the scale C.

Now, find the pitch circles on A and B corresponding to 36 and 72 teeth, respectively. Place the straight edge E approximately tangent to these two pitch circles, and, noting the points where spirals cross these pitch circles, shift the straight edge E so that it covers all but one of these points. See that the zero point on the scale coincides with the point not covered on the left hand dial, and that the point not covered on the right hand dial just touches the straight edge. In other words, place the straight edge in the position that the centre line of the chain would occupy in passing from one sprocket to the other.

Take the straight edge reading 38, which is twice the number of links in the span of free chain. The number marked on the spiral passing through the zero point is 44. The number marked on the spiral passing through the right hand reading is 14. The sum of these three numbers is 96, which is the chain length in terms of the pitch, $96 \times .75 = 72$ inches, which is the chain length in inches.

As the length of a roller chain must in general be a multiple of twice the pitch, the reading on the straight edge E must be an even number. If then the spiral does not pass exactly through one of the even numbered scale divisions, the next higher even number must be used. If an offset connecting link is used this number must be odd. If the chain is of the block type, the reading may either even or odd.

In the steel instrument shown in Fig. 4, the adjustments are greatly facilitated. The right hand sector is quickly clamped in position by a thumb screw,

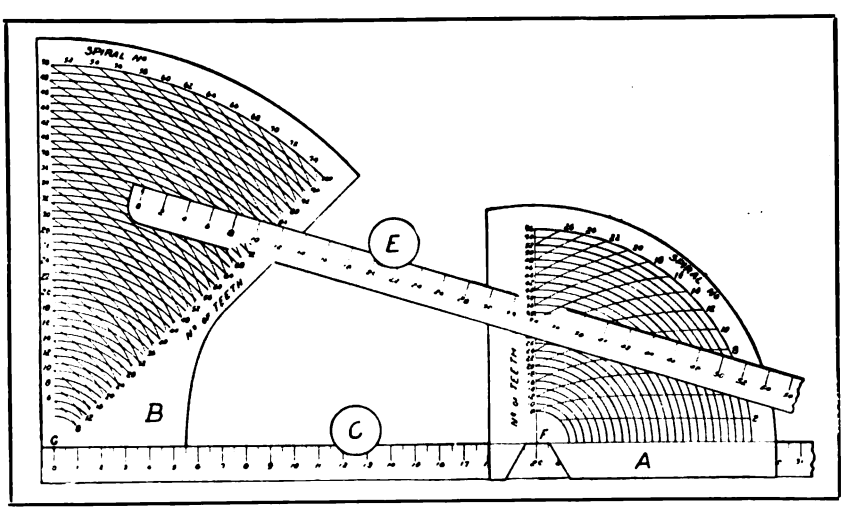


Fig. 5—Measuring Device Constructed of Paper, Also Outlining Scales.

the zero point of the straight edge is brought to the proper pitch circle by the slide which is graduated on the left for roller chains, and on the right for block and twin roller chains.

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MOTORISTS AND GOOD ROADS.

If, as it would appear from the statistics available, the motorists of America paid some $4,000,000 in registration fees during 1911, it follows that they have a substantial interest in the subject of good roads. Whatever may have been the original reason for imposing a special tax on this class of highway users, it has come to be generally recognized that the chief cause for increasing the fees from year to year lies in the supposed damage that results to the road surfaces by the swiftly moving vehicles. Leaving aside all disposition to question the truth of this assertion, it is proper to consider whether or not those who have charge of disbursing the fund thus created are giving the best possible return for the money.

It must be admitted that organized motorists have been responsible mainly for the agitation which has resulted in bringing this matter to the attention of those who were once its most rabid opponents, but now equally as interested in securing the benefits to be obtained as the automobilists themselves. It has been largely an educational campaign, and thus far only the rudiments have been learned. The really serious study has yet to be begun.

Good roads meetings and conventions have been held in every section of the country. They have been and doubtless still are of inestimable value in bringing the subject to the attention of those who have given it little thought heretofore, but there is great need for a more systematic application to details. Several forms of permanent road building have been tried out under varying conditions in this country and abroad, and it is time that the motorist give close attention to what has been accomplished along this line.

It is no doubt true that those who have been most directly connected with the campaign are thoroughly conversant with the results which have been obtained, but past experience indicates that it is from the rank and file of the organization that the proper agitation is to come. The individual motorist has been interested in the subject of good roads and has carried his interest into personal endeavor. When he becomes properly informed as to what is needed in the way of permanent road surfaces he will be able to make his position felt as keenly, as has been his demand for better ways. It follows that the individual automobile owner, as well as the organized body of motorists, should take advantage of every opportunity to study the methods now employed and seek to apply them wherever practicable. Plenty of opportunity will be afforded if the tourist keeps his eyes and ears open during the coming season.

PLACING THE RESPONSIBILITY.

Upon his plea of guilty to a charge of manslaughter a motorist in Massachusetts was sentenced recently to serve from five to seven years in prison. Information revealed to the court indicated that this was the prisoner's seventh violation of automobile speed laws. The situation offers room for comment as to how it could be possible that a man who by his previous actions had given sufficient indication of his reckless disregard for the rights of others was still permitted to drive a motor car.

Such operators bring discredit upon the whole body of motorists, and the immense majority which recognizes in them an ever present source of danger, has a direct interest in desiring that their number shall be reduced to an absolute minimum. But most of all there will be general demand that the responsibility be transferred from those who earnestly strive to obey the law in this regard, to those whose duty it is to see that the existing laws are properly enforced.

New York City has been experiencing considerable reckless driving of late, and as is more or less characteristic, those in authority, instead of seeking to apply existing speed regulations, have been urging

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more drastic legislation. Motorists hold that what is needed is not more laws but an actual attempt to enforce those now on the statute books.

That this latter statement is true is borne out by the fact that organized motorists throughout the country are lending every aid to the constituted authorities in this matter. In Detroit, for instance, three prominent members of the local club, one of them the president, have been sworn in as special speed officers to serve without pay. The responsibility does not rest upon the shoulders of law abiding automobile owners, but upon those whose duty it is to see that the reckless driver is deprived of his license to operate, particularly when it has been demonstrated so conclusively that he has lost all regard for the other users of the highways.

THOSE CHARITABLY INCLINED.

The annual orphans' day outing, which has become a permanent feature with many of the local automobile clubs throughout the country, has served to indicate how generously motorists are willing to respond to an opportunity to give pleasure to those less fortunate than themselves. It may be suggested in this connection, that these opportunities are really much more frequent than is sometimes realized. Undoubtedly physicians will be glad to furnish the names of patients to whom a ride in the open country, and particularly in an automobile, would prove a decided blessing.

In the early days of the automobile, the novelty of riding in them was much better appreciated. Nowadays, so many machines are being operated and so many persons have come to consider them as a necessary part of the daily life of the community, that few realize there are still a large number of people who have never experienced the pleasure. It is probable that the novelty of the ride, combined with the fresh air thus obtained, would work wonders upon the convalescent. In fact, the scheme is being tried in several cities with excellent results, and it offers a method of doing good which costs the donor almost nothing.

MOTOR TRUCK AND HORSE PARADES.

Springfield, Mass., inseparably connected with the early history of the motor car industry, has just held a work horse parade. New York, Newark, and a host of other cities throughout the country hold annual commercial vehicle demonstrations of this nature. This is not necessary in Springfield, since the number of mechanical transports which pass up and down Main street every day in the regular course of events is in every sense a parade. Even the fire department is so completely motorized that the horse is practically extinct.

Motor truck parades are held for the purpose of calling the attention of business men to the varied uses to which the modern transport may be put. A work horse parade is something of a novelty. Perhaps Springfield, which has become a pioneer in the development of so much that is connected with the automobile industry, seeks to establish a precedent along this line, realizing full well that the time is soon coming when it will require some such demonstration to remind the public that it once depended upon the low efficiency equipment to take care of its transportation problems.

VALUE OF THE TRADE MARK.

The trade mark is the purchaser's guarantee against substitution of inferior goods. The careful motorist will realize the importance of this, and as a result will not fall an easy prey to products which have no established reputation, on the plea that they are just as good and can be bought for less money. It is false economy to experiment with unknown goods, when the future efficiency of the car and its components are considered.

Too much stress cannot be laid upon this point. Manufacturers who have expended large sums in experimenting with the result that they have perfected a product on which they are willing to base their reputation by an extensive advertising campaign are in a position to recommend that which is best for the individual motorist. The frequency with which automobile owners have been victimized of late makes it obvious why absolute dependability should be placed upon the trade mark.

In many instances it has been found imperative by the manufacturer to place his goods upon the market in sealed packages. Every safeguard is being thrown about the motorist, and if he fails to secure that for which he expends his good money it is largely his own fault. Apparently, the American people have yet to learn that dependable goods cannot be purchased for less than the standard price and that the manufacturer's trade mark is the purchaser's protection against fraud.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



SAMPSON HAULS HOUSEHOLD GOODS.

From New York to Baltimore with a full load of household goods is a trip which should tax the capacity of any vehicle. The distance is 180 miles, going by the way of Trenton, N. J., and Philadelphia, and J. Edwin Hood recently made the journey with a Sampson truck, the product of the Alden Sampson Manufacturing Company, Detroit, a constituent of the United States Motor Company, New York City, in 15 hours, running time. Only one stop was made.

This is believed to be one of the longest motor truck household removals on record. Mr. Hood is engaged in the transfer business, and the trip proved of particular interest to many persons who are watching the progress of long distance transportation by commercial vehicles.

PIERCE-ARROW IN HONOLULU.

While the climatic and road conditions in Hawaii have been found to be admirably adapted to the use of the pleasure car, it is stated the first commercial vehicle to make its appearance in the city of Honolulu is a five-ton Pierce-Arrow truck, made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y., for the Oahu Ice & Electric Company and recently placed in commission. The car is shown herewith, and it will be noted that it was constructed especially for the work it was expected to undertake, at least insofar as the body was concerned.

Taking into account the fact that the vehicle was to operate in a tropical temperature, provision was made to protect the driver from the beating rays of the sun. The floor and sides of the interior, the latter to a height of 24 inches, are covered with heavy zinc plate, this forming a tank to catch the water from the melting ice and prevent it from coming in contact with the mechanism of the chassis. This tank is drained at the front, and the zinc plates are thoroughly protected from injury by means of wooden gratings. The body is sufficient in proportions to carry 36 cakes of ice of standard size.

As is more or less well known, the Pierce-Arrow truck is fitted with worm drive, the pioneer vehicle to be thus equipped in America. This form of drive has been tested out under all sorts of conditions abroad, and the experience of the Pierce-Arrow company during the past year and a half, has been such as to indicate that it made no mistake in deciding upon the innovation here.

The five-ton model is fitted with a four-cylinder, water-cooled motor. The cylinders are cast in pairs with bore of 4.875 inches and stroke of six, giving an S. A. E. rating of 38 horsepower. Ignition is dual, consisting of Bosch high-tension magneto and battery. The carburetor is a special design, automatic in action, the feed being by gravity. Lubrication is by forced feed system.

The clutch is of the cone type. The transmission is selective, affording three forward speeds and reverse. Two sets of brakes are



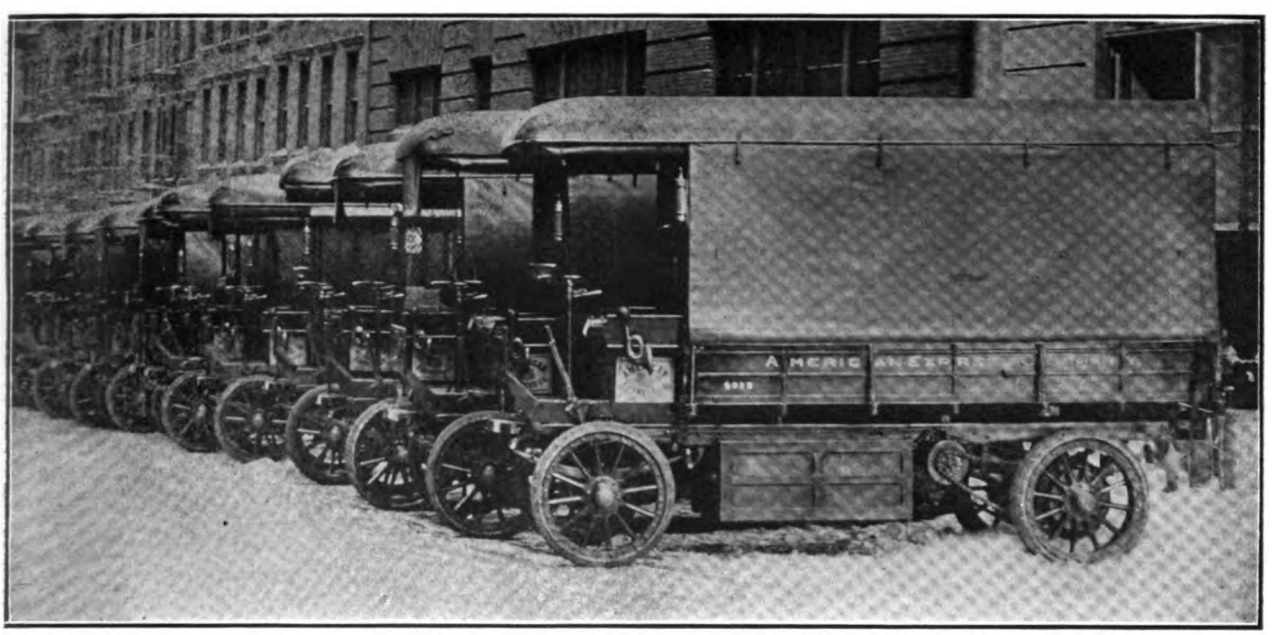
Pierce-Arrow Worm Driven Vehicle Recently Placed in Service with Honolulu Ice Concern.

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provided, the foot brake being on the outside of a drum at the rear of the transmission and the equalized hand brakes on the inside of the drums on both rear wheel hubs. Springs are semi-elliptic. Tires are 36 by five inches single in front, and 40 by six inches dual in the rear. The wheelbase is 13 feet and the tread 69 inches.

BAKER ELECTRICS FOR EXPRESS.

Several of the well known express companies throughout the country have adopted the electric vehicle as standard equipment in making deliveries. One of the most recent orders placed with the Baker Motor Vehicle Company, Cleveland, O., maker of the Baker electric, was a repeat from one of these concerns, for 28 two-ton cars for use in Washington, Baltimore, New York and Chicago. Part of the fleet of



Part of the Fleet of Two-Ton Baker Electric Vehicles Operated by the American Express Company in New York City.

two-ton Baker electrics operated by the American Express Company in New York City, is shown herewith.

In these cars the motor is a special four-pole design, series wound, with unusually large commutator, which is claimed not to spark or blacken under the heaviest load and to possess an electrical characteristic which permits of 300 per cent. overload. The motor and countershaft are completely self-enclosed in dust and water proof cases. They are connected by Reynold silent chain, which is enclosed and runs in oil. The armature shaft and countershaft run on imported annular ball bearings, four of which are employed for the latter to provide against distortions.

The steering gear and controller are connected in a very compact manner, and are rigidly attached to the chassis. The controller is a patented continuous torque, drum type, and is enclosed in a dust and water proof case. Five speeds forward and reverse are provided. No pedals or switches are used with this controller, and all speed changes are gradual and accomplished without waste of current.

Special attention has been paid to the matter of wiring, this being rendered acid and weather proof and so arranged as to be free from all mechanical strains. All connections are securely blocked. Every part of the working mechanism requiring attention, adjustment or lubrication is made conveniently accessible from the outside of the vehicle without disturbing the body or the load.

The frame is of pressed steel of special design, giving unusual strength and lightness. A particular method of chain drive is employed, permitting the flexible suspension above the springs of the entire power plant, and a light and strong rear axle construction. Both axles are drop forged steel with integral spring seats, and are equipped with roller bearings of standard design.

DECATUR REPLACES HORSES.

George E. Sturdevant of Danbury, Conn., who has been engaged in the trucking business in that city for a number of years, has decided to purchase motor trucks in the future instead of horses. After experimenting for the past year, Mr. Sturdevant has come to the conclusion that mechanical transports are far superior to horses in his business.

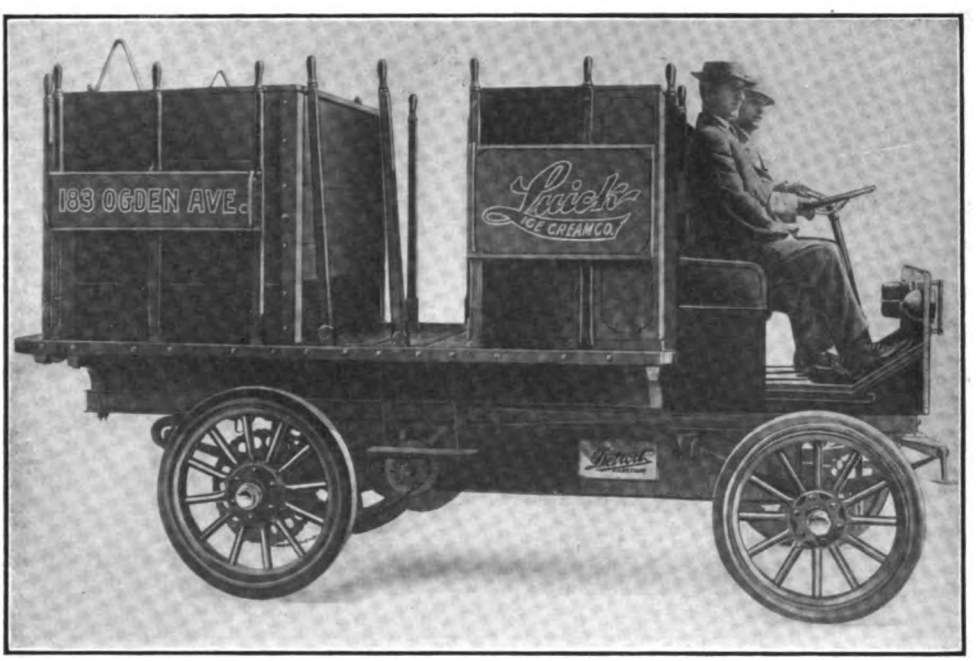
Recently, he decided that he must add to his equipment and after giving the matter sufficient study, gave an order to the Fillow Auto Company, local agent

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for the Grand Rapids Motor Truck Company, Grand Rapids, Mich., for a two-ton Decatur Hoosier Limited. The chassis was fitted with a handsome black body by J. R. Vrendenburg of Danbury. Mr. Sturdevant says his investigation leads him to believe that through this purchase he has saved the price of two and possibly three horses.

ALCOS FOR CITY WORK.

The city of Pittsburg, Penn., has purchased three six-ton Alco trucks, made by the American Locomotive Company, New York City, which will be used by the municipal authorities in hauling asphalt. It is maintained that the decision involves a saving of $15,000 a year over horses. The order came after a rigid investigation and tests, which proved conclusively that the mechanical transport could do the work more efficiently, and of course with greater economy. The trucks will be equipped with bodies designed especially with a view to securing quick loading and unloading, and it is estimated that each will carry sufficient material for seven square yards of street surface.



Detroit Electric Wagon Utilized by Luick Ice Cream Company, Milwaukee, Wis.

LARGE ORDERS FOR WAVERLEYS.

Following the recent order for 20 Waverley electric light delivery wagons, made by the Waverley Company, Indianapolis, Ind., placed by the Fleischmann Yeast Company, New York City, which are now in service, comes an additional order for a two-ton vehicle from that concern. A fleet of 10 cars on the same Waverley chassis has been received from the Mandel Bros. Department Store in Chicago, and four have been ordered for Louisville. The demand for these light delivery machines is held to be due largely to the fact that they are absolutely noiseless in operation, while their efficiency and economy have been proven under all conditions of service.

SPECIAL ICE CREAM BODIES.

The marketing of ice cream is a decidedly seasonable subject, and it is significant that the motor truck is being utilized for this purpose in largely increasing numbers throughout the entire country. The business offers some special features, which have proved more or less difficult of solution, but the manufacturers have given it such close study and application during the past year, that it is possible to secure what is needed from several truck makers.

In the first place, the deteriorating effects of the melting ice, mixed with salt, upon the metal of the chassis, made it necessary to overcome this difficulty. The use of zinc plates, or some other similar material, has done away with this danger, however, and there practically is no reason why a truck utilized in the delivery of ice cream should not give the same degree of service that would be possible in many other fields.

The next problem may be said to be that of arranging for carrying a maximum load, and thus securing the greatest efficiency, which means the utmost economy, from the vehicle in service. It has been proven to the satisfaction of most business men, at least, that there is undoubted economy in the use of the mechanical conveyance. The degree of saving is measurable, however, in direct proportion to the total amount of time the car is engaged in useful work.

Ice cream is delivered in tubs or pails, and it is somewhat difficult to pack these so as to make use of the available space in the most advantageous manner. Body designers have overcome this in a number of ways, and it will prove of interest to note how this has been accomplished in specific cases.

Electric Car in Milwaukee.

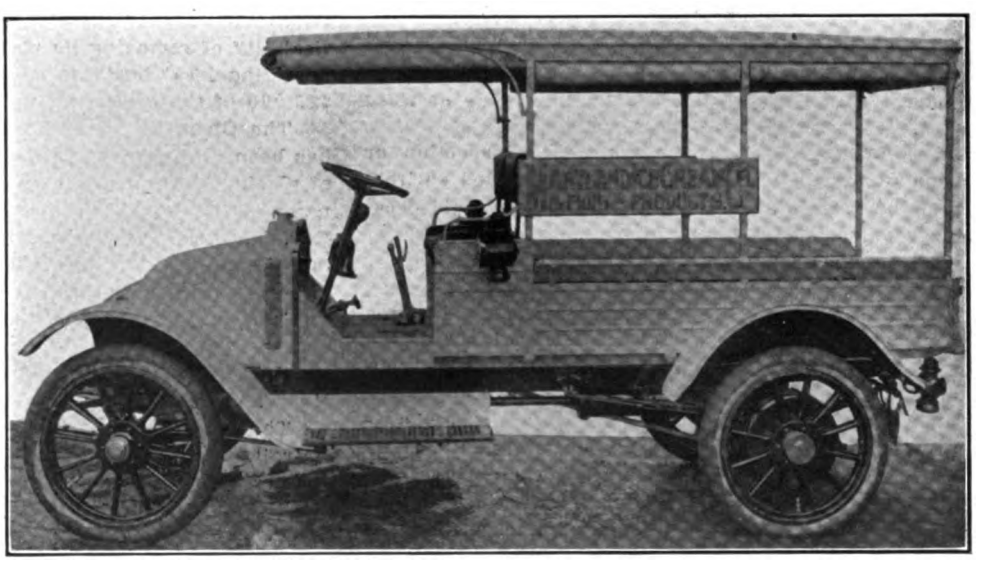
Herewith is presented a photograph of the 3000-pound Detroit electric wagon, made by the Anderson Electric Car Company, Detroit, and in service with the Luick Ice Cream Company, Milwaukee, Wis. It will

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be noted that ample provision has been made for overcoming both difficulties mentioned above. The special containers are so constructed as to protect fully the chassis mechanism, and to afford the utmost room for packing the ice cream. The body platform extends over the wheels, so as to provide additional carrying capacity, and the entire assembly is neat and attractive.

The Luick company favors electric vehicles for this work, because it feels that the nature of the ice cream business is such that the electric can be utilized to a much better advantage than the gasoline propelled car. This is due primarily to the number of short stops required on most of the delivery routes. There will be no denying that electrics have a distinct field, but there probably will be disposition to question the opinion of this concern with reference to the above statement. In fact, it must be admitted that many gasoline cars are utilized in this work and with splendid success, despite the numerous short stops encountered.

There is no reason for assuming that the experiences of all should be exactly alike. It is sufficient for the purposes of this discussion to note that the Luick Ice Cream Company has had its Detroit electric truck in service for a number of months, and that it has covered from 30 to 40 miles daily without difficulty and with an excellent showing for economy and efficiency. In its operation two men are employed, and this makes it possible to serve a large number of patrons, including stores and private consumers, in the course of a day.



Lippard-Stewart Truck with Express Body Built Especially for a Baltimore Ice Cream Company.

As is true of all Detroit electrics, the car is equipped with the Edison battery, this particular set consisting of 60 A-6 cells. The wheelbase is 96 inches; the tread 62, and the road clearance 11.5. The overall dimensions are: Length, 155 inches; width, 74; height, 100. The height of the platform from the ground is 35 inches. Tires are solid, 34 by 3.5 inches in front and 36 by four in rear.

Gasoline Cars Also Successful.

The Lippard-Stewart 1500-pound wagon utilized by the Maryland Ice Cream & Fruit Products Company, Baltimore, Md., also shown herewith, was designed especially for this concern by the maker, the Lippard-Stewart Motor Car Company, Buffalo, N. Y. It will be noted that provision is made for completely enclosing the interior, should occasion demand, while the arrangement of the flare board sides is such as to afford ample loading space. It is painted a neat cream and brown, presenting a decidedly attractive appearance.

This type of vehicle is meeting with favor in many sections. In fact, the Lippard-Stewart company has been called upon to deliver a large number of these cars during the past few months. One firm, the Hoefler Ice Cream Company of Buffalo, recently purchased five. These were designed particularly to take care of the retail trade and were of the enclosed panel body type.

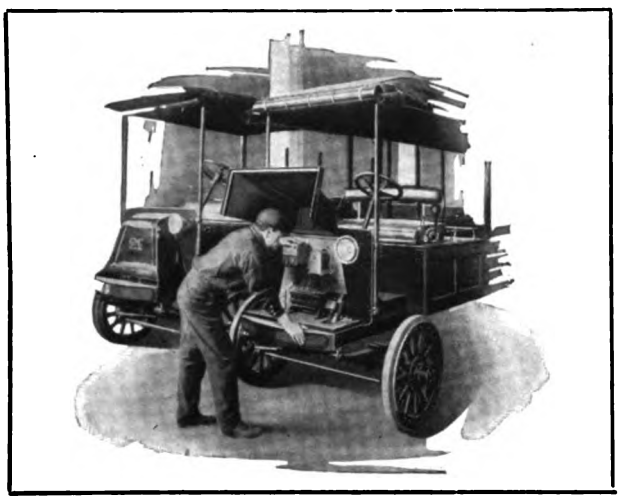
In the face of these facts, it hardly can be maintained that the gasoline vehicle is not altogether suitable for the retail delivery of ice cream. Still, as said before, conditions vary and what will prove to be the best for one concern may not necessarily give the same results under other circumstances. It is necessary to learn all of the conditions under which a vehicle is to operate before making decision as to the type to be employed.

It may be stated that the Lippard-Stewart cars are equipped with a four-cylinder, four-cycle, water-cooled motor, cast en bloc, with bore of 3.375 inches and stroke of 4.312. Ignition is by Bosch magneto. Lubrication is by force feed and splash. The clutch is of the disc type. The selective transmission affords three speeds forward and reverse. Two sets of brakes are fitted, expanding and contracting on the rear wheels, lined with Raybestos. Springs are full elliptic in front and semi-elliptic, with auxiliary coil springs, at the rear. Tires are pneumatic, 34 by four inches, all around, mounted on Universal quick detachable rims.

A special feature of the construction is the radiator mounting and hood. The former is located at

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the rear of the motor, next to the dash, where it is held to be entirely out of danger from possible collision or other accident. The hood lifts from the front,



Depicting Accessibility Afforded by New Type of Hood on Latest G. M. C. Electrics.

and completely exposes the motor for inspection or adjustment, while the latter may be removed entirely from the chassis in a very few moments, should occasion require.

THE NEW G. M. C. ELECTRIC.

According to C. L. Morgan, sales manager of the electric division of the General Motors Truck Company, the new G. M. C. electric, designed by John Lansden, has at least 18 important features, embodying the maximum of accessibility and simplicity. Some of these are outlined as follows: Rear springs outside of the frame to insure maximum axle strength, permitting the use of a narrow frame and giving short turning radius. The steering post is inclined. Double brake equipment is provided, each brake locking at wheel. Auxiliary springs supplement the rear semi-elliptic members, and an apparatus or controller hood is placed in front of the dash.

This latter is designed somewhat along the lines of the so-called Renault hood for gasoline cars. The accompanying illustrations bring out this exclusive feature. It will be noted that the controller, safety switch, ampere-hour meter, lamp circuits, etc., are all instantly accessible by lifting this hood. It is maintained that this location means a great deal to the garage man, because the controller has been so placed that adjustment and inspection of each and every finger is made readily. The whole assembly is amply protected by a heavy oak bumper, substantially ironed.

Another feature is the location of the battery on top of the frame under the driver's seat. This has been decided upon as eliminating unnecessary labor and removing all possibility of accident by dropping of battery crates, or short circuiting due to hanging wires, etc. In addition, the battery is in plain sight, so that the caretaker does not have to work through a trap door or around corners to get at the cells. It is claimed that the battery is assured of the best possible care under this arrangement. The housing is properly ventilated, as well as being protected against excessive chilling, two factors which make for long life and the greatest efficiency possible.

NEWS OF THE TRUCK FIELD.

The Chase Motor Truck Company, Syracuse, N. Y., has added a new model to its already extensive line. This is a 500-pound delivery wagon with open express body, equipped with a two-cylinder, two-cycle, air-cooled motor, rated at 12 horsepower, the bore being 4.125 inches and the stroke four. Ignition is by Bosch magneto.

The Seamless Pressed Steel Company, Redkey, Ind., which has been producing trucks in a small way for some time past, is said to be considering the advisability of removing its plant to Hartford City, Ind., providing local business men can be induced to take $25,000 of the capital stock of the concern.

The Cleburne Motor Car Manufacturing Company has been organized at Cleburne, Tex., for the purpose of placing in the market two small vehicles under the name of Chaparral. The president of the company is Rev. H. E. Luck, who has been engaged in developing the product for the past two years. The other officers are: Vice presidents, E. N. Brown and F. L. Deal; secretary, R. H. Crank; directors, J. E. Poindexter, Brown Douglas, G. A. McClung, S. B. Norwood, E. N. Brown, O. L. Bishop, R. E. Gatewood, J. M. Moore, A. C. Barber and F. L. Deal.

The Ware Vehicle Company, formerly located in Detroit, where a four-wheel drive truck was manufactured, has secured temporary quarters at 771 Raymond avenue, Minneapolis, Minn., and is conducting negotiations with H. J. Tremain of the Minneapolis Commercial Club, for the erection of a suitable plan-



Controller, Safety Switch, Ampere-Hour Meter, Etc., Instantly Revealed for Inspection and Adjustment.

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The Auburn Automobile Company, Auburn, Ind., is to place a two-cylinder light delivery car in the market in the near future. The first machine is under construction, and will be rated at 1500 pounds capacity.

The Lambert-Morin Motor Vehicle Company, Lawrence, Mass., has been experimenting with electric trucks for the past three years, and is now placing machines of its own design upon the market.

The Cincinnati Motors Manufacturing Company, Cincinnati, O., has 25 commercial cars under construction, and intends to erect a suitable plant for the production of Alter trucks during the coming summer. The officials of the company are: President, Franklin Alter; vice president and general manager, H T. Alter; treasurer, J. B. Doan.

The Jackson Automobile Company, Jackson, Mich., is said to be contemplating the production of a 30 horsepower light delivery wagon, equipped with solid tires of a special construction, capable of giving the same resiliency as pneumatics.

The Spaulding Manufacturing Company, Grinnell, Ia., a large and well established maker of carriages, is to enter the motor truck field with a light delivery wagon. Several experimental machines have been constructed and have given decidedly efficient service.

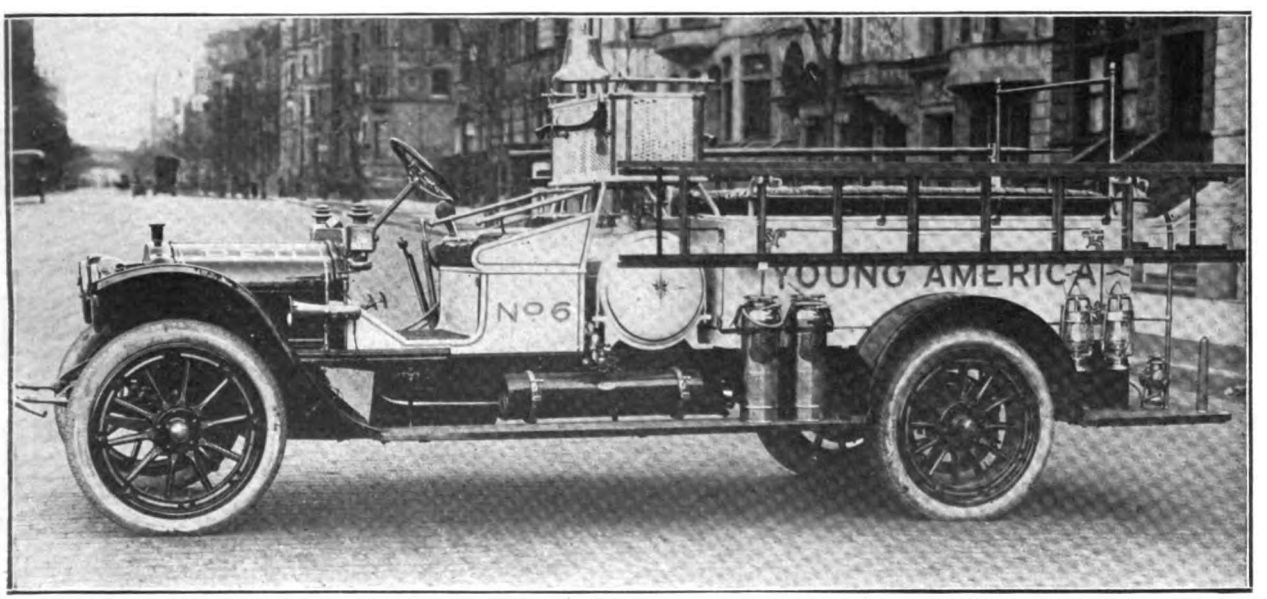
The Oakland Motor Car Company, Pontiac, Mich., is expected to announce a 1500-pound, 40 horsepower delivery wagon in the near future. Four of the machines have been in daily use about the Oakland plant for some time, and their work has included the hauling of supplies from Detroit, a distance of 25 miles.

G. M. C. GASOLINE VEHICLES.

One hundred and thirty-three G. M. C. gasoline trucks, made by the General Motors Truck Company, Detroit, are used by merchants in San Francisco, Cal., according to recent information. The largest number owned by any one firm is eight, and the next, five. There are several who employ two and three. Among the lines represented may be noted the following: Steel, ice, hardware, furniture, transfer, wine, gas, brewing, electric light and power, etc.

WHITE FIRE WAGON SUCCESSFUL.

An accompanying illustration presents the combination chemical engine and hose wagon delivered by the White Company, Cleveland, O., to the Young America Hose Company of Poughkeepsie, N. Y., in November, 1911. The equipment is fitted to a regulation White chassis and includes everything required for the proper fighting of fires, the main idea being to stop the blaze before it has reached definite proportions. The Poughkeepsie company answers every alarm in the city, and writes that it has never experienced any trouble whatsoever.



White Combination Chemical and Hose Wagon in Service with the Young America Hose Company in Poughkeepsie, N. Y.

In every respect the machine has surpassed all sections of the guarantee given by the White Company when it was purchased. It climbs the hills of the city with ease, and as for speed, it has developed as high as 55 miles an hour on the long runs into the suburbs. Although some of the streets in these outlying districts were in decidedly poor condition, the mud often being hub deep during the spring months, the White fire wagon travelled over them easily.

The item of expense always is of interest, and President Lewis A. Thomson of the Young America Hose Company says the total cost of maintenance for the first five months was exactly $1.49.

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TYPES OF REAR AXLE CONSTRUCTON.

(By R. S. Lane, M. E.*)

THE large number of inquiries constantly received by trade papers covering the automobile field is ample evidence of a considerable lack of knowledge

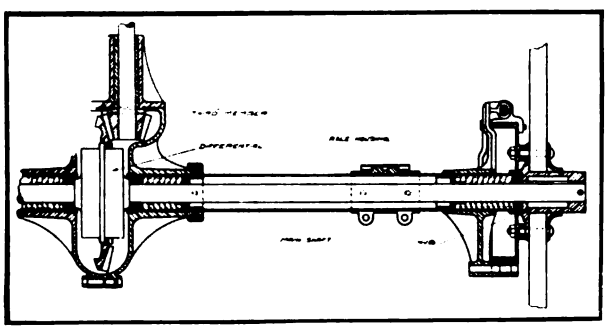


Fig. 1—Live Type Axle in Which the Shaft Is Supported by Bearings at Each End.

on the part of the reader concerning rear axle construction on the motor car. In view of this fact it is quite pertinent that the writer should endeavor at this time to express as far as possible in non-technical language some of the chief advantages of the various types, as well as to give a description of each type sufficiently clear to enable those advantages to be understood. It is scarcely possible to answer in a few words the direct question of a reader for such attempt invariably is misleading, due to the fact that so many things have to be left to the imagination or be so briefly described as to practically amount to no description at all.

To some it may seem strange that a general ignorance should prevail in connection with what might be termed one of the simpler parts of the automobile. Some of this surprise, however, with respect to the layman can be laid aside when it is considered that the confusion of terms and lack of understanding of the principles of the various types extends even to the builders of the cars themselves and back of them to the makers of the axles on which the cars are mounted. This is quite apparent from advertisements which have been published within the past few months and in which terms have been used without explanation and in a manner to be strongly misleading.

The best way perhaps, to arrive at our goal in the present discussion will be: First, to give a definition of the major term "floating"; second, to give a description of the various axle types, and third, to point out a few features relative to their bearing equipment and other items of practical value to the owner.

Definition.

The term "rear axle" is ordinarily used to designate the entire rear construction including the axle housing, differential, driving shaft, hub, etc. The "main shaft" or "main driving shaft," of which there are two for each "axle" is the rotating member extending from the middle of the axle or the differential, out to the hub, and which is wholly enclosed by the axle housing or tube. The "third member" or "propeller shaft" is placed at right angles to the main driving shaft, carries the driving pinion at its lower end meshing with the ring gear, and extends forward from the differential to the transmission or gearcase, assuming that the latter is a unit by itself and is hung midway in the frame of the car by cross members.

The feature which determines whether the axle is of the floating type or not consists only in the method by which the main driving shafts are supported at either end. In other words, the axle "floats" to just the extent that it is relieved at each end from all working forces in any direction in any plane through its axis. The forces involved can consist either of a radial pressure (through contact with a bearing) or a bending force, due for example to the hub end being coupled rigidly to the wheel. The latter construction, of course, would necessitate the axle shaft being so held as to resist thrust or side pressure.

Live Type.

The first axles on motor cars were all of the "live type." This term was simply used to distinguish the axle from the "dead" or non-rotating axle. Its construction involves simply that the main shaft be supported by bearings at each end, as at Fig. 1. These bearings were placed inside the tubing and ran directly on the axle shaft. The weight of the car was carried from the spring support through the bearing at the outer end, into the wheel and to the ground. At the inner end the differential was simply hung on the two projecting ends of the main shaft.

Semi-Floating.

Desiring now to better support the differential

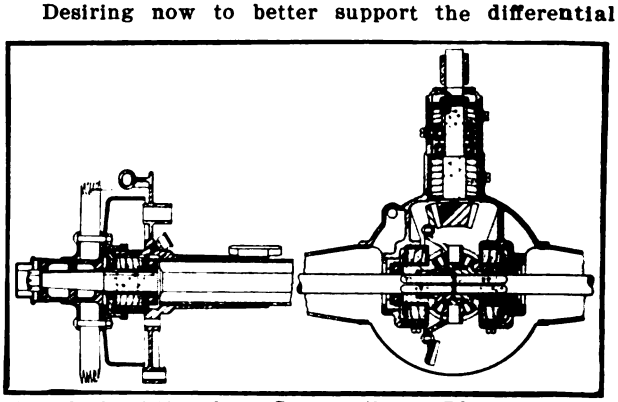


Fig. 2—Semi-Floating Construction: Differential Is Mounted on Bearings and Inner End Shaft Is Relieved from Forces Other Than Torsional in Transmitting Power.

gears it was decided that advantage would be gained by projecting either side of the differential case in the form of a hub and mounting the anti-friction bearing on each hub. In this way the differential

*Chief engineer, Hyatt Roller Bearing Company, Detroit.

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case, and hence the whole differential was held in correct position within the entire housing, as indicated at Fig. 2. The work which the inner end of the main shaft now had to perform was simply that of transmitting power from the differential to the wheel, instead of having to carry the weight of the differential in addition as it had heretofore. This, therefore, relieved the inner end or half of the main shaft from forces other than torsional as above mentioned, and consequently gave us what we have long called "semi-floating" axle construction.

Three-Quarter Floating.

Looking now at the hub or outer end of the main shaft we find that these can be relieved here also, of some of their radial and bending load by mounting the bearing outside of the axle tubing as in Figs. 3 and 4. This construction involving the use of only one bearing as heretofore, has recently become quite

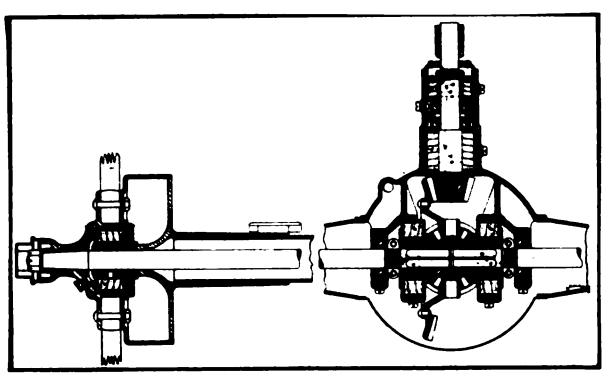


Fig. 3—Three-Quarter Floating: Outer End of Main Shaft Is Relieved from Radial and Bending Loads by Mounting Bearing Outside of Axle Tubing.

popular both in this country and abroad. When used the main shaft no longer has to carry the weight of the car as in live or semi-floating types of axles. It is necessary, however, that the shaft give some support to assist in keeping the wheel in an erect position as the single bearing used is not designed to withstand alone all of the skidding or side stresses to which the wheel may be subjected.

When withdrawable shafts are desired this feature can be obtained by the use of an extra thrust bearing, as illustrated at Fig. 4, or—without the thrust bearing—the shaft can be removed together with the wheel by jacking up either one side or the other of the car and removing the split collar at the differential through the cover plate, also as illustrated. In neither case is it necessary to remove the entire rear construction from the car in order to get at either the differential or the main shaft. With the inner end wholly floating now and with the outer end partly floating we have what is called today the "three-quarter floating type" construction.

Full Floating.

Freeing the outer ends of the main shafts from their duty of even supporting the wheel in an erect position involves the use of an extra bearing at this

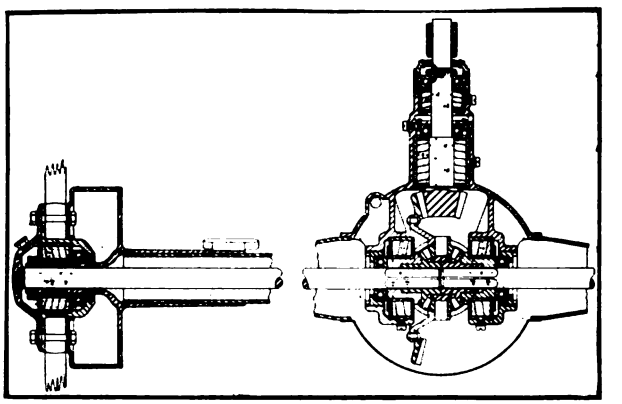


Fig. 4—Three-Quarter Floating, in Which Withdrawal of Shafts Is Permitted.

point. This construction is illustrated in Fig. 5. Here the two bearings are sufficient to carry the wheel in its proper position under any and all conditions. The main shafts now have absolutely nothing to do beside simply transmitting the torsional load or power from the gears at the centre to the wheels at the end of the axle. This is usually accomplished at the wheel by means of a flexible connection in the form of a clutch.

Advantages.

A properly designed and properly built axle of any one of the above types will prove entirely satisfactory to the average user. The parts will all be strong enough and will be assembled with such accuracy as to make repairs, except in the case of accident, almost unnecessary. The two moderate priced cars whose total production added is more than one-fourth the entire quantity of cars built each year have axles of the live type. There are a number of cars selling for $5000 and over whose axles are of the semi-floating type.

Assuming that one is entirely conversant with the construction of his car and is capable of making his own repairs it is of course convenient in the event of difficulty with the differential to be able to withdraw the main shaft without other trouble than simply the removal of the wheel hub caps and differential cover. This feature of removable shafts, however, can be and is applied to axles of all but the live type. Overlooking the fact, this feature is one which is most prominently played upon today in advocating the full floating axle.

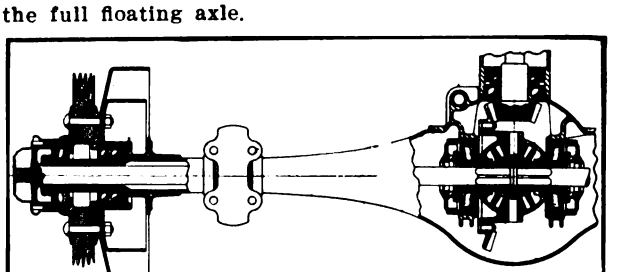


Fig. 5—Full Floating Design: The Outer and Inner Ends of Shafts Are Free from Other Than Driving Load, the Wheels Being Supported by Two Bearings.

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So far as the bearing equipment is concerned it must be remembered that no special make or type of bearing is necessarily adapted to any particular axle type. Each maker claims certain merits for his product whether it be a roller bearing or a ball. If the product stands up to the claim his bearing can be practically applied to any axle by proper arrangement of the surrounding parts.

The full floating axle, especially if in addition to the loose clutch at the outer end, it has added a universal joint at the inner end, is necessarily somewhat noisy. These features, therefore, will have to be done away with as a part of floating axle construction if the present tendency toward reduction of noise is to continue.

STUDEBAKER COMPANY FOR CANADA.

The organization of the Studebaker Corporation of Canada, Ltd., the Canadian representative of the Studebaker Corporation, has been completed, and Frank E. Fisher appointed as manager. He is a Canadian, and well acquainted with the people and geography of the country, and has had considerable experience with the Studebaker companies, so that he is particularly well fitted for the position. He has been placed in entire charge of the Canadian business, which centres at the plant at Walkerville, Ont.

SPOKE TIMBER SHORTAGE?

That the floods which have caused so much loss this spring in the South will result in a shortage of timber for automobile wheels is the opinion of a number of the wheel manufacturers, who obtain much of their hickory from the affected territory. Drury L. Porter, of the Auto Wheel Company, Lansing, Mich., has stated that at least a temporary shortage is to be expected, and that the manufacturers are not taking any chances, but are placing orders early. It is stated that all the second growth hickory, from which the best wheels are made, comes from Arkansas, Tennessee, Kentucky, and Louisiana, in the low ground which has been under water for some time. No shipments are to be had from this territory, and it will probably be a month or more before any may be expected.

MOVING PICTURE DRIVING TEST.

One of the most interesting and popular courses at Harvard University is that in psychology, conducted by Hugo Munsterberg. A recent piece of apparatus which was installed in the laboratory is designed to test the reaction of chauffeurs and see if they are fit to drive cars. In the test, the subject is placed in an automobile, in running order, but jacked up. In front of this is a screen upon which is thrown moving pictures of road conditions, according to which the chauffeur is to govern his car. He is told to consider that he is out on the road, and to act just as he would if any of the things shown on the screen should happen. The pictures are shown in a darkened room, and the illusion of being on the road is quite good, so that it is an excellent test. Various emergencies occur on the wall, pedestrians and other vehicles suddenly appearing in the way, and by the actions of the chauffeur his ability is judged. It has been found that all men fall into one of three classes. The first perform the necessary operations without delay or confusion, the second appear slightly disturbed, while the third lose control entirely and perform the reverse of the proper operations.

OLD OREGON TRAILS UNITED.

A movement is on foot, fostered by the Portland Automobile Club, Portland, Ore., to establish a new route to be called the Central Oregon highway. This will be a union of the Old Oregon trail, the California trail, the Dalles Military road, and the Willamette Valley and Cascade Mt. Military road, and will lead from Dalles down through central and eastern Oregon across southern Idaho through Boise to Salt Lake City, where it will connect with the main transcontinental route which has been mapped out as the course of the run to San Francisco in 1915. The idea of the new highway, aside from providing a route to the Middle West, is to divert automobile parties going westward, and lead them to Portland, whence they can take the Pacific highway direct to San Francisco.

INDIANAPOLIS TENT SHOW A SUCCESS.

The automobile show which the members of the Indianapolis Automobile Trade Association held this spring in a tent was a decided success. At a recent meeting of the association, the members were given checks amounting to 50 per cent. of the sums they paid for space, and it was reported that $1000 had been laid aside to go toward the erection of a coliseum where displays can be held in the future. No plans have as yet been made for the erection of the building, but it is stated that the members are still endeavoring to interest public or private enterprise.

DETROIT CLUBMEN SPECIAL OFFICERS.

Three members of the Wolverine Automobile Club, Detroit, have been sworn in as special policemen and provided with badges and full authority to arrest speeding motorists. They are Harry Porter, the club president and chairman of the runs and tours committee, H. H. Robinson, and W. G. Bryant, the club's attorney. They will act without salary, in the interests of motoring in the automobile centre. This action is the result of the campaign which the club has been waging against speeders, with the co-operation of the police department, and is expected to assist the organization considerably, as it places some power in the hands of three of its members who have been especially energetic in the anti-speeding crusade.

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ADDITIONAL LEGISLATION IS NOT NEEDED.

IT IS more or less well known that the police and court officials of New York City have been taking up the matter of automobile speed regulation in that municipality with a view to securing a new ordinance or law, which is expected to solve the problem. At least one conference has been held between the city magistrates and leading motorists, but with somewhat indefinite results. The following communication sets forth the situation in a logical manner, from the viewpoint of the Automobile Dealers' Association, Inc., an organization which has done much for motor car owners in local and state legislative matters.

Editor, Automobile Journal:

Just at this time the automobilists are being severely criticised and a demand is being made for new regulations governing their control in New York City. Great stress is laid upon the increased number of accidents, the critics contending that they are caused by excessive speed. In nearly all cases it will be found that where accidents occur the automobiles are driven at a reasonable speed and are absolutely under control of the driver, and in nearly every case it will be found that the accident was due to contributory negligence on the part of the injured person.

A special committee has been appointed by the aldermen of New York City for the purpose of drawing up a new ordinance regulating automobile speed with the idea of reducing the number of fatalities and accidents. This is not the way to handle the situation; the laws which we have at the present time are adequate if enforced, and the answer to the critics is the enforcement of the law rather than the drawing of new ones. The making of a new speed ordinance will not stop the reckless driver. If he breaks the law limiting speed to 30 miles an hour, he will do so if the speed limit is reduced to 20 miles an hour. The proper thing to do is to arrest and punish such drivers, not to make new laws that will be a hardship on all motorists.

The magistrates of New York City have decided that the old city ordinance is effective. This ordinance provides for a speed of eight miles an hour in congested districts and 15 miles an hour where the houses are more than 100 feet apart. This is a ridiculous ordinance and is broken by every automobile that runs upon the streets. This law should be revoked at once; the Automobile Dealers' Association believes that if the Callan law were in force in this city and the same was strictly enforced, it would be a means of reducing the number of accidents.

Very few people connected with the enforcement of the automobile laws understand the Callan law. This law provides among other things that "every automobile shall be equipped with brakes in good working order and sufficient to control such vehicle at all times when the same is in use, and a suitable and adequate bell, horn or other device for signalling." It further provides "that upon approaching a pedestrian who is upon the travelled part of any highway and not upon a sidewalk, and upon approaching an intersecting highway or a curve or a corner in a highway where the operator's view is obstructed, every person operating a motor vehicle shall slow down and give timely signal with his bell, horn or other device for signalling." Any person found guilty of a violation of these two sections shall be punished by a fine not to exceed $25.

The Callan law in regard to speed specifies that every person operating a motor vehicle on the public highway shall drive the same in a careful and prudent manner and at a rate of speed so as not to endanger the property of another or the life or limb of any person; provided, that a rate of speed in excess of 30 miles an hour for a distance of one-fourth of a mile shall be presumptive evidence of driving at a rate of speed which is not careful and prudent. The question of speed is well taken care of in this section as is reckless driving and if this law were enforced, and there is no doubt that this could be done as well as the enforcement of the present speed ordinance, it would do away with reckless and careless driving.

At the present time the contention is, that the magistrates, under the old ordinances can only fine a speeding motorist $10, under the Callan law, a reckless driver can be fined $100, and upon the certifying of the facts to the secretary of state he may upon the third offense revoke the driver's license for at least six months or for such a period of time as he may desire. A special provision of the Callan law provides for the punishment of a motor driver while driving a car in an intoxicated condition, and punishable by a fine. If convicted the second time upon this charge the driver shall be guilty of a felony punishable by a fine of not more than $500 or by imprisonment for a term not exceeding two years, or by both such fine and imprisonment.

These are only a few of the points taken up in the Callan law and are quoted for the purpose of showing that this law fully provides for the care of the public and if put in operation here and strictly enforced the reckless driver will receive the punishment due him. Under the present ordinance and the way it is enforced there is no control over the motorist who desires to speed. With the proper administration of the law the fatalities in this city would be decreased instead of increased. At present there are 25 motorcycle officers in plain clothes in Greater New York who are detailed to catch offending motorists. We read in the press of the number of drivers arrested and the large amount of fines collected. This does not solve the problem.

We believe that if the commissioner of police would put the motorcycle officers in full uniform the same as they were a few years ago it would be the means of stopping the speeders. A driver running along a good stretch of road is inclined to drive fast for the reason that he does not see any one to prevent it. If a motorcycle officer were in view this driver would immediately slow down and keep well within the speed regulations. Strict enforcement of the law, plenty of officers in uniform to enforce it, a revoking of the present city ordinance and the operating of the Callan law in New York City will without doubt decrease the number of automobile accidents.

A great many people have a mistaken idea that the automobilists are looking for everything for their own selfish interests without due regard to the public. This is an erroneous idea; the Automobile Dealers' Association is doing everything in its power to protect the public, and to require automobiles to be operated in a safe and sane manner. A short time ago an ordinance was presented to the city aldermen against the use of the muffler cut-out. This association immediately went upon record as advocating the passage of this ordinance, realizing it was a nuisance to the public and of no use to the automobile. At the present time it is working on a number of city ordinances all of which have to do with the eliminating of certain features of the automobile to which the public are antagonistic and which it feels are unnecessary.

Yours very truly,

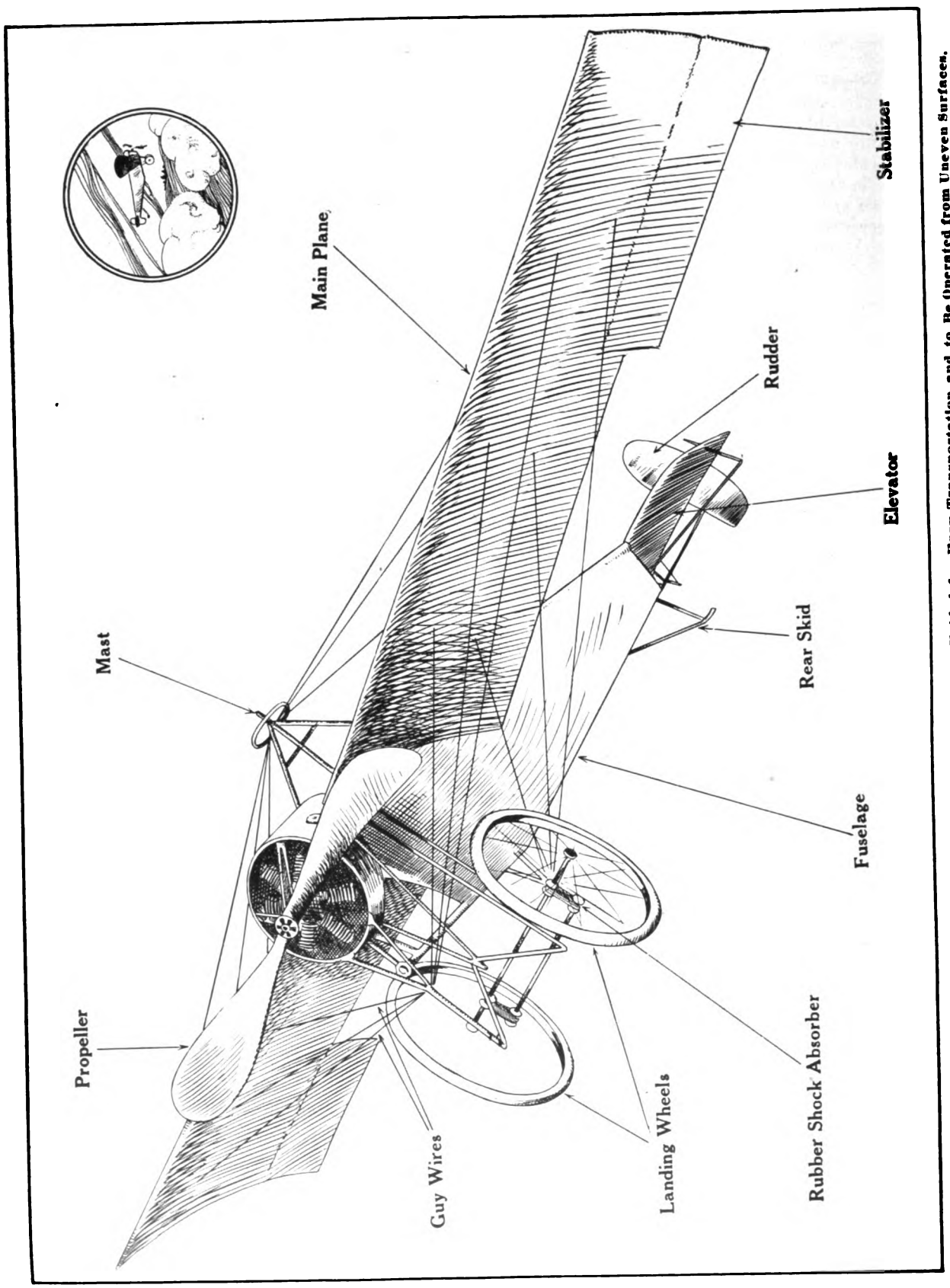
CHARLES A. STEWART,
General Manager, Automobile Dealers' Association.

New York City, May 26.

FOREIGN STUDEBAKER SALES MANAGER.

W. H. Lalley has been appointed foreign sales manager of the Studebaker Corporation, Detroit, after having been in charge of the European sales of the company for the past two years. He has established branches in London and Berlin, and is one of the directors of the Studebaker Corporation of England, Ltd. Besides having had considerable experience with the foreign sales of the Studebaker, he is a technical man, being a graduate of the Massachusetts Institute of Technology. His many friends throughout the industry will be glad to learn of his appointment.

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Perspective View of the Vendome Military Monoplane, Designed to Be Folded for Easy Transportation and to Be Operated from Uneven Surfaces.

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Progress of Aerial Navigation.

Mechanical Details and Features of Construction.

THE VENDOME MILITARY MONOPLANE.

Back in the early part of 1910, Raoul Vendome of France brought out an exceedingly small monoplane, which was in some respects smaller, lighter and faster than the diminutive Demoiselle of Santos-Dumont. The weight of the complete machine was but 190 pounds, and the inventor frequently demonstrated this particular feature by lifting the entire assembly off the ground upon his back.

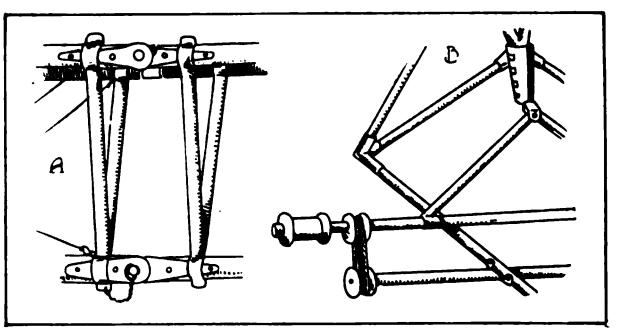
Since that time, Vendome has been experimenting along other lines, but it must be said that each of his creations have demonstrated striking originality, and this is especially true of his latest machine, designed for military service and constructed for the French army. It weighs but 440 pounds, which is very light for a machine of its capacity and still retains the features of simplicity which marked the original design.

First of all, particular attention has been paid to the matter of folding the entire construction for easy transportation in the field. It is claimed that when it is received in a dismounted condition, two men will be able to place it in flying order within four minutes. The work of dismantling is accomplished with equal rapidity.

M. Vendome claims for his machine the following advantages: Rapidity of taking apart and reassembling; folding to take up a space of six feet eight inches by 16 feet six inches by 10 feet; rapidity of getting away and ascending and facility for starting under any condition of earth surface. Each of these has been demonstrated under very severe tests arranged by the government officials before accepting the design.

By examination of the accompanying sketches, the general construction is made apparent. Each section of the main plane is made in two parts, the outer or wing tip, if such it may be termed, being slightly wider than that portion next to the main cellule. The wire bracing is attached in such manner that both the leading and trailing edges appear to have a certain degree of flexibility.

The mast is mounted on four converging legs, which rest upon the top of the main frame just forward of the pilot's seat, and in the centre of this construction is a small hand wheel, turning which slackens off all lower wing bracing. There are then two bolts to loosen and two cotter pins to remove in order to detach all the upper guy wires. A third cotter pin loosens the lower front wires, and the fourth the rear main plane wires. The two sections of the main plane may then be removed immediately and folded as indicated in an accompanying sketch. At first thought it would appear that there might be some difficulty in handling the various wires while this assembly was thus folded, but the inventor claims to have overcome anything of this nature.

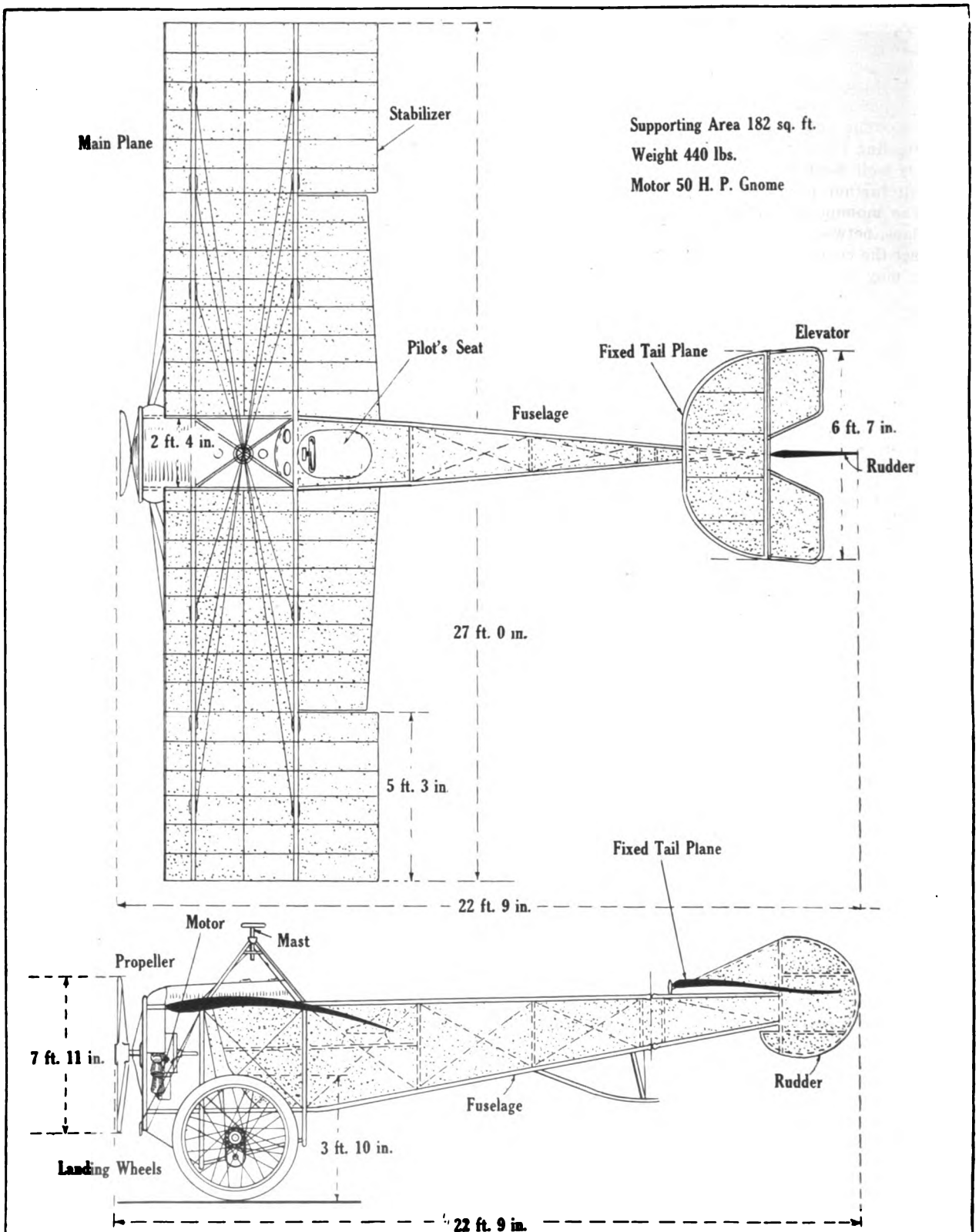


Some Construction Details of Vendome Military Monoplane: A, Fuselage Hinge by Which Empennage Is Folded Upward; B, Arrangement of Landing Chassis and Rubber Shock Absorbers.

The fuselage is enclosed thoroughout its entire length, with the exception of that point immediately under the engine mounting. The front of the motor housing also is open to assist in cooling the revolving Gnome. By examination of the side elevation, a joint in the fuselage may be noted just behind the tail skid. This permits the empennage to be folded upward against the rear of the main plane, still further reducing the size of the package for transportation. This fuselage hinge is shown in more detail at A in an accompanying sketch.

It ought to be added in this connection that the en-

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Plan View and Elevation of Vendrome Military Monoplane, Showing Detailed Dimensions and Principal Features of Design.

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gine is mounted on two pressed steel bearers and that the pilot is amply protected from the splashing of oil and the rushing currents of air by a distinctive wind and oil shield. Although most military machines are expected to carry two persons, it would appear that Vendome has made no such provision in this instance. The single seat is located well back toward the trailing edge of the main plane, and placed sufficiently well down in the machine so that the operator is still further protected from air currents.

The monoplane tail carries at its rear two elevator flaps, between which is placed the rudder. In this respect the construction does not vary materially from what may be termed standard design. The location of the rear skid is somewhat unique, however, due to the provision for folding, previously mentioned. It may be added that it is so situated as to protect fully the tail formation in landing.

Vendome does not place the same reliance in front skids that has been noted with other constructors. In his opinion their use is far from satisfactory in making landings on uneven ground it being maintained that they dig into the earth and tend to force the machine to capsize.

The landing chassis is another original feature with Vendome. Inasmuch as this machine is designed primarily for the purpose of being operated over the most uneven ground, it is claimed by the inventor that small running wheels are liable to become caught in the irregularities of the soil, suddenly stopping the machine with sufficient force to turn it over. Therefore, he employs wheels of very large diameter—three feet 10 inches.

These are attached to the fuselage in a manner suggesting the so-called Henri Farman design, although the construction of the chassis is materially different because of the size of the wheels. Rubber shock absorbers take up all jars and jolts, to which the machine necessarily is subjected when making landing as contemplated.

The entire assembly has a neat and finished appearance, extreme care having been taken to bring about a machine which shall be capable of withstanding severe usage. The workmanship and material are of the very best, and particular attention has been paid to the matter of strength and durability. The accompanying sketches show how well the details have been carried out in every particular.

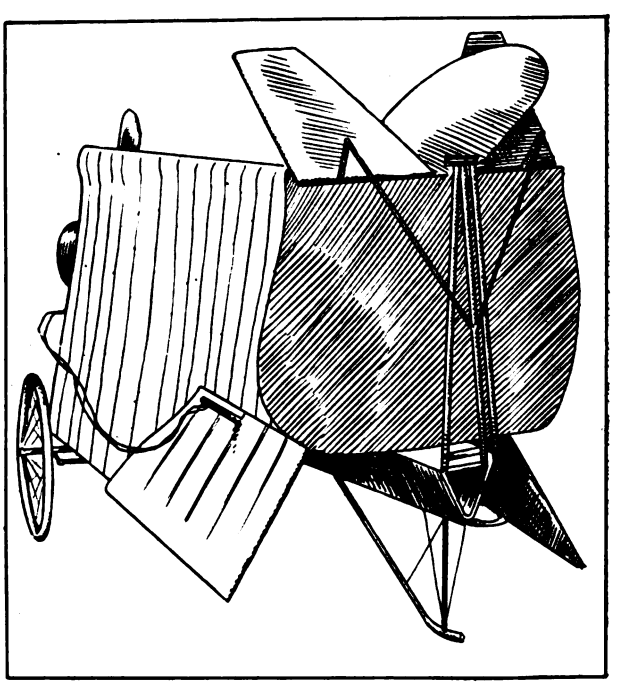
Apparently, the machine will find its greatest usefulness in reconnoitring work, in which the services of but one man will be required. The ease and rapidity with which it may be made ready for flight, and the corresponding facility with which it may be returned to its folded position for transportation, are factors that are expected to make their appeal with army officials.

Universal lighting means the safe use of public ways at night. It need not inflict unreasonable restrictions on anyone. Why not follow Massachusetts' example?

AUTO TO POST DESERT.

The Great American desert, in southern California, is to be charted and its trails and pure springs posted, by the aid of an automobile, a Flanders, made by the Studebaker Corporation, Detroit. Lou Weston Beck, a former prospector, who is familiar with the desert, is to do the work, accompanied only by his dog. It is estimated that the desert exacts annually a toll of 25 lives, and it is with the idea of saving some of those who penetrate the waste that this work is to be done. The cost is to be borne by wealthy citizens of Pasadena, who have purchased the car, and by Mr. Beck, who for the past winter has been painting the signs.

The itinerary of the car calls for a total of 600 miles, and the route touches the railroad only once for gasoline and oil. The car is to go as far as the famous Death Valley on this trip, and Mr. Beck hopes to continue the work until the entire desert is charted and posted. He is trying to enlist the services of the federal government, which, by installing large signs and signals on the tops of buttes could render what might be called a desert light house service. No automobile has as yet successfully negotiated the desert, the last attempt being two years ago, when a party of seven in a high powered car perished through drinking from a poisoned spring.



Vendome Military Monoplane Folded Ready for Transportation in the Field.

L. P. Halladay, who formerly made a car bearing his name in Streator, Ill., has returned to that town and secured a plant on Monroe street, where he will make parts and accessories.

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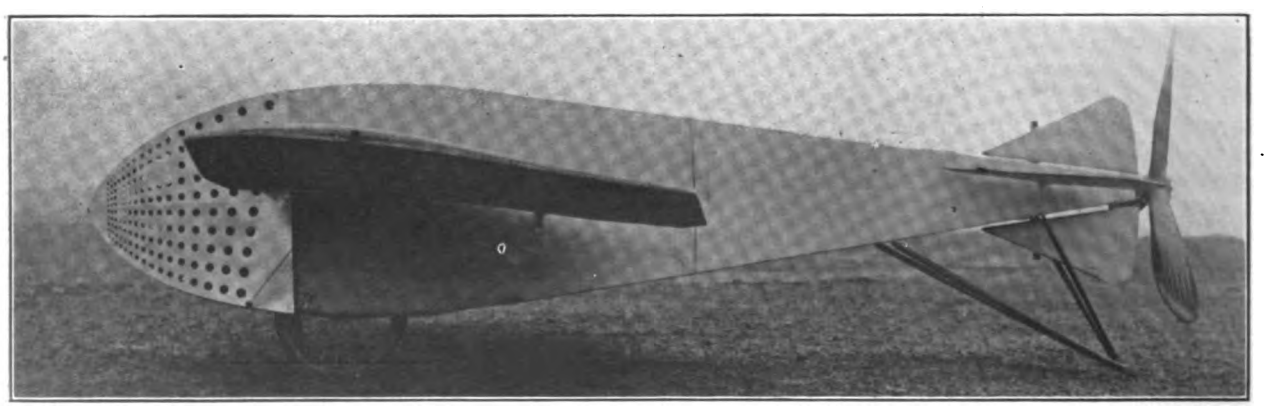
The entire world mourns the death of Wilbur Wright, the result of typhoid fever, at Dayton, O., May 30. So absolutely have the two Wright brothers, Wilbur and Orville, sunk their identity in connection with the development of the aeroplane, that it is impossible to state which of the two thought out the first detail, constructed the first successful heavier-than-air flying machine, or made the first flight. Wilbur was the elder. There is an older brother, Lorin, who materially aided in perfecting all of the Wright machines, although he appears to have been in no sense an inventor or an aviator. There also is a sister, Catherine; another brother, Reuschlin, and the father, Bishop Milton Wright of the Methodist church, all of whom survive Wilbur.

Wilbur Wright was born near Millville, Ind., April 16, 1867. Orville was born in Dayton, O., four years later. Their education was limited to that obtained in the public schols of Dayton and ended with the high school. Their father was at that time an itinerant Methodist preacher, but later became editor of a church periodical. The two brothers early turned their attention to printing, but the mechanical mind of their mother is largely held to have been responsible for the future of the aeroplane.

It was as the Wright brothers that Wilbur and Orville gave up the printing business to open a bicycle repair shop in Dayton, just previous to 1896. During that year Orville had the typhoid fever, and when he was recovering Wilbur began reading to him accounts of Prof. Langley's steam driven machine, which flew without an operator; Octave Chanute's glider, and A. M. Herring's experiments. Orville became so enthused that the physician and nurse were compelled to forbid Wilbur's visits. When the former recovered, the two constructed a glider, and while the neighbors laughed at them and the rest of the world refused to believe what it heard concerning them, the Wright biplane came into being.

In 1900 the experiments were continued at Kitty Hawk, N. C., but the world still refused to believe. In 1903, they first installed an engine, a 12 horsepower unit, in their glider, and one of the brothers, which it has never been stated, left the earth's surface. The world had laughed so long that the brothers determined to keep their secret, until they were certain of their reward. The first corner was turned in 1905, and the wing warping device, upon which has hinged the patent litigation of two continents, is supposed to have been brought out about that time.

How the Wright biplane has changed in appearance, and what it has done for the science of aviation are well known by students of that science. The world no longer laughs. It hastens to give credit to the Wright brothers for solving one of the greatest mysteries of all ages. It mourns the death of Wilbur Wright, largely because it believes that his work was far from being completed.



"Bullet" Monoplane of Novel Appearance, Designed by J. Edson Gallaudet and Constructed by the Gallaudet Engineering Company, Norwich, Conn.

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The Gallaudet monoplane, otherwise known as the "Bullet," because its outlines suggested that name to the designer, J. Edson Gallaudet, is made by the Gallaudet Engineering Company of Norwich, Conn. It made its first public appearance in the recent international exhibition at the New Grand Central Palace, New York City. It previously had been given its trials at Norwich, but neither the inventor nor the constructor was prepared to make a statement concerning it.

The accompanying illustration was taken at Garden City, Long Island, and gives an excellent idea of its construction. Practically the whole machine is built of steel, the only wood employed being found in the propeller and a few small parts around the operator's seat. Its chief characteristic lies in the fact that the entire assembly, except for the lower portion of the chassis wheels, is completely enclosed. It will be noted that the motor is covered with a perforated shield, the whole idea being to provide the least possible wind resistance, and at the same time to secure the utmost cooling effect from the rushing currents.

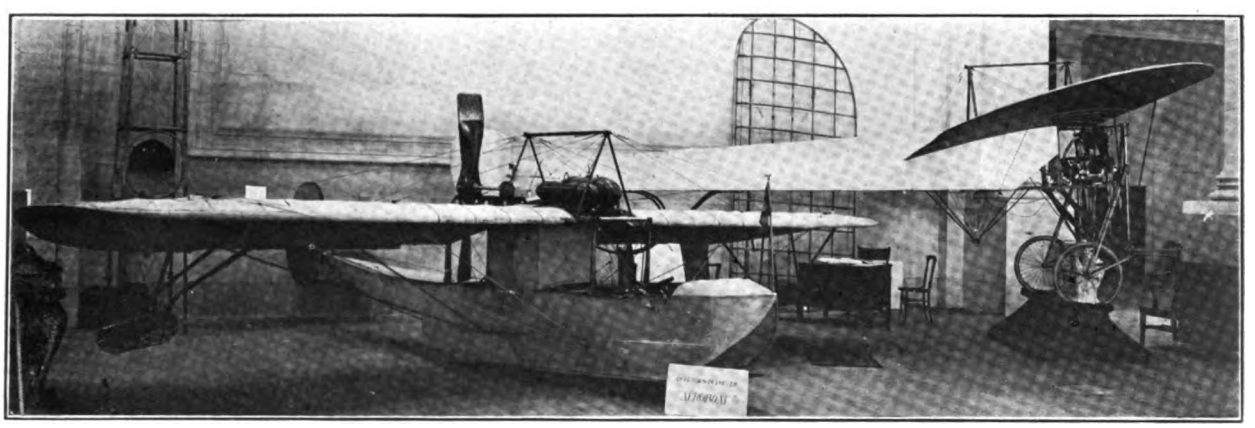
Lateral balance is secured by warping, this being accomplished by depressing pedals, and the wing construction is such as to bring about automatic stability in a measure. The tail and rudder are operated by a single hand lever. The angle of both wings may be adjusted during flight, so that a wide range of speed may be obtained. Attention may also be drawn to the propeller at the rear, this being a three-bladed unit, and the position is claimed to offer many advantages, among which may be mentioned the elimination of danger from rough landing and the location of the chassis with a low centre of gravity. The wheels are fitted with regular automobile clincher tires, which the company holds may be replaced at any garage. The Gnome engine is fitted as standard equipment, although any other make may be had at the purchaser's option.

The third woman to secure a pilot's license in this country is Mrs. Julia Clark of Denver, and it may be added that she is the first woman pilot to fly an American made machine. Mrs. Clark took her course of instruction at the Curtiss school in San Diego, Cal., and drives a Curtiss biplane.

The Loening aeroboat, shown in an accompanying illustration, is designed by Grover C. Loening and constructed by the Queen Aeroplane Company of New York City. It was given its first trials at Bayonne, N. J., in April, and has proved itself a practical air and water craft.

As will be noted, the machine is sustained on the surface of the water by the hull, resembling that of a motor boat, about 25 feet long. In this the pilot sits well forward, a windshield and the control mechanism being the only portions of the craft in front of him. Behind him is the revolving Gnome motor of 50 horsepower, and above a single pair of wings with spread of 28 feet. A special type of rudder is located at the extreme rear.

The other machine seen in the illustration is a



Grover C. Loening's Aeroboat and Queen Monoplane, the Latter of Bleriot Design, Exhibited by Queen Aeroplane Company at Recent New York Show.

Queen monoplane, a design which was patterned closely after one of the Bleriot models. This machine has done excellent work in the hands of several aviators, its most notable performances being in connection with the Chicago meet of last summer.

While the matter of selecting the three aviators who will represent America in the fourth race for the Gordon-Bennett trophy in Chicago in September, rests with the Aero Club of America, it is of interest to note that several applicants are ready to be chosen. The proposals for constructing a machine for this purpose were in the hands of the committee June 1, but no decision is expected to be announced in the immediate future.

Among those who seek to defend the cup, now held by Charles Terres Weymann, who may defend it if he choose are included representatives of Curtiss Aeroplane Company, Hammondsport, N. Y., maker of the Curtiss biplane; Burgess Co. & Curtis, Marble-

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head, Mass., maker of the Burgess-Curtis monoplane and other machines; Rex Monoplane Company, Washington, D. C., Rex monoplane; Gallaudet Engineering Company, Norwich, Conn., Gallaudet monoplane, and Washington Aeroplane Company, Washington, D. C., Columbia biplane. Others are expected to make known their desires in this respect within the next few weeks.

Lieut.-Col. C. P. Winder of the Ohio National Guard, has the honor of being the first militia officer to have his name placed on the army register as a military aviator in reserve. He received his license at College Park, Md., May 24.

During the progress of the recent show in New York City, the newly organized Aeronautical Manufacturers' Association held its first banquet, at which 28 members were present. Undoubtedly, this was destined to be an epoch making feature in the history of American aviation. Few people are aware that the business of constructing aeroplanes and aeroplane materials has reached a point where it is either desirable or possible to form an association of this nature.



F. A. Seiberling, Vice President, Aeronautic Manufacturers' Association.

Probably the chief moving spirit in the organization of this body was F. A. Seiberling, president of the Goodyear Tire & Rubber Company, Akron, O., and first vice president of the association. In fact, it may be stated that no one concern, expect those directly connected with the production of aeroplanes, has done more to promote the industry in America than that represented by Mr. Seiberling.

Some years ago, when the flying machine was in the process of its early development, and before the manufacturers on this side of the water were ready to conduct the business as it is handled today, the Goodyear company decided it would be necessary, in order to encourage the industry, to undertake at once the making of aeroplane fabric.

It was found that the best fabric made was a rubber treated material produced abroad, and after importing some of this, the Goodyear company at last secured machines that could produce it properly. Since that time several improvements have been made, until the Goodyear fabric is now considered far superior to the imported product, by such well known constructors as the Wright Company, Curtiss Aeroplane Company, Burgess Co. & Curtis and several others.

In this connection it is of interest to note that the United States Army is studying the efficiency of an aviator's life vest, manufactured by this company and invented by John H. Maus, manager of the New York branch, who is also treasurer of the association. The aeronautical department at Akron is in charge of E. R. Preston, while E. B. Sigerson represents the company on the road as aeronautical salesman. It must follow that the construction of aeroplanes has reached an important stage when a concern of the standing enjoyed by the Goodyear Tire & Rubber Company, is able to employ a travelling salesman who devotes his time and attention to calling upon this trade.

Flying a Deperdussin monoplane, Albert Crombez, a Belgian aviator, flew from Nieuport-les-Baines, near Ostend, to Calais, thence to Dover and back to Belgium, May 21, covering a distance of 150 miles in 14:00. This is the first time a double-cross channel trip has been made without stopping.

Paul Peck drove a Columbia biplane, made by the Washington Aeroplane Company and fitted with one of Emile Berliner's Gyro revolving motors, 4:23:15, at Nassau Boulevard, Long Island, May 24, creating a new American record for duration. The previous mark of 4:16:35 was held by Howard Gill in a Wright biplane, and was made at Kinloch, Mo., in October.

The Aero Club of Belgique (Belgium) has named Charles Frank van dan Merrsche, known to the world of aviation as Frank Morok, an inventor and constructor, as its representative in the fourth race for the International cup at Chicago in September. He will fly a Morok biplane, in the building of which F. F. Shneider of Germany is associated with him. Van dan Merrsche is a resident of New York City, and has been for some time. He secured his pilot's license at Nassau Boulevard, Long Island, last month, under the observation of officials from the Aero Club of America.

The Aero Club of Switzerland is planning an hydraeroplane meet at Ouchy-Lausanne during the first two weeks in September. Invitations have been sent to all the aero clubs represented in the Federation Aeronautique Internationale asking that all manufacturers of this type of air craft enter the contest.

Germany has joined other foreign countries in securing an American hydraeroplane, having bought a Curtiss, from the Curtiss Aeroplane Company, Hammondsport, N. Y. The purchase was made through

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Herr Kober, directing engineer of the Zeppelin Company, Friedrichshafen, constructor of dirigibles for the German army, and it is understood that it will be placed at the disposal of the German navy. Charles C. Witmer will deliver the machine at the Zeppelin works on the shores of Lake Constance.

Basing his design upon a vision described in the first chapter of Ezekiel, B. Cannon, an inventor who claims Texas as his home state, has organized the Security Air Craft Company and is building what he calls a biblioplane on the Cicero flying field of the Aero Club of Illinois at Chicago. The quotation from the Bible follows:

> And their appearance and their work was, as it were a wheel in the middle of a wheel.
>
> And when the living creatures went, the wheels went by them. And when the living creatures were lifted up from the earth, the wheels were lifted up.
>
> And under the firmament were their wings straight, the one toward the other; every one had two, which covered on this side, and every one had two which covered on that side, their bodies.
>
> Their wings were joined one to another; they turned not when they went; they went every one straight forward.

Cannon has applied this prophecy literally, it would appear, since he has built a wheel within a wheel, which has four propellers, each of which may be feathered on the upward sweep of the wheel, thereby eliminating resistance, and opened on the downward sweep to exert the greatest degree of power. A chain will drive the larger outer wheel and connect the blades. Four of these wheels, two on either side, are expected to drive the biblioplane, which is of the monoplane type.

TO MAKE CRARY STARTER.

The T. C. F. Manufacturing Company, which was recently organized in Detroit to manufacture the Crary starter, has taken offices at 650 Woodward avenue. The Crary starter is of the acetylene gas type and has been adopted as standard equipment on Lion cars.

VACUUM OIL DIVIDEND.

The Vacuum Oil Company, Rochester, N. Y., has issued a statement that a dividend amounting to six per cent. is to be declared shortly, in two installments. The company recently increased its capital to $15,000,000, and it is upon this capitalization that the dividend will be paid. It is probable that in the future the dividend rate will be 12 per cent. annually.

MAINE CLUB WANTS GOOD ROADS.

The Maine Automobile Association has issued a call to the citizens asking for the construction of good roads. The association maintains that much of the wealth of the state is due to the tourists, and that the only reason that more of them, and consequently greater wealth, do not enter the state is due to the poor condition of the roads. The association says, that if the people help it with better ways, it can advertise them through its affiliations and connections in all parts of the country, and bring many millions of money into the state.

BENSON WITH STUDEBAKER.

Ernest R. Benson recently was appointed sales manager of the Studebaker Corporation, Detroit, after having been connected with the Cadillac Motor Car Company in the same capacity for five years, and the move has attracted considerable attention in automobile circles. He is numbered by those who are qualified to know, as one of the pioneers in placing automobile selling on a firm basis, where the prices and service of high grade cars are as well established as in other lines of successful business endeavor.



E. R. Benson, Sales Manager, Studebaker Corporation.

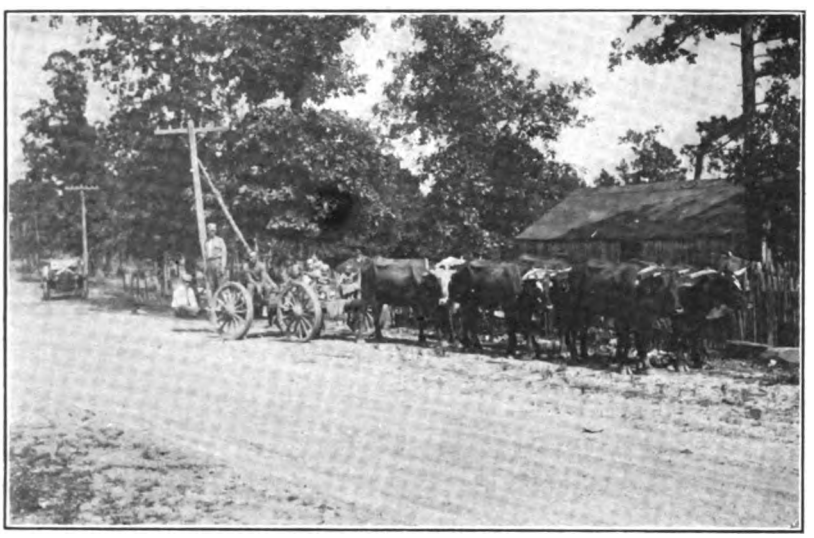
Mr. Benson has earned the name of business builder, having a reputation for creating a solid and permanent volume of sales, and of securing the confidence of the manufacturer, dealer and customer. During his experience he has been a sales organizer, engaged with dealers in managing selling arrangements. His first connection was with the Pope Manufacturing Company, Hartford, Conn., with which concern he was associated for 12 years, as a member of the sales organization. He then joined the sporting goods house of A. G. Spaulding & Bro., working in the sales department for four years. Returning to Hartford, he became secretary of the Hartford Rubber Works Company in charge of the New England sales.

It was from this office that he went to the Cadillac as manager of sales. In this he succeeded in building up the business along well founded principles, creating a permanent and loyal body of dealers. This quality of developing a loyal force of dealers coupled with his ability to sense the future of the markets and lay plans accordingly makes Mr. Benson a valuable acquisition to the Studebaker organization.

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ARCADIA AND THE OZARK HILLS.

YEARS and years ago, when the first white man visited what is now St. Louis, there was a dim path leading down the Mississippi valley and into the Ozark hills. It was made by the soft tread of many Indians in their search for the new hunting grounds. At least, that is the tradition most generally accepted. Such was the beginning of "the trail that is, nobody knows how old."



The Ancient and Modern Methods of Transportation on the Arcadia Trail.

This old trail enters the Ozark region by way of what has long since been named Arcadia. Those who have visited this section are unanimous in the opinion that Arcadia was rightly named, for a more romantic spot does not exist in the entire United States. The whole Ozark country abounds in romance, albeit its people have been satisfied for the most part to spend their lives among these hills and vales, sometimes looking out beyond the ridges and wondering what was transpiring in that other world, but more often content with their lot and the beauty of their surroundings. Arcadia is the connecting link between what is termed civilization, and the somewhat more primitive life of the hills.

Those who have traced the outline of the Ozarks on the map of Missouri, remember them as a long, low chain of mountains running well up into the state from the Arkansas border line. In reality they are a series of table lands, dotted here and there with more or less pretentious peaks, and separated by fertile valleys. When the first dim path from St. Louis to Arcadia gave place to the trail, it was marked by the wheels of the pioneers' wagons, who came from the East seeking farm lands. And if the trail is, nobody knows how old, many of the Ozark people originally came from, nobody knows where.

Next the trail became a rough, uneven road, over which rolled the heavily loaded mineral wagons, drawn by slowly moving oxen, for the Ozark hills are rich in mineral wealth. There was a time when the iron mines of this region were regarded as possessing the best ore that could be found. The lead mines still are the wonder of the age.

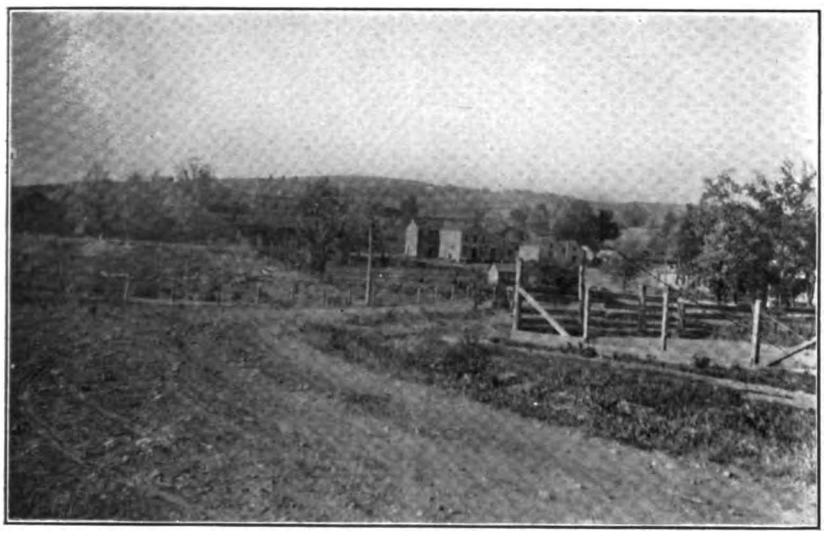
Soon after the opening of the War of the Rebellion, this old trail was beaten down by the tramp of an army's marching feet. Students of history may have lost sight of the importance these old hills played in the conflict, but those who take the time to visit the region are surprised to find the evidences still remaining, which testify to the splendid campaign waged therein, terminating only with the end of the struggle between the North and the South.

During the peaceful period which followed the close of the war, the trail remained for years, the same old, rough, uneven road, winding here and there among the hills and through green valleys, over which in the dusk of the evening, the cattle were driven to their shelters by the rural youth and maiden to the tune of the "Houn' Dawg" song.



The Famous Chalk Hill in St. Francois County Between Bonne Terre and Flat River.

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The Deserted Village of Iron Mountain with the Mountain Itself in the Distance.

A few years ago, the trail that is, nobody knows how old, first showed signs of the most modern of passenger carrying vehicles—the automobile. There was something about the romantic hills and the still more romantic trail, which attracted the motorist, ever busy seeking new fields of exploration, far from the hustling commercialism of the cities. And shortly after the first car went over the road, a movement was started looking toward the construction of a permanent highway following the original foot path.

Money was raised to carry out the project, and the work was started immediately. The transformation is now complete. The other day, a modern macadam highway, capable of withstanding the heaviest traffic, leading practically all of the way from St. Louis to Arcadia, and entirely replacing the old Indian trail, was dedicated by the State of Missouri with appropriate ceremonies in every town through which it passes.

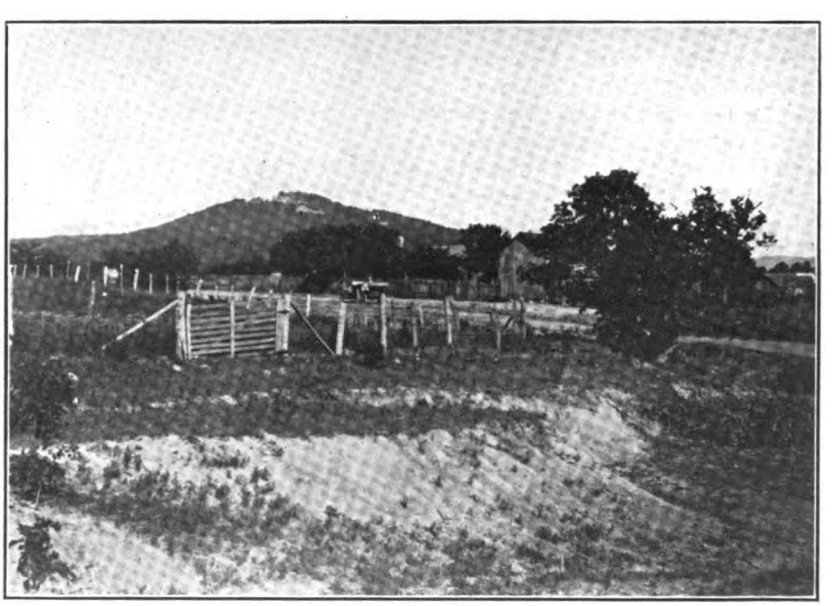
Henceforth, the motorists of the country will be able to visit what is said by many to be one of the most picturesque spots in the United States, with every facility in the matter of good roads. The ancient landmarks will be found to have been unchanged, except as the unrelenting hand of time has written the passing of the years.

From St. Louis, the road leads over the well known route through St. Louis and Jefferson counties to De Soto, from which point the romantic portion of the trip may be said to begin. Here the way turns toward the southeast and Bonne Terre. It is somewhat hilly, but over $16,000 was expended for the purpose of placing it in first class condition, and the entrance to Bonne Terre is over a splendid new bridge. While the tourist climbs the easy grades, glimpses of the Ozark hills in the distance continually remind him of the Arcadia which he seeks.

Soon after leaving Bonne Terre, the way leads past the famous old chalk hill with its curious formation. It is but one of the wonders of the Ozark region. Further to the south are numerous caves and caverns in which the venturesome visitor may exercise his imagination as best suits his fancy. But those are beyond Arcadia, and may not be reached as yet by automobile. This old trail leads to a sufficient number of natural curnosities to whet the appetite for further adventure, if time and inclination will permit.

Flat River is in the heart of what has been termed the largest lead mining district in the world. The mines themselves are worth visiting and the owners and managers are always glad to show guests the entire process of extracting the ore and preparing it for market.

Farmington is a city of substantial size, noted principally as a seat of learning. Here are located the Farmington Baptist College, Carvelton Institute, and the Elwood Seminary for Girls. It may almost be said that Farmington offers a strange anomaly, because of its close proximity to the Ozarks, where the people are at least popularly supposed to regard an education as wholly unnecessary for the proper enjoy-



Pilot Knob and Shepherd Mountain, Where Gen. Price's Confederate Army Was Located.

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One of the Springs of Crystal Clear Water Frequently Found by the Roadside.

ment of life. However, it may be stated that this condition has been changed slightly during the past few years, and the younger generation is seeking opportunity to improve its mental as well as physical well being. Perhaps the automobile has done its full share in bringing this about.

But to return to the old trail: Beyond Farmington is Doe Run, where a stop should be made to inspect the largest individual collection of relics and mineral specimens in existence. It is the property of F. P. Graves, a retired mining man, who takes great delight in exhibiting his curios to motorists and others. This brief respite will prepare the tourist for some of the features which remain before reaching Arcadia.

The road now enters the virgin forest, which covers a greater portion of the Ozark region, excepting of course the rich meadow lands of the valleys and some of the slopes. Handsome foliage abounds on either side and springs of crystal clear water are to be found at frequent intervals near the highway. The rise is somewhat gradual, but the Ozarks are coming nearer with every turn of the wheel, and here and there the woods part sufficiently to provide glimpses of individual mountains which attract and hold the interest.

One of these is Iron mountain, near the old and deserted town of that name. Back in the '50's, when this place was a veritable beehive of industry, the great railroad, the first to enter the Ozark region, was built and had this town as its southern terminus. Some of the richest iron ore in the country was extracted from this mountain, and for a number of years it appeared as if the supply would prove unlimited. Today, the peak, which has been torn open by man in his search for mineral wealth, stands a grim and silent guard, wounded and forlorn, over the old, tumbled down buildings near its base.

Far back in the dim ages, when the oldest of mountains were yet warm with the volcano's breath, nature molded from her storehouse of granite, curious images, such as no imagination could fashion, and hurling them down the smouldering steeps, left them to season and dry. Such granite moldings may be found only at Graniteville. Here the tourists may stop to slip from the back of a great granite elephant into the arms of a huge black sphinx. Here also he will find the modern quarrymen working on the granite blocks for the busy city streets. It is a quaint co-mingling of the fantastic and the real, and a scene long to be remembered.

Old Fort Davidson is next passed. It is located in a meadow at the right of the road, and today there is nothing more than a hole in the ground. It was during the height of the Civil War, when the opposing forces were contending every inch of ground in these Ozark hills, that the little band of Union troops was detailed to hold this position, against what later developed to be practically the whole of Gen. Price's army. For a time they stood their ground despite the



The Road Between Doe Run and Iron Mountain Enters the Virgin Forest.

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Emerson Park, Ironton, Where U. S. Grant Received His First Commission as Captain.

aggressiveness of these mountain warriors, but finally, in the dead of night, when it was seen that they could hold out no longer, this handful of men blew up the fort and marched into Rolla, nearly 80 miles away.

Pilot Knob, one of the most picturesque spots on the trip thus far, marks the centre of the Confederate position during that conflict. Shepherd mountain, seen in the distance, was where the rebel guns were planted. It was from Pilot Knob that Gen. Price marched upon Fort Davidson to find it desolate and deserted. The battle, one of the bloodiest of the conflict, was fought many miles distant, but the old trail saw its beginning.

Ironton is one of the towns dear to the heart of every American. In the centre is Emerson park, in which a monument marks the spot where U. S. Grant received his first commission as captain in the United States Army. In later years he was to be called to head the Union forces, where the fighting was the fiercest, and afterward to become commander-in-chief as President, but the people of Ironton still cherish the memory of that day on which he took command of his company beneath the trees in the centre of that old town.

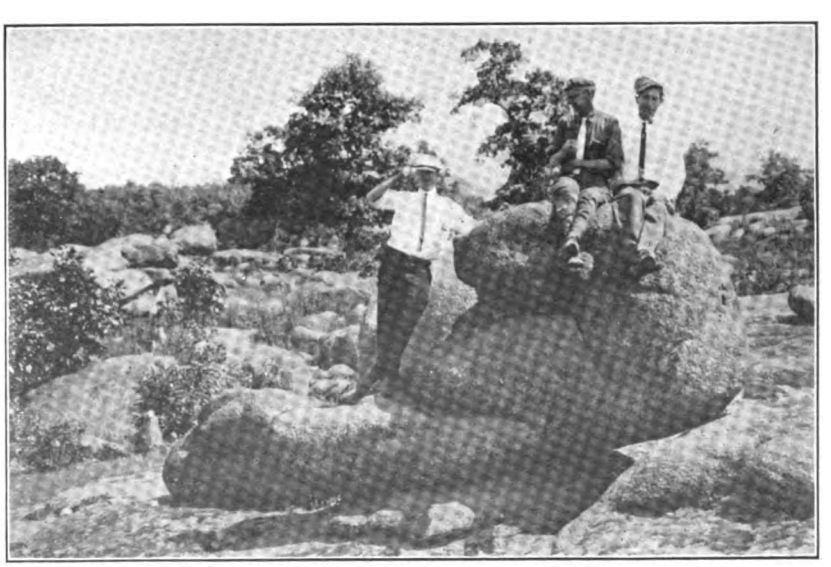
The road now begins to wind in and out among the hills and the turns are somewhat more frequent. The beauty of the wooded slopes is appreciated as the car descends into a valley only to begin another ascent almost immediately. At last the beautiful town of Arcadia comes into view in the heart of "the Valley of Flowers", where the blood red "Indian pinks" bloom in June. And here ends the trail that is, nobody knows how old.

Ends? Or begins? It ends, insofar as the macadam automobile road is concerned. Those who desire to explore the Ozarks still further, and there will be many, will find it but the beginning of several pleasant trails which lead to, nobody knows where. There is a particular charm about these simple people of the hills. There was a time when they failed to greet strangers as cordially as might be wished, but that is largely a matter of the past. Nowadays they are too anxious to learn something of that world on the other side of the ridges—that world, about which many of them have heard but concerning which they really know almost nothing.

There is one trail, which leads back to Flat River by way of Fredericktown, Roselle and Ste. Genevieve. The writer took this trip last year. The route lies through the mountains practically all of the way. The conditions, while not at all bad, for the most part, hardly are what might be termed ideal.

It is anticipated that the new road from St. Louis to Arcadia will prove of exceptional interest to motorists from all over the country. There is so much to occupy the attention of the tourist, that although the distance may be covered easily in a day, few will care to make the trip without loitering along the way.

Chief of Police C. B. Bowen of Meriden, Conn., has notified the motorists of that city that the law, respecting the passing of trolley cars which have come to a stop, will be rigidly enforced.



Nature's Handiwork as Shown by the Giant Shoe in the Quarry at Graniteville.

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SIMPLE SLOW SPEED OIL PUMP.

An oil pump with a minimum of moving parts, as well as being free from valves, springs or other similar mechanism, has been invented by G. E. Whetman, an English engineer. Among the features claimed of the device is that it will exhaust air and draw up oil from the start without the necessity of priming and that all of its rotating parts practically constitute bearings of large surface, operating in a bath of lubricant.

The operating mechanism is exceedingly simple.

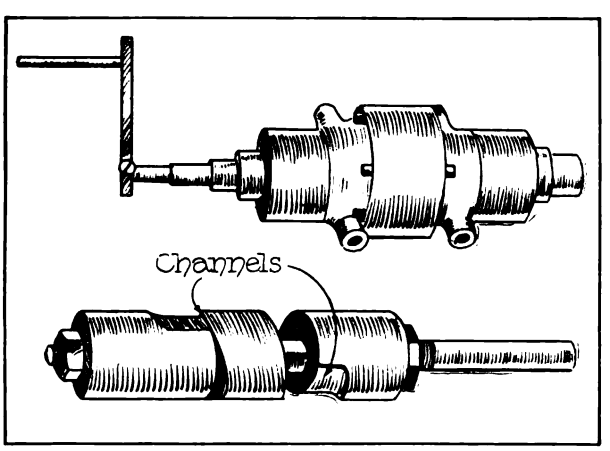


Fig. 1—Whetman Oil Pump Having a Minimum of Working Parts and Operating at Low Speeds.

At Fig. 1 is depicted a complete model and the intake sections will be noted on one side while the outflow is located on the opposite. Inside, the casing merely forms a cylindrical chamber, through which is a shaft driven from the engine. On this shaft, at each end of the chamber, are circular pieces of steel of such diameter as to be an oil floating fit in the pump chamber, but, while they fit in this compartment both on their circumference and at the outer end of the chamber, they are profiled on their inner ends so as practically to constitute side cams. The latter, at each end of the shaft, operate in conjunction with one placed between them in the centre of the chamber.

The outer cams rotate, though the centre member does not revolve but slides along a feather in the pump chamber so as to accommodate itself to the working of the two end cams as they rotate. This combination of sliding and rotating cams is such that in one position the profile of one fits against the other, leaving practically no space, but as the other cam rotates, while the inner cam can only accommodate itself to movement by sliding, it is obvious that the two will cease to fit into each other's profile, and space will occur between the two as soon as one begins to revolve. The position of this sliding cam is, therefore, so arranged that this space begins to open just opposite the intake in the casing, and thus oil is drawn in by suction to fill that space. Further movement finally shuts this space off from the inlet, and the oil filled space is then, by the revolution of the outer cam, transferred around the profile of the sliding cam to the delivery side of the pump. Moreover, the cam combination is so formed that, just as the oil filled space begins to reach a point opposite that of the delivery opening, the profile of the rotary cams again begins to butt up against that of the slider, so that the profiles of the two again tend to fit each other. This has the effect of squeezing the oil out from between the cams, and so force it through the delivery openings.

The internal cam arrangement is also shown, and it will be noted that the divided line between the rotary and sliding cams does not lie absolutely opposite the intake and delivery openings, because space has been allowed between these for the use of a wrench on the union nuts, and therefore channels are cut on the rotary cams to connect the openings with the internal cam spaces.

The device is designed to be operated at slow speeds, the inventor pointing out that the shaft should not exceed 120 revolutions a minute. Tests developed the fact that at extremely low speeds, even at nine revolutions a minute, Vacuum A oil was pumped with excellent results.

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WING NUT KINK.

There are several places about the motor car where wing nuts would be desirable, as these members facilitate the removal and replacement of parts. A simple method of converting ordinary nuts into wing members is depicted at Fig. 2 A. It consists of drilling two holes in the nut and driving a staple through the openings, peining over the ends of the staple. The latter should be long enough to pass through the nut as well as to provide means for rotating it.

HOME MADE MICROMETER.

A micrometer is a very useful tool in the garage equipment as by it fine measurements may be made. One may be produced at a very small expense, says Popular Mechanics, and the tool will fill all requirements. The frame is cut from heavy sheet metal and of the shape depicted at Fig. 2 B, the ends being rolled over to form openings .25 and .375 inch outside diameter. A piece of brass tubing, .375 inch outside diameter and two inches long, is fastened securely into the larger opening. On the other end of this tube is brazed a nut tapped with a .25-inch tap, having 40 threads. The sleeve is made of another piece of tubing large enough to go over this nut. Next a bushing is fitted in one end of this sleeve and the other is beveled to about 45 degrees. The bevel is divided on its circumference into 25 parts, numbering every fifth graduation, beginning with zero.

A four-inch rod is threaded about half way to fit the nut and fastened in the other end of the sleeve with a bushing. The anvil is a piece of .25-inch rod fastened on the opposite frame opening, and allowed to project .5 inch inside the frame. Next the sleeve is run down until the screw comes in contact with the anvil and a mark is made on the stationary tube to register with the zero mark on the sleeve and at right angles to it. The sleeve is turned one revolution and another mark is made. This operation is continued until the caliper is opened to its full capacity. One complete turn of the sleeve represents 1-40 inch. One-twenty-fifth of a turn equals 1-25 of 1-40 or 1-1000. Half and quarter-thousandths can be estimated readily.

REMOVING STUBBORN FLYWHEELS.

A flywheel that has been shrunk on and keyed to a shaft presents difficulty in removal and when ordinary methods fail a recourse to heat must be made. At Fig. 2 C is presented a suggestion for removing the most obstinate members. It consists of two pieces of plank of a length slightly greater than that of the crankshaft. These are placed in a perpendicular position, with the flywheel resting on the top ends and the shaft hanging down between the braces.

A little clay is then packed around the end of the shaft as shown in the sketch, and the cavity in the wheel filled with very hot molten lead. If the shaft does not drop out under this treatment, a slight tap with a copper or lead mallet on its end will separate the two pieces.

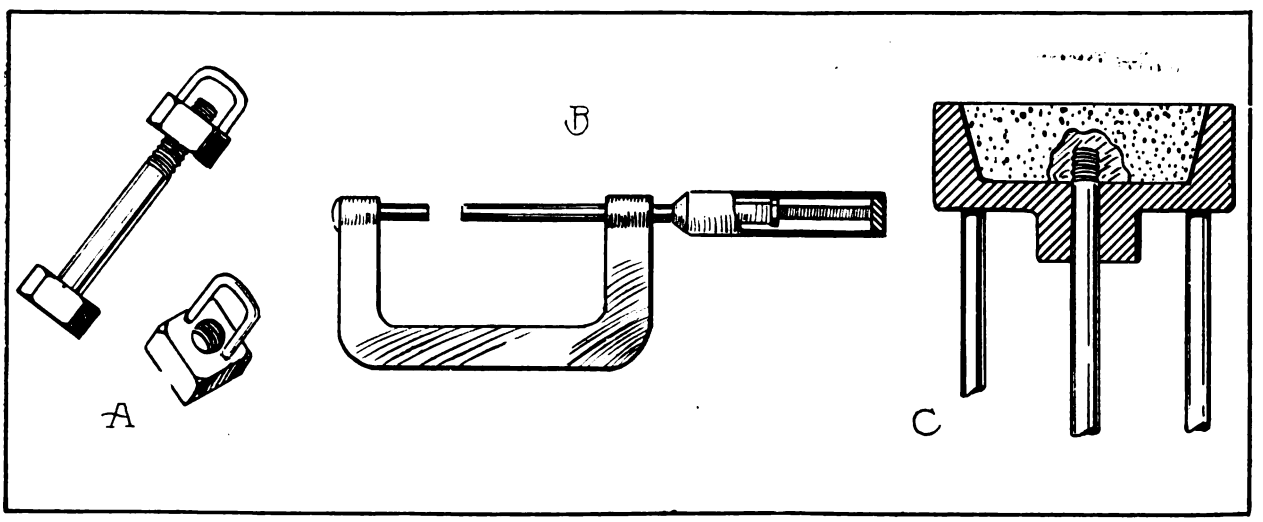


Fig. 2—Suggestions for the Repairman: A, Converting Ordinary Nuts into Wing Members; B, Inexpensive and Easily Made Micrometer; C, Method of Starting Stubborn Flywheel by Application of Molten Lead.

EXHAUST CIRCULATES COOLING WATER.

A new type of water circulating device has just been brought out in England by J. Overs of London, which utilizes the exhaust from the motor to circulate the water through the system. The apparatus is simple, and the idea consists in admitting a part of the exhaust gas through a narrow nozzle into the water pipe. The speed of the gas coming from the nozzle is such that it forces the water along the pipe into the radiator, the device being a sort of injector. The gases pass into the radiator and out by the overflow pipe, so that the water is not heated unduly or any

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pressure produced in the system. The nozzle is provided with a valve or tap, by which the amount and velocity of gas may be reguated as desired, from a

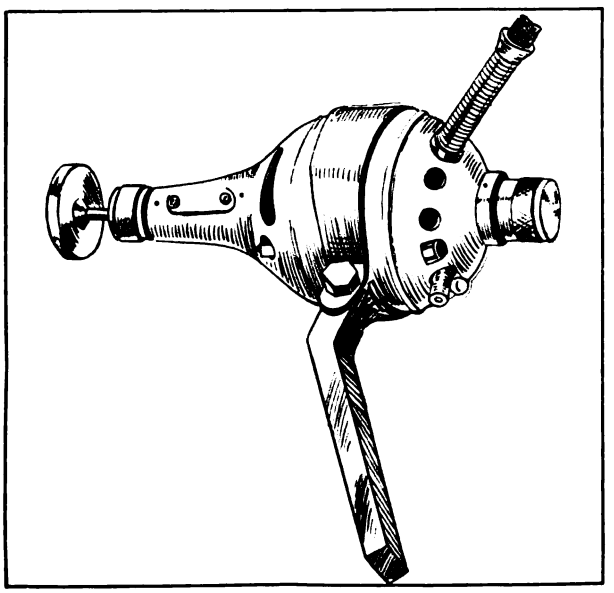


Fig. 3—Hamilton-Beach Portable Electric Grinder, Adaptable to Internal and External Work.

gentle stream to a powerful current. In a test of the device in the open, drawing water from a tank, it was made to throw a jet a considerable distance. The pressure at the nozzle is of course limited only by that in the exhaust manifold at the place from which the gas is taken.

PORTABLE ELECTRIC GRINDER.

Grinding machines are important factors in the equipment of the machine shop, and not only are they economical in the manufacture of machinery and tools, but they produce the same degree of accuracy and excellence when used either on hardened or soft work. While there are many forms of grinders, those of the portable type and designed for attachment to the lathe, shaper or miller are very efficient.

The design depicted at Fig. 3 is the product of the Hamilton-Beach Manufacturing Company, Racine, Wis. It is an exceedingly handy tool for grinding dies, reamers, cutters, etc., and operates equally well on external or internal work. It is claimed by the maker that a .25-inch hole four inches deep may be ground easily and accurately as the device is sturdily constructed and free from vibration. Any kind of wheel may be utilized and felt or oil stones may be employed when a very fine finish is desired.

The grinder is operated by electricity and a direct or alternating current may be employed. The motor is 1-12 horsepower and drives the grinding wheel at 10,000 revolutions a minute. It is air-cooled and proof against heating from overload. The device is very light, weighing as it does, five pounds. The outer casings are constructed of aluminum, highly polished and the dust proof bearings are made of a high speed nickel babbitt. The armature is ground on centres to a mirror finish, assuring extreme accuracy. Adjustable end thrust and main bearings take up all possible wear.

The grinder comes complete with 10 feet of special cord and attachment plug permitting connection to any electric light socket. It is stated by the maker that it may be operated economically, consuming but little current and that hardened tools may be ground accurately. Cutters may be ground without removing them from the milling machine.

SACHS MAGNALAMP.

One of the difficulties experienced by machinists is arranging the lighting equipment so that the work is properly illuminated. Before the electric lamp came into general use gas was utilized, and by means of pivotal joints the flame was brought into the desired position, an operation requiring considerable time.

Even with the ordinary electric lamp there is trouble in locating it so that good results will be obtained. Tie cords, hinged brackets, pedestals, rods, etc., are employed but these have the disadvantage of requiring time for adjustment. A device which eliminates all these troubles, as well as meets with the demand for a light just where and when needed, is the Sachs Magnalamp, brought out by the Sachs Laboratories, Inc., Hartford, Conn.

It is a portable device and similar to the ordinary electric lamp with the exception that it is equipped with a magnetic extension as will be noted by reference to Fig. 5. This projection carries a highly efficient electro-magnet which is combined with the lamp and connection socket, and a switch in a cylindrical structure. It is very compact, being three inches high and 2.5 in diameter. The bulb is protected by an electrically welded guard. The lamp extends either longitudinally from the top end of the cylinder or radially from the side, and its position may be changed

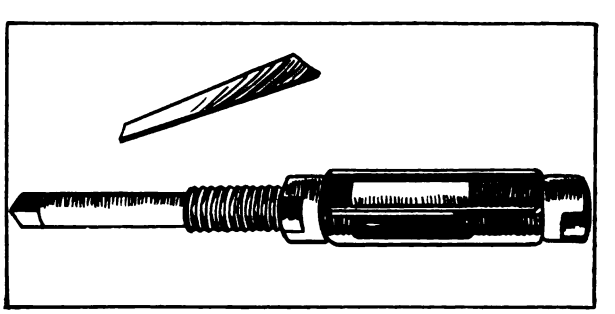


Fig. 4—Critchley Expanding Reamer Fitted with Adjustable Cutter Blades, Permitting Reaming of Odd Sized Holes.

easily and quickly. A connecting plug attached to a flexible cable, may be fitted in either receptacle of the device, and the other end of the cord carries a

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socket member for attachment to the usual lighting circuit.

A main switch is provided, this being only oper-

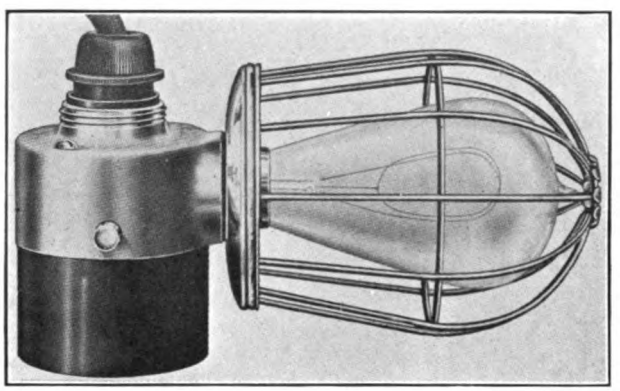


Fig. 5—Magnalamp, an Electrical Device Self-Adhering to Metal by Means of Self-Contained Magnet Operated by Push Button.

ative when the magnet device is not in use. It is operated by turning a knurled disc forming the central pole piece of the magnet, completely closing or opening the circuit with each snap. Pressing a push button on the side of the cylinder releases the grip of the magnet so that the lamp may be placed, removed or changed instantly. Releasing the button brings the magnet into service again. After the light has been turned on by the switch the current continues to flow irrespective of the manipulation of the magnet.

The device will adhere to iron or steel surfaces, smooth, rough or uneven, painted or unpainted, and its grip is unaffected by heat, cold or vibration. One of the many uses to which it may be put is depicted at Fig. 6, which shows it attached to a piece of machinery in operation.

The Magnalamp requires a direct current and is furnished in two standard voltages, 110 and 220 for use with 16 candlepower carbon filament lamps. If utilized with lamps of less candlepower the magnetic grip is said to be less, due to the small amount of current, as the 110-volt member requires about .5 ampere and the 220 about .25 ampere.

Magnalamps are made for servive with higher candlepower and for use on other voltages than those designated. In addition to being of service when operating the lathe, drill press, miller, etc., the Magalamp will prove of value when working on the motor car as it may be attached readily to any metal part of the chassis, facilitating the work. It is not expensive and for a small sum may be augmented by a counter balance device which permits the use of the lamp either with or without the magnetic member.

CRITCHLEY EXPANDING REAMER.

Reamers are exceedingly useful tools in the repair shop as they are used frequently to enlarge holes to size. A complete equipment of these members in order to take care of different work means a large investment. The Critchley patent expanding reamer, manufactured and marketed by Chadwick & Trefethen, Portsmouth, N. H., is designed to do the work of several instruments, inasmuch as the cutters are adjustable, permitting the reaming of odd sized holes, a feature which will be appreciated by the average workman.

The device is shown at Fig. 4 and it will be noted that a screw thread is cut on the body of the tool on either side of a space. The latter is left uncut to insure stability. Five grooves or slots are made on the shank to take the cutters which are beveled at each end and held securely by nuts. When in normal position a certain standard size is obtained. An enlargement is secured by loosening the retaining nuts and moving the cutters in the grooves, increasing the diameter of the cut.

Very fine measurements may be secured easily. The graduations vary by sixteenths, beginning at .46875 inch diameter, although in larger size the reamers vary from .125 to .25 inch. The reamers are not expensive and extra cutters may be secured for a small sum. The device is constructed from a high grade material and all parts are strictly interchangeable.

OPEN MUFFLERS IN NEW HAVEN.

The city of New Haven, Conn., is rigidly enforcing the law against the opening of mufflers, and a number of motorists have been fined for using cut-outs. The chief of police has notified the New Haven Automobile Association to warn its members to observe the

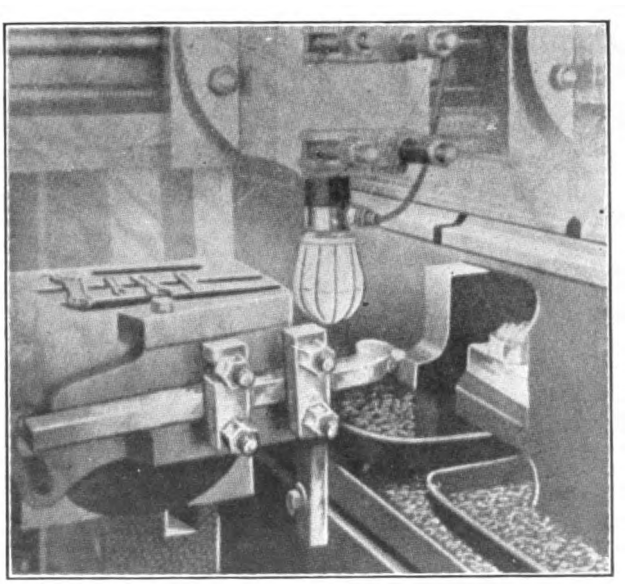


Fig. 6—Showing the Magnalamp Attached to Operating Machinery.

law, as a vigorous campaign is being waged. The law requires that mufflers be not opened within the city limits at any time.

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MOTORING NEWS OF NATIONAL IMPORT.

Vermont and New Hampshire Garagemen Unite in Purchasing Supplies and Accessories---New Concerns for Manufacturing Cars and Fittings---Census Figures Interesting---Transcontinental Highway Plans.

Automobile agents and garage owners in Vermont and New Hampshire have organized the Consolidated Automobile Company, incorporated under the laws of Vermont, and with headquarters in St. Johnsbury, Vt. In many respects this is somewhat unique, and its promoters claim it is the first of its kind. H. B. Blossom of the Union Garage & Machine Company, Buick agent in St. Johnsbury, is general manager and treasurer.

The men interested in the new concern operate garages throughout what may be termed the chief touring section of the country. Naturally their business is not so large during the winter months as throughout the period when motorists from all parts of the United States and Canada are visiting the White and Green mountain regions.

After giving the matter considerable thought it was decided that purchases of supplies, accessories and parts could be made to better advantage where these were ordered in substantial quantities. As the business of no one concern is sufficient to warrant extensive buying, the plan calls for the purchase of needed goods by the consolidation, which will sell to the individuals, and it is expected that the dividends at the end of the year will result in larger discounts than would be possible under the old scheme.

FIRST OKLAHOMA FACTORY.

Initial Attempt to Produce Automobiles in This Far Western Commonwealth.

The first automobile factory in the State of Oklahoma is to be built in Oklahoma City by W. E. Nation, who hopes to be producing pleasure and commercial cars within the next three months. A company will be organized with capital of $50,000, and the proposed plant is to have floor space of 12,000 square feet.

Mr. Nation is proprietor of one of the largest retail harness and vehicle companies between Kansas City and the Gulf of Mexico, besides being a member of the Oklahoma City Chamber of Commerce and vice president of the Retail Dealers' Association. For a number of years he and his sons have been spending their summer vacations visiting some of the largest automobile concerns in the country and studying manufacturing methods.

Little is known concerning the new product, but it is understood that it will embody a number of distinctive features, which have been the subject of recent patents granted to Mr. Nation. These are expected to work for economy of maintenance and upkeep, and to prove of decided interest to those who desire a machine adapted for use on the sandy areas of the Far West.

NEW HIGHWAY ASSOCIATION.

Kansas City Convention Takes Important Action Relative to Transcontinental Route.

An important step in the movement to construct a national highway across the continent was taken recently in Kansas City, when the National Old Trails Ocean-to-Ocean Highway Association was formed. This action was the result of a convention at which delegates were present from all the states through which the proposed highway is scheduled to pass, from New York to San Francisco. The route includes almost every city of importance between the two oceans, including Philadelphia, Baltimore, Washington, Wheeling, Columbus, Indianapolis, Terre Haute, St. Louis, Kansas City, Emporia, La Junta, Albuquerque, Phoenix, San Diego and Los Angeles.

The western cities are fully alive to the value of being placed on the route of the transcontinental highway, and many have called the attention of motorists to the good roads leading to them, or to those which they are about to build. The Ogden Good Roads Association reports that a stretch of 100 miles of mountain road, around the northern end of the Great Salt lake is now being improved. The proceeds of a $175,000 bond issue are being used, and the roads are to be marked with direction signs for the entire distance.

The Canon City Business Men's Association, Canon City, Col., has stated that within a year a central route will be in good condition through Pueblo, Canon City, Salida and Montrose, which it advocates as an alternate route for transcontinental motorists. A large force of men is reported at work on a new road between Canon City and Colorado Springs, a magnificent boulevard being under course of construction. According to the secretary of the association, with the expenditure of hundreds of thousands of dollars and the utilization of convict labor, there will be a revelation in the good roads situation in Colorado in the next year or so. A

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network of scenic highways is under course of construction, new roads being laid out and old ones resurveyed and improved.

INTERESTING DECISION.

Massachusetts Supreme Court Interprets Law Concerning Use of Signal Horn.

The Massachusetts supreme court, which has been called upon a number of times to explain the law with reference to the matter of operating automobiles, recently handed down another decision which will be of interest to motorists. The case was that of Lauritz F. Rasmussen against Amos H. Whipple, in which the plaintiff, as administrator of the estate of Albert E. F. Rasmussen, a newsboy, sought to recover for the death of the boy in consequence of injuries alleged to have been inflicted by the defendant's automobile in Mattapan, April, 1907. The full court upholds the verdict of the lower court, giving $2000 to the plaintiff. In passing upon the case the court says:

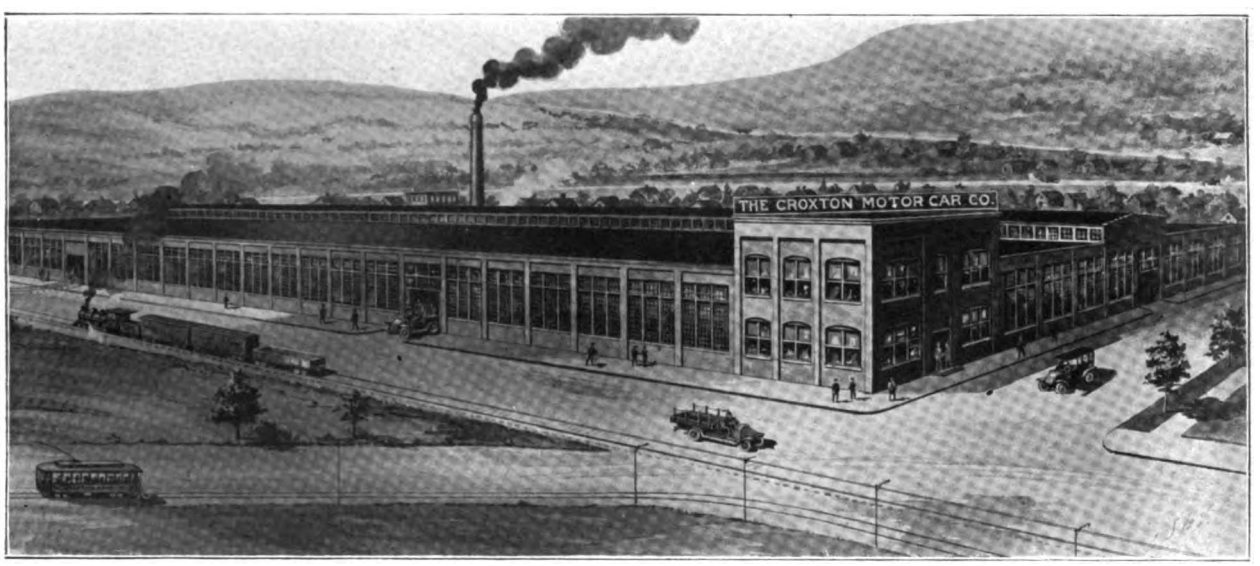
"Every person operating a motor vehicle on our ways must run it at a rate of speed that is 'reasonable and proper, having regard to traffic and the use of the way and the safety of the public.' There was testimony that the signal horn was sounded, but it was not heard by a number of witnesses to the accident, and under the circumstances the jury could infer that it was not sounded loud enough or sufficiently near the place of the accident to give timely warning. Nor is it contended that even the loud blowing of a horn would give to the motor vehicle any exclusive right of way or relieve the driver from the duty of proceeding at a reasonable rate of speed and of keeping his car in control when approaching a busy thoroughfare."

CROXTON COMPANY EXPANDS.

Well Known Maker of Taxicabs Reorganizes and Locates in Washington, Penn.

The Croxton Motor Company, maker of motor cars, taxicabs, etc., with present factory at 2260-2264 East 69th street, Cleveland, O., has plans prepared and is receiving bids for the construction of an entirely new plant at Washington, Penn., which it expects to occupy Aug. 1. The concern will reorganize, taking out a charter under the laws of Pennsylvania, to be known as the Croxton Motor Car Company, with capital of $300,000. J. P. Stoltz, president and general manager, will retain his positions. The new directors from Washington will be as follows:

John H. Donnan, vice president of the Citizens National Bank; A. M. Linn, president of the First National Bank; A. C. Warne, treasurer of the Washington Trust Company; J. B. Bigger, director of the Real Estate Trust Company; C. S. Caldwell of the A. B. Caldwell Company; G. W. Dudderar, managing secretary of the Washington Board of Trade, and J. I. Brownson, attorney at law and director of the Washington Trust Company. An accompanying illustration presents the proposed new factory.



Proposed Plant to Be Erected by the Croxton Motor Car Company at Washington, Penn.

WISCONSIN CENSUS REPORT.

Automobile Industry Increased from Six to Thirty Establishments in Five Years.

The census figures for Wisconsin show that the industry in that state practically has been developed since 1899. In 1904 there were six establishments,

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and in 1909 there were 30. The growth of the industry is shown by the following:

	1904		1909	
	No.	Value	No.	Value
Pleasure cars	2378	$1,846,294	5559	$7,050,862
Commercial cars	12	10,400	32	34,700
Totals	2390	$1,856,694	5591	$7,085,562

Other detailed information is included in the following table:

	1904	1909
Number of establishments	6	30
Persons engaged	587	4647
Proprietors	8	18
Salaried employees	59	331
Wage earners	520	4298
Primary horsepower	645	3153
Capital invested	$1,240,000	$8,746,000
Salaries paid	54,000	443,000
Wages paid	300,000	2,733,000
Cost of materials	845,000	5,340,000
Value of products	1,875,000	11,440,000
Value added by manufacture	1,030,000	6,100,000

WANT LENOX FACTORY.

Citizens of Stoughton, Mass., Make Exceptional Bid for Growing Boston Concern.

Recently, H. E. Holbrook of Stoughton, Mass., representing several citizens of that town, called upon the officials of the Lenox Motor Car Company, Boston, maker of the Lenox car, for the purpose of laying a proposition before them, looking toward the location of a plant in Stoughton. That the town appears to be in earnest in seeking the company is gleaned from the fact that the offer includes the gift of sufficient land beside the railroad track, and the erection of a brick factory at a cost of $40,000, the company to pay for the factory at the rate of $5000 a year without interest.

The Lenox car first made its appearance in the market during the Boston show of 1911, and since that time has enjoyed an enviable sale throughout New England and the East. Plans have been under way for an enlarged production during 1912. Evidently the people of Stoughton share the optimistic view of the Lenox officials and are anxious to secure this rapidly growing business for their own.

INDUSTRY IN INDIANA.

Interesting Figures Revealed by Report of the Thirteenth Census of Manufactures.

The report of E. Dana Durand, director of the 13th census, concerning the manufactures for the State of Indiana, sets forth the following with respect to automobiles, including bodies and parts:

"This industry, for which but one establishment was reported in 1899, had increased in 1904 to 11 establishments, with products valued at $1,639,000. In 1909 there were 67 establishments, the value of whose products amounted to $23,764,000, or more than 14 times that reported in 1904. The manufacture of automobile bodies and parts has become so interwoven with other industries that it is not possible to state how fully the statistics show the magnitude of the industry. A number of the foundries and machine shops, and establishments engaged in the manufacture of electrical apparatus and supplies incidentally manufacture automobile accessories and parts, while a number of the establishments in Indiana classified under the heading, 'Rubber goods, not elsewhere specified,' manufacture automobile tires."

The increase in number of cars produced during the five-year period between 1904 and 1909, insofar as the report can be made without disclosing individual operations, is best set forth in the following table:

Pleasure Cars—	1904		1909	
	No.	Value	No.	Value
Buggies	..	.....	1,639	$652,956
Gasoline	..	.....	1,576	.....
Electric	..	.....	63	.....
Runabouts	578	$620,334	8,139	5,055,208
Gasoline	208	298,850	8,100	.....
Electric	370	321,484	39	.....
Touring	424	787,969	6,838	10,710,289
Gasoline	387	735,669	6,838	.....
Electric	*37	52,300	....	.....
Enclosed	..	.....	439	772,401
Gasoline	..	.....	100	.....
Electric	..	.....	339	.....
All others	..	.....	32	147,232
Gasoline	..	.....	30	.....
Electric	..	.....	2	.....
Totals	1002	$1,408,303	17,087	$17,224,231
Gasoline	595	1,034,519	16,644	16,553,237
Electric	407	373,784	443	670,994

Commercial Cars—	1904		1909	
	No.	Value	No.	Value
Delivery wagons	18	$20,160	107	$157,358
Gasoline	..	.....	31	.....
Electric	18	20,160	76	.....
Trucks	..	.....	59	223,347
Gasoline	..	.....	32	.....
Electric	..	.....	27	.....
Totals	18	$20,160	166	$380,705
Gasoline	..	.....	63	.....
Electric	18	20,160	103	.....
Grand totals	1020	$1,428,463	17,353	$17,604,936
Gasoline	595	1,034,519	16,707	16,734,648
Electric	425	393,944	546	870,288

*Includes one steam touring car.

The growth of the industry is set forth in another manner in the following:

State of Indiana.

	1904	1909
Number of establishments	11	67
Persons engaged	921	7753
Proprietors	6	36
Salaried employees	99	920
Wage earners	816	6797
Primary horsepower	760	5813
Capital invested	$1,194,000	$16,722,000
Salaries paid	80,000	870,000
Wages paid	496,000	4,131,000
Cost of materials	824,000	14,995,000
Value of products	1,639,000	23,764,000
Value added by manufacture	815,000	8,769,000

City of Indianapolis.

	1904	1909
Number of establishments	4	17

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Persons engaged	509	2782
Proprietors	...	9
Salaried employees	62	379
Wage earners	447	2394
Primary horsepower	...	2296
Capital invested	$810,000	$5,066,000
Salaries paid	56,000	329,000
Wages paid	278,000	1,466,000
Cost of materials	554,000	5,994,000
Value of products	798,000	8,840,000
Value added by manufacture	244,000	2,846,000

NEW CARBURETOR COMPANY.

Organization Perfected for the Production of Miller Device in Indianapolis.

The New-Miller Manufacturing Company has been organized in Indianapolis for the production of the Miller carburetor, which first made its appearance in Los Angeles some few years ago. Although no attempt was made to exploit the device through the country until during the Madison Square Garden show in January, 1911, it has been impossible for the Miller Carburetor Company, which originally undertook its manufacture, to take care of the demand. The new concern has acquired a substantial factory in Indianapolis and its executive offices are located in the Murphy building in that city.

The Indianapolis plant will have a capacity of over 70,000 carburetors a year. The officers of the company are: President, F. C. Fairbanks; vice president, A. W. Nash; secretary, K. K. Parrot. L. H. Colvin, formerly sales manager of the Warner Manufacturing Company, Toledo, O., will act as general manager of the organization.

It is claimed that the Miller carburetor is a distinct departure. It is operated mechanically, the opening of the throttle introducing exactly the proper proportions of gas and air into the cylinder, and it is held that when it once has been set will supply this mixture at all speeds. The control is so constructed as to be attached either to the dash or the steering post, and by it the driver is enabled to regulate the flow from the seat, making it unnecessary to raise the hood and adjust the vaporizer for different grades of gasoline or because of climatic conditions.

UNITED STATES RUBBER PLAN.

Will Increase Capital Stock from $75,000,000 to $120,000,000 for Expansion Needs.

At the annual meeting of the United States Rubber Company in New Brunswick, N. J., May 22, President Samuel J. Colt reported that the company found it desirable to increase its cash capital by $10,000,000 to finance manufacturing extensions and to take care of increased production. The plans suggested called for a total authorized capital stock of $120,000,000. instead of the present $75,000,000, this to be divided into $40,000,000 common and $80,000,000 preferred shares. The increase will be represented by $15,000,000 common and $30,000,000 preferred, the distribution to be as follows:

A dividend of $5,000,000 of the new common stock to present stockholders which would be at the rate of 20 per cent. of their present holdings. Ten million dollars of first preferred to be offered ratable to all stockholders at par and accrued dividends. To submit an offer to the holders of the present second preferred issues to exchange their stock for the new first preferred on a basis of 100 shares of the existing second preferred for 75 of the first preferred.

GRAMM'S FUTURE PRODUCT.

Will Produce New Models Instead of Collaberating with Willys in Old Company.

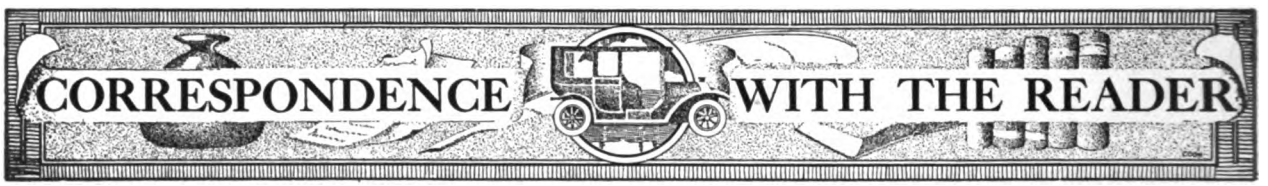
When announcement was made recently that John N. Willys, president of the Willys - Overland Company, Toledo, O., had purchased the controlling interest in the Gramm Motor Truck Company, Lima, O., it was stated that B. A. Gramm, who designed the Gramm truck and built up the business, would be associated with him in perfecting the details of the new organization. Mr. Gramm now explains that such was his original intention, but upon more mature reflection he has decided that this should prove an opportune time for him to bring out some new designs, which be believes will reflect the standard of the future.



B. A. Gramm, Designer, Gramm Motor Truck.

It is understood that Mr. Gramm has secured a new factory in Lima and that he has associated with himself a strong organization, which will proceed with plans for the production of new models. These are to be worked out thoroughly and given every test before being placed before the public. Beyond the bare information that the new trucks will be simple in design and construction, with few working parts, accessible in every detail and embodying features of comfort for the driver, absolutely nothing is known concerning them. Additional news concerning the factory and the product will be awaited with interest by those in the industry.

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The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Mixing Acetylene with Air.

(1383)—What is the minimum and maximum amount of acetylene that can be mixed with air which will ignite readily from a spark? About what pressure can a mixture of nine parts air to one part acetylene be compressed without danger of being exploded? Can a mixture of the above proportions be drawn into a pump and forced through a small brass tube without danger of being exploded from the pressure or friction produced? If a mixture of the above proportions were injected into a cylinder just after the motor stopped, would there be any probability of the gas being exploded when the same came in contact with the hot inner walls of the cylinder? G. B. H.

Merkel, Tex., May 29.

According to O. H. Skinner, general superintendent of the Prest-O-Lite Company, Indianapolis, the proportions for perfect combustion are approximately nine parts air and one acetylene. Such a mixture burns with an explosive wave when ignited. It should not be compressed except under those conditions existing in the cylinders of an internal combustion engine running in the usual manner. If such mixtures of gas were compressed in the compressor so that absolutely all heat of compression were removed it might possibly be done with safety. However, it must be borne in mind that the violence of the explosion increases as the pressure increases, and should such a mixture become ignited there might be danger. Such mixtures taken into the engine in the usual manner through the manifold are not subjected to compression so great that there is any danger of injury to any part of the machinery when the gas is ignited.

Regarding the probability of acetylene exploding by coming in contact with the hot inner wall of the cylinder: This would depend upon the temperature of the metal. It is doubtful if the metal would be warm enough at any time to ignite the mixture; that is, no more so than if the gasoline mixture were utilized. When a cylinder becomes so warm that it will explode any gas vapor with the ignition switched off, the motor should not be operated until the cause for overheating has been removed.

Horsepower Formula.

(1384)—Can you secure for me or advise where I can get the formula for computing horsepower. For example: What is the horsepower of a motor having a 4.25-inch bore and 5.75-inch stroke? If this is not asking too much, I would like to see it figured out.

J. E. BUCKLEY.

Kansas City, Mo., June 1.

The formula adopted by the Society of Automobile Engineers, which is standard, being generally utilized, is based upon a piston speed of 1000 feet a minute. It consists of squaring the bore and multiplying the result by the number of cylinders and dividing by 2.5. The horsepower for a four-cylinder motor of the bore mentioned is 28.9.

Peculiar Knock.

(1385)—I have a Flanders 20 touring car, and the engine has a peculiar knock that I am unable to locate. It is only noticeable when the motor is operating at low speeds. I have inspected the connecting rods, tappets and valves. All are in prime condition. The car has plenty of power and runs nicely, only this knock is annoying. Could it be that the muffler is dirty? Please give me your opinion as to the probable cause.

M. F. GENOH.

Rich Hill, Mo., May 22.

It may be that the knock referred to is caused by a loose wristpin which might operate quietly when the motor was pulling steadily and under a load. The main bearings may need attention. It would be well to examine these parts and test for looseness. Sometimes when the motor is throttled down and the spark too much retarded a form of knock will be heard. Advance the spark and note if the knock continues. A dirty muffler would hardly cause the noise referred to. A clogged silencer creates back pressure, reduces the power of the engine and sometimes makes it difficult to start.

Horsepower Ratings.

(1386)—I would be pleased to ask which would have the most power, a six-cylinder motor having a four-inch bore and 4.75-inch stroke or a four-cylinder motor having a 4.5-inch bore and 5.25-inch stroke? Which motor would be the most economical of fuel?

JOHN L. AGNES.

Falun, Kan., June 1.

The horsepower of the six-cylinder motor according to the S. A. E. formula is 38.4, while that of the four-cylinder engine is 32.4. The latter should be more economical of fuel, all other things being equal.

Dual Ignition.

(1387)—Will you please answer the following questions? In a dual ignition system is the high-tension jump spark coil used by the high-tension magneto? I should think that the high-tension coil would be used only to transform the current of the

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batteries. What causes the magnetic vibrator of a jump spark coil to stop by sticking to iron core of the coil? What causes the gasoline to run out of the main air supply chamber of the carburetor in a stream while cranking the engine, both in hot and cold weather?

ELMER S. SMITH.

Nora, Neb., May 20.

The term "dual ignition" is meant to apply to two sources of current such as a magneto and batteries. A coil, such as referred to, is utilized when the magneto generates a low-tension current. The step-up coil or transformer builds up the current which is led back to the magneto and distributed to the proper spark plug.

With a true high-tension magneto its armature carries two windings, a coarse and fine, primary and secondary, respectively, these being similar to those employed in the high-tension coil. The current from the magneto is led direct to the plugs.

A true dual ignition is two separate and distinct systems, each operating independently of the other. A battery, timer or distributor and coil are included in one group and the current is led to a set of spark plugs. The magneto is of the true high-tension type and its current is supplied to another set of plugs.

Regarding sticking of the vibrator of a jump spark coil: It is probably due to the fact that the core does not lose its magnetism and release the vibrator. The action of a high-tension coil is depicted at Fig. 1 which outlines the member, also the battery, timer and spark plugs, as well as the primary and secondary circuits. It will be noted that one wire leads from the positive terminal of the battery and this in practise is attached to the "battery" terminal of the coil and a switch provided for the interruption of the current.

Another wire from the battery is led to the frame of the car, which being of metal is a conductor. This lead is called a ground. In the sketch this lead is shown going to the timer, which is practically a second switch in the system. It will also be seen that the bottom of the plug is grounded. With both the primary and secondary currents it is essential that a return path be established for the electricity.

When contact is made at the timer, closing the primary circuit, current flows to the primary or coarse windings of the coil. This excites the soft iron core, causing the latter to act as a magnet and draw down the trembler blade. In this operation the platinum points are separated and the circuit broken. When the current ceases, the core loses its magnetism and releases the blade which springs upward remaking the connection. This re-establishes the circuit and the core is remagnetized, this continuing at rapid speed. At the instant the platinum points separate, the secondary current is built up to a very high point and flows through its circuit, in which is placed the spark plug.

Relative to the third question. The trouble is doubtless due to flooding or leaking. It may be that the float is too high or dirt may have become lodged in the needle valve seat preventing the valve from seating properly. The correct point for the fuel level is between .03125 and .0625-inch. The float should be examined for leaks, as the cork may have become impregnated with fuel.

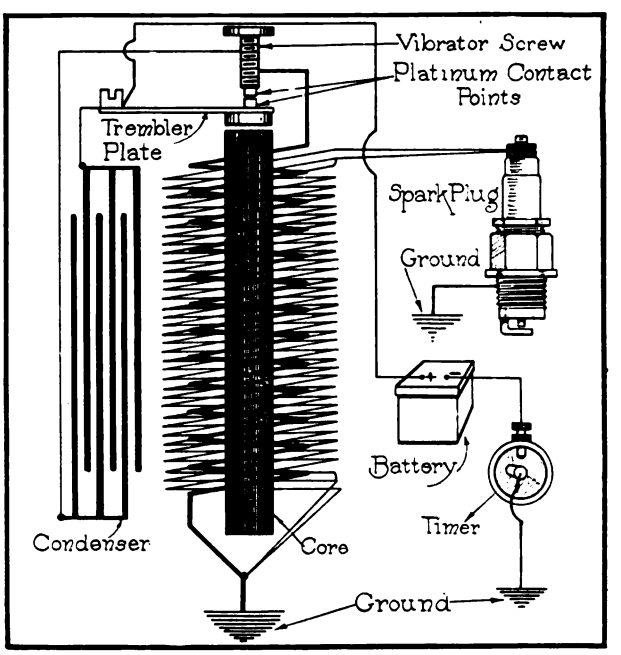
Motor Heats.

(1388)—I have a 1910 model T Ford and am having some trouble with the motor overheating. I am using Polarine oil so do not think the trouble can be due to the lubricant.

J. H. WEBB.

Carterville, Mo., May 21.

The trouble is not due to your lubricant but may be caused by several things. Too rich or too weak a mixture, carbon, or operating with a retarded spark will produce heating. Among other causes may be mentioned improper timing or too insufficient lift of the exhaust valves. The circulation system may be



Outlining the Action of a High-Tension Coil.

clogged partially, or the fan belt be loose. The water pump should be examined as it may not operate at its proper efficiency. It may be that the muffler is filled with soot, creating back pressure.

Motor Will Not Throttle.

(1389)—I have just purchased a new car and when running on the magneto it will stop if I try to throttle it down. I keep the spark advanced but the engine will run a short time and finally come to a stop. It will run all right on the batteries. The agent stated that the magneto was at fault and put on a new one. The engine now throttles. What was the cause of the trouble?

B. D. M.

Harrisville, R. I., June 5.

It may have been due to the magneto as the agent stated. Presumably the magneto was timed a trifle late and the agent merely retimed it and obtained the desired result. Some magnetos will not permit the car to be throttled to exceedingly low speeds.

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Grades and Gear Ratios.

(1390)—Kindly tell me how to calculate grades as to percentage, also how to figure the gear ratio of the transmission? DANA A. LANE.

Hazardville, Conn., May 29.

The most common way of designating a grade is in per cent. This is figured on a given horizontal distance of 100 feet, for example, and the difference there is in the height of the hill at either end of that 100 feet. If the rise be 10 feet, the ratio is 10-100 or 10 per cent. Similarly, any rise as 17 feet, is 17 per cent., always remembering that the horizontal distance is 100 feet. A 100 per cent. grade would be one in which the rise was 100 feet in horizontal distance. Shorter horizontal distances, of course, can be used in figuring, as, for instance, a rise of three feet in 10 equals 3-10, or 30 per cent. Or one foot in 20 equals 1-20, or five per cent. With a rise of five feet in five, 10 feet in 10, 100 feet in 100, or whenever the rise is equal to the horizontal distance, the grade is 100 per cent. or 45 degrees.

In measuring grades in degrees, the foundation is the circle which contains 360 degrees. A line drawn horizontally across the circle through the centre is the level and a point in the circumference is considered as the top of the hill. Then a line drawn from this point to the centre of the circle would form an angle with the horizontal line, and the angle would contain as many degrees as there were degrees in the circumference of the circle between the point considered as the top of the hill and the point where the horizontal line cuts the circumference. The side of a house forms a 90 degree angle with the street level. Cutting this in two would give a slope, as on the roof of a dwelling, an angle of 45 degrees.

No motor car could stand on this grade or climb it, unless some other means besides ordinary roads and tires were used. It has been found that ordinary traction ceases on a slope of about 26 degrees or a 57 per cent. grade. A simple method of measuring grades is to attach a piece of stout string to a top iron or any other convenient place on the automobile, and as near as possible over the edge of the running board. The twine should be long enough to drop a few inches below the board. Next tie a weight to the free end, taking care that the twine moves freely so that the weight will act similarly to a pendulum.

Next drive the machine upon a level space, such as the floor of the garage, and mark the intersection of the string on the edge of the running board. The string now hangs perpendicular from the point where it is suspended. In driving up a hill the twine will move backward and in descending a grade it will move forward. As the car stands upon the grade to be measured, mark the spot on the running board where the string intersects. For convenience call the point where the twine is attached A, the point of intersection on running board B, and location of string when on a grade C. The length of C B is to the length of A B as the per cent. of the grade of the unknown slope is to 100 per cent. For example: If it be eight inches from B to C and 40 from A to B, then the per cent. is equal to eight divided by 40, which results in a fraction of one-fifth or 20, thus determining the grade to be 20 per cent.

A free swinging pendulum and a scale marked on a piece of board to swing either way from zero is made easily and also may be utilized. There are devices called gradometers which are not expensive and these register the grade. They are attached to the dash or any other convenient place.

In figuring the gear ratio of the transmission the gears and pinions of the main and secondary shaft are taken into consideration. Suppose for example that the engine shaft extension carries three gears, beginning at one end, respectively, 19, 32 and 48 teeth, and that the sliding sleeve bears gears of 77, 64 and 48 teeth, respectively. When the 77-tooth gear on the sleeve is slid into mesh with the 19-tooth gear upon the engine shaft, the speed ratio is about four engine turns to one sprocket turn, and the low speed is engaged. When the sleeve is moved until the 64-tooth gear on the sleeve meshes with its 32-tooth mate, the two-to-one or intermediate gear is obtained, and when by a further motion of the sleeve the two 48-tooth gears are meshed, the engine and sprocket shaft are rotating at equal speeds and the car is running on the high. In estimating car speeds the final gear; that is, the ratio between the pinion or driving gear on the shaft and crown gear, should be taken into consideration.

STUDEBAKER METZGER NEWS.

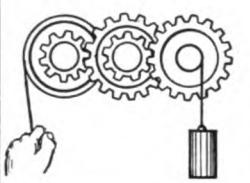
While rumors concerning the retirement of W. E. Flanders and E. LeRoy Pelletier from the Studebaker Corporation of Detroit, to become associated with the Metzger Motor Car Company of Pontiac, Mich., have been circulated frequently of late, no definite information has been made public concerning the situation, with the exception that J. N. Gunn, now general manager of the Studebaker forces, has announced the appointment of W. S. Pettit, who has been with the Studebaker organization for the past year, to replace Mr. Pelletier as director of advertising. Mr. Gunn also announces the appointment of Charles Gordon as factory manager, vice Charles Adams. The Metzger company is said to have secured a number of Studebaker branch managers.

NEW IDEAL COMPANY OFFICERS.

The Ideal Motor Car Company, Indianapolis, Ind., maker of Stutz cars, has elected the following officers: President, Harry Stutz; secretary, J. H. Ebersole; treasurer, H. F. Campbell. Mr. Campbell, who is president of the Stutz Auto Parts Company, succeeds E. G. Sourbier, who has retired from the Ideal company. Carl G. Fisher, president of the Indianapolis Motor Speedway, and Frank L. Moore have taken the Stutz agency for Indiana.

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RECENT MOTOR VEHICLE PATENTS



Stewart Auxiliary Valve.

A patent has been granted to Alfred C. Stewart, Los Angeles, Cal., for an auxiliary air valve applicable to the intake manifold or pipe of an internal combustion motor. It comprises a cylindrical casing, one end of which is reduced and threaded to fit the manifold. The reduced part has a shoulder forming a seat for a movable valve which seats in a manner similar to a poppet valve. Attached to the valve member is an operating wire enclosed in a flexible housing which leads to any convenient point for service. Near the valve are apertures through which air is drawn when the valve is moved from its seat, and the amount of atmosphere may be regulated.

Wheeler Locking Device.

To prevent the use of the automobile by others than the owner or those intended, Charles A. Wheeler, Bridgeport, Conn., assignor of one-half to the Smith & Egge Manufacturing Company of the same city, has patented a locking device for motor car cranks. It comprises a substantial chain having an elongated socket formed of a series of wire convolutions, one end of the wire being pivotally connected to the chain. The other end is equipped with a padlock. In attaching, the socket is utilized for the handle of the starting crank, the chain wrapped tightly around the cross bar or other suitable place and the padlock secured.

Liebau Vehicle Spring.

A patent for a vehicle spring which presents unusual features, inasmuch as it is designed to combine the function of a spring and shock absorber, has been granted to Richard Liebau, Watervliet, N. Y. Instead of the lower section of the spring being mounted upon the axle it is divided into two sections, that from the body or frame being fastened securely above the axle while the other extremity is pivotally mounted to an extension of the frame. Attached to the goose neck is another spring member, this being secured by a link, while the other end is pivotally mounted and held under the axle. Interposed between the spring and frame is a pneumatic cylinder, also pivotally mounted.

Edgington Chain Tool.

In attaching tire chains, especially worn members, it is sometimes difficult to tighten the chain properly and at the same time snap the retaining hooks into place. William F. Edgington, Springfield, O., assignor of one-half to Alexander Murray of the same city, has invented a chain tightener which consists of two levers, one of which is pivotally mounted and carries a pawl which engages with the smaller member. Both arms are equipped with hooks, these being so constructed as to fit and engage between the links of the outside chain. When the main lever is moved the action brings the hook members together and by means of the ratchet and pawl mechanism the tool is locked, allowing the securing of the locking members of the chain.

Smith Valve Lift Spacer.

Charles W. Smith, Annapolis, Ill., has been granted a patent for a valve lift spacer for internal combustion motors. It comprises a valve mechanism, combining an inlet controlling valve having a stem, and a sleeve mounted upon the latter, and having a screw threaded exterior. Longitudinal grooves intersect the threads, and a valve closing spring and spring lock device are mounted upon the sleeve. The spring is bent into circular form and has a loop at one end and an eye at the other extremity laterally deflected and adapted to interlock with the terminal loop to secure the ends of the wire when brought together. It also has loops or crimps to form a support for the valve closing member and means for contracting the locking device about the sleeve.

Beers Lock Washer.

A patent has been issued to Charles F. Beers of Newark, N. J., for a lock washer which comprises a spirally shaped body having a number of concentric ridges which are triangular in cross section. It is claimed by the inventor that such an arrangement will retain nuts, etc., more securely than those of the spring form.

Myers Bumper and Fender.

Harry T. Myers, Chicago, has been granted a patent for a combined bumper and fender which comprises a two-part bumper and an apron. The upper and lower edges of the latter are attached to the bumper and in a normal position are compactly arranged. Means are provided for opening the apron automatically as well as for separating the parts of the bumper to stretch and hold the apron.

OTHER PATENTS GONE TO ISSUE.

Terminal, William C. Brunt, Boston. A fork shaped spark plug terminal provided with an insulated handle and a set screw to hold secondary wire in said handle.

Steering-Driving Mechanism, Felix A. Eisner, Rochester, N. Y. A driving and steering system in which all

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four wheels are driven by means of a fluid motor, provision being made in the fluid connections to steering wheel to give differential power effect in turning.

Tire Inflator, Royal L. Foster, Fort Riley, Kan. A rotary pump attached to the axle and wheel spokes, pumping air direct to the tire and to a pressure chamber.

Faucet, Frank M. Ulmer, Philadelphia. A lock faucet for gasoline or other fluids, in which a lock is embodied, the insertion of key in handle being necessary before same can be turned.

Lighter for Gas Burners, Stewart Brown, Chicago, Ill. A spark gap for acetylene burners, in which the sparking wires are held in a base which is movable by means of a thumb screw, enabling it to be adjusted.

Bearing, H. E. Coffin, assignor to the Chalmers Motor Company, Detroit. A bearing for a motor crankshaft, consisting of a disc attached to the shaft between the cranks and bearing on an annular soft metal seat in the crankcase, giving a bearing for each end of each crank and also separating each into a separate gas tight compartment.

Running Gear, David M. Dearing, Jackson, Mich. Automobile running gear in which two members are hinged at the middle, the upper being attached to the frame

holds the bulb forms part of the reflecting surface of the lamp.

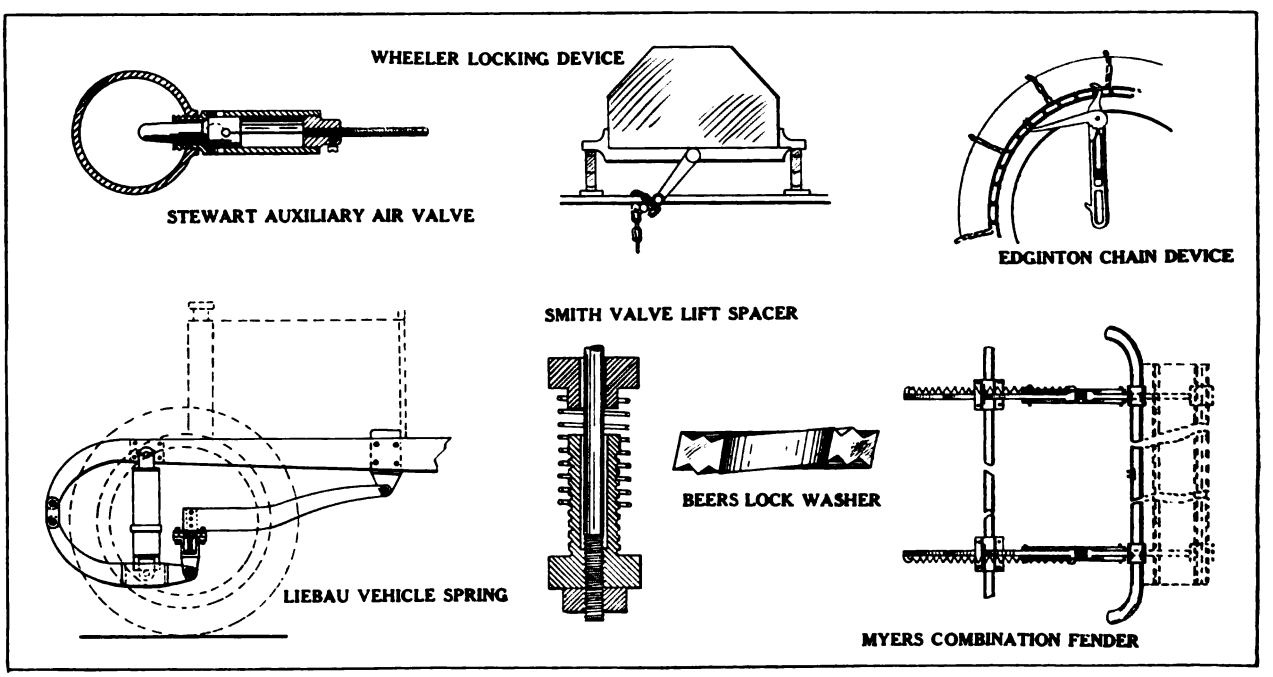
Rotary Motor, Olof F. Edqvist, Denver, Col. Cylinders are mounted on fixed shaft so that their produced axes do not intersect the axis of rotation. Provision is made to lock pistons against travel and for varying their speed in relation to the cylinders.

Hub Odometer, H. P. C. Browne, New York City. An odometer in combination with the hub cap of a wheel, the cyclometer being operated by means of a plug inserted in a hole in the stationary axle.

Starter, Cornelius Van Tubbergan and Paul Westrate, Grand Rapids, Mich. A starter of the spring type, the spring being attached to a sleeve which may be fitted to the engine shaft by means of a clutch.

Lamp, John H. George, Bridgeport, Conn., assignor to the Hawthorne Manufacturing Company, Inc. An automobile lamp with the reflector held in a holder of sheet metal provided with a threaded projection extending beyond the casing, enabling adjustment of the reflector.

Wrench, George Jurkovitch, Homer City, Penn. The parallel jaws of this both slide upon a frame, to the opposite ends of which handles are attached, so that the jaws are midway between the two handles.



Outlining Some of the Ideas of Inventors Working Along Lines Applicable to the Automobile.

by the usual elliptic springs, and the lower to the axle. Between the ends of the members are coil springs, so that while the axle may be moved from the horizontal without affecting the elliptic springs, the resistance of the coil springs is met.

Motor, Simon Lake, Milford, Conn. A two-cycle motor in which a chamber is formed in the head, into which gasoline and air is injected to be transformed into a gas by the heat of the chamber and then forced into the combustion chamber by means of air from a pump. The base of the cylinder is also scavenged by a jet of air.

Carburetor, F. H. Walker, Lincoln, Neb. A carburetor for starting motors, in which an inner chamber may be filled with gasoline from which an especially rich mixture can be drawn.

Pneumatic Cushion, F. L. Baker, Orange, Mass. A pneumatic spring, in which the compression chamber is separate from the plunger guides, being between them.

Radiator, J. B. Beam, Punxsutawney, Penn. An automobile cooler in which the radiating sections are removable from the frame.

Lamp, Percy Avery, Milwaukee, Wis. An electric automobile headlight in which the electric bulb may be inserted and removed from the back, without disturbing the glass front. The inner surface of the portion which

Carburetor, Francis P. Johnson, Oakland, Cal. Is provided with a chamber containing a number of horizontal plates, over which air is forced through the gasoline from the bottom to the top.

BOSTON TO HAVE ORPHANS' DAY.

The annual automobile outing of the orphans and the blind and crippled children of the city of Boston is to be held in the near future, under the auspices of the Boston Automobile Dealers' Association. Chester I. Campbell, the well known show promoter, has the affair in charge and is busy enlisting the aid of private owners, appealing to them for cars. The responses so far have been generous.

Uniform motoring laws would end the needless confusion attendant upon interstate touring. Now is the time to advocate their passage.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



Presidential Candidates.

This is presidential year, and it would appear that some of the political ideas which have been noticeable in national politics are to be more or less prevalent in the Federation of American Motorcyclists. This does not mean that there is to be "mud slinging" at President G. H. Hamilton, who has made such an excellent chief executive that there is little doubt of his re-election, providing he makes known his decision to run again. However, there are other candidates, despite the fact that it has been an established practise of late to give a man a second term.

P. E. Zimmerman, general manager of the Hagstrom Bros. Manufacturing Company, Lindsborg, Kan., and local commissioner, places in nomination the name of Dr. B. J. Patterson of Pratt, Kan., now vice president of the Central District. Those who are at all acquainted with motorcycling matters know that Dr. Patterson has a reputation for doing things. In the first place, he is a physician and surgeon with large practise, yet he finds time to direct a band of 50 pieces, sufficiently well known to receive an invitation to attend the Democratic national convention in Baltimore.

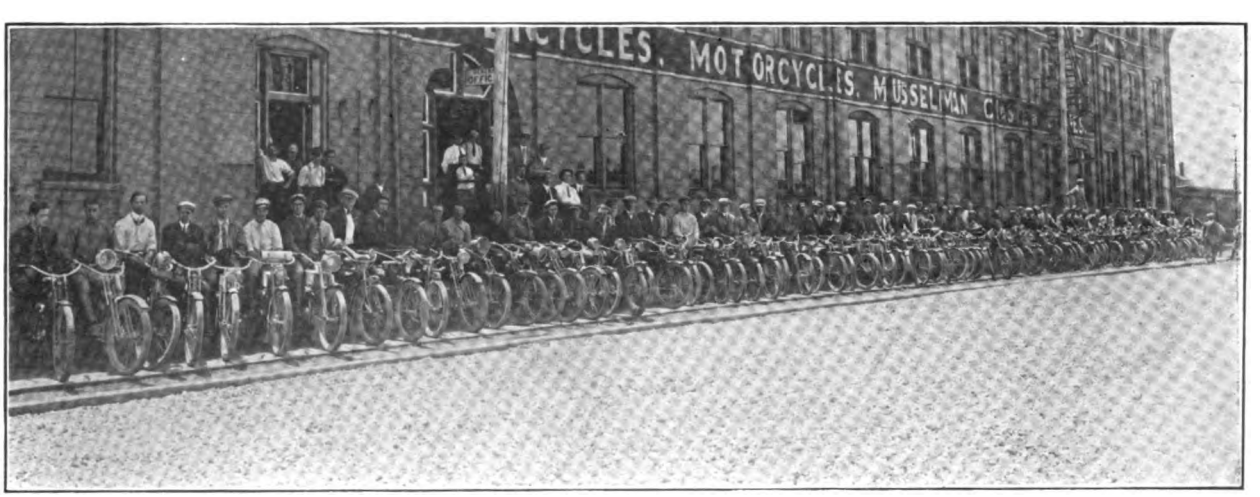
In the motorcycle field, Dr. Patterson writes from 25 to 75 letters a day as vice president of his district, helps arrange and personally supervises all racing events in Kansas, and is an officer and prime mover in the Kansas Short Grass Club. All this is on the authority of Mr. Zimmerman, and to him this seems to be sufficient recommendation for a president of the F. A. M.

Then, there is Dr. C. W. La Salle of Rochester, N. Y., vice president of the Atlantic District. Robert S. Morton of Brooklyn, N. Y., is his sponsor. He was a candidate last year, but withdrew in favor of Mr. Hamilton.

Some mention has been made of E. M. Estabrook, Bangor, Me., chairman of the membership committee, but Mr. Estabrook made it very plain last year that he did not want the office, although it was stated that he could have it merely for the asking. In fact, his name would have been presented as a candidate by the old New England District, except for his refusal to run.

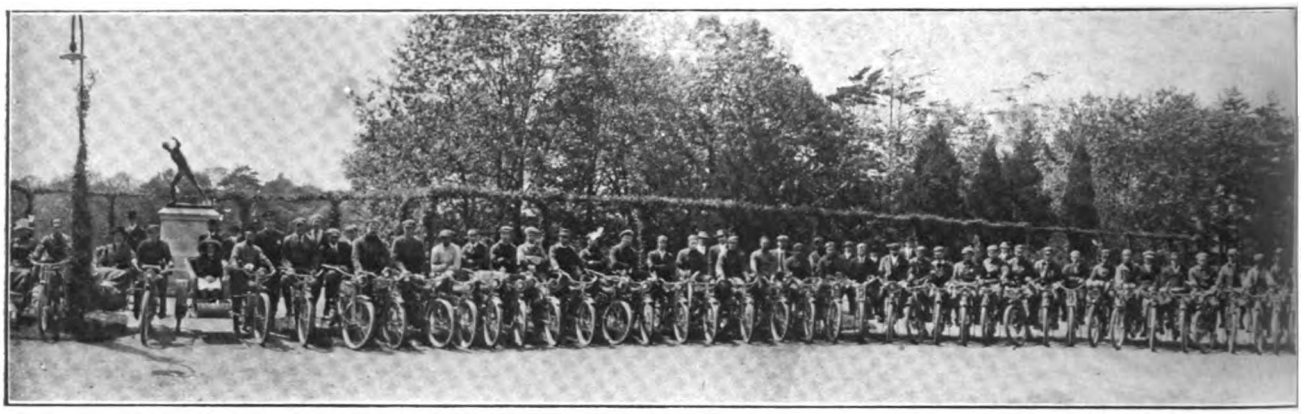
Mention also has been made of Dr. J. B. Thornley, New York City, chairman of the competition committee, but Dr. Thornley disposes of his case as follows:

"As long as President Hamilton, who has done conscientious work, and has been fair and square, wants the presidency, there is no consideration conceivable which would induce me to run. My wishes,



Members of the Queen City Motorcycle Club of Cincinnati and the Dayton Motorcycle Club of Dayton, Visiting Merkel Plant in Middletown, O.

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and all my efforts as far as I would feel justified in making any effort in a political game, would be thrown on President Hamilton's side. Should Hamilton wish to withdraw and should he do so, I would consider it one of the worst misfortunes that had ever confronted the F. A. M. Then, it might be conceivable that I would run if a nomination were presented to me in such a way as to make it apparent that I was serving the very best interests of the F. A. M. by running for the office. I most certainly do not want it, and while I would appreciate the honor, I feel that I am far better fitted to do the work for the F. A. M. in my present position than I would in the office of president."

It really looks, at this time, as if President Hamilton would be renominated and elected and there seems to be no good reason why this should not be true. It all depends upon whether or not he wants the office, and so far as can be learned he has made no statement which would indicate that he intended to withdraw.

The Annual Picture Run.

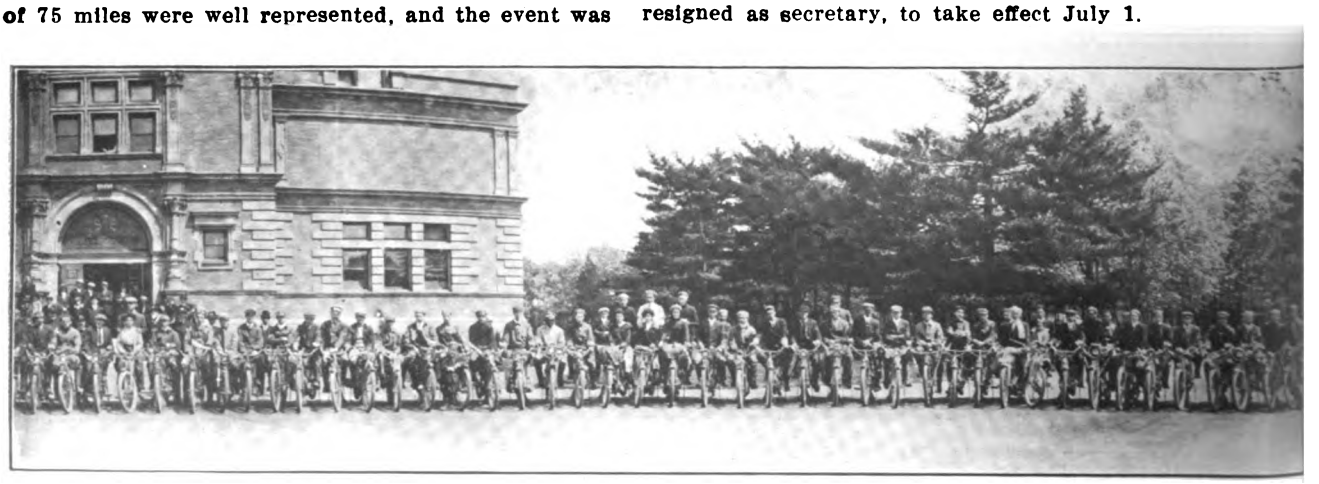
The annual picture run of the Providence Motorcycle Club, Providence, R. I., was held May 26, some 150 riders being in attendance. But for the fact that a thunder storm broke over Rhode Island and southeastern Massachusetts early in the morning, the crowd would have been much larger. Clubs within a radius of 75 miles were well represented, and the event was by all means the most successful ever held.

The moving picture part of the programme failed to materialize. Wm. Mills & Son, of Providence, which has taken this picture for a number of years, again had the honor. In fact, had the moving picture men been on hand as promised, the Mills concern still would have retained its position as official photographer. This year's picture was taken on a six-foot film, and the result is indicated in the accompanying reproduction. As will be noted, the picture had to be cut into four parts in order to be presented on the two pages.

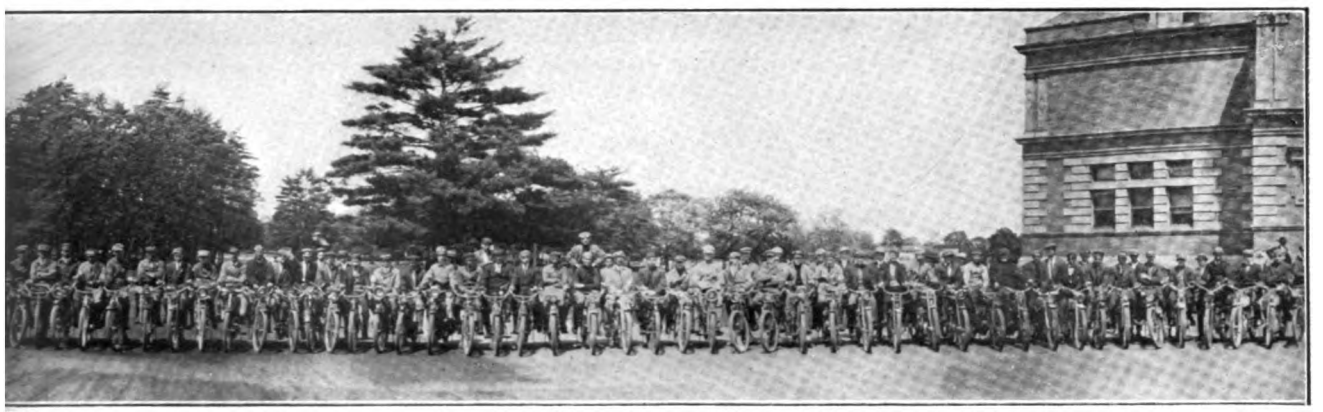
After the session before the camera, the visiting riders were taken to Motorcyclists' Rest, the new home of the Providence Motorcycle Club in the Swenson building, Blackstone and Broad streets. Although the new clubrooms were not ready for occupancy, the visitors were shown over the place and all agreed that Providence would have one of the most enjoyable homes in the country. It was made plain that riders from other cities always would be welcome at Motorcyclists' Rest.

Rhode Island Club.

The Rhode Island Motorcycle Club, Providence, R. I., has secured new quarters at 10 Earle street, and the members are expecting increased interest as a result. Several of the riders went to Newport, R. I., on the annual Lobster run, June 2. W. L. Medhurst has resigned as secretary, to take effect July 1.



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Ohio Riders Visit Merkel Plant.

More motorcycles were seen in Middletown, O., May 26, than ever before graced the city streets, despite the fact that one of the largest motorcycle factories in the country, that of the Merkel, operated by the Miami Cycle & Manufacturing Company, is located there. The occasion was the invasion of the city by the members of the Queen City Motorcycle Club of Cincinnati and the Dayton Motorcycle Club of Dayton, for the sole purpose of inspecting the Merkel plant.

Both divisions picked up a number of stragglers on the way, and all told there were something over 100 among the guests, who were liberally entertained by President J. R. Jacoby, Treasurer H. S. Wise, Sales Manager James W. Ash, Superintendent Charles R. Miller and Chief Engineer Joseph Merkel. After inspecting the plant, the riders sat for the accompanying picture, then paraded through the town to the United States hotel where luncheon was served with Mr. Ash as host. The following signed the Merkel guest book.

Cincinnati—M. Fischer, president, Harley-Davidson; Charles Laile, Jr., Thor; John Heck, Harley-Davidson; Herbert Tolbert, Harley-Davidson; Charles Weigart, Merkel; S. Wise, Curtiss; J. L. Motz, Indian; E. P. Sindlinger, Indian; Leslie L. Davis, Merkel; Earl Davis, Merkel; H. Wessel, Merkel; Ralph Slomer, Merkel; H. Niedersmith, Merkel; Harry Tate, Pierce; George Tate, Pierce; W. J. Burlinger, Thor; G. Y. Orverberg, Merkel; J. M. Morris, Harley-Davidson; Elmer Noell, Merkel; Gus Boesche, Merkel; Fred Stenger, Merkel; Albert F. Jung, Merkel; John Deckart, Jr., Merkel.

Dayton—R. Miller, Merkel; W. A. Fitzgerald, Thor; E. Haas, Merkel; Edward Lautchslager, Thor; Frank Lesher, Merkel; John Remula, Merkel; R. Reasoner, Indian; A. H. Komer, Thor; L. R. Doyle, New Era; J. F. Saul, Thor; Charles Winters, Excelsior; Ralph T. Bates, Merkel; Otto Miller, Merkel; Edward Richel, New Era; C. G. Blackwell, Harley-Davidson; H. H. Emrick, Merkel; M. Mumma, Indian; H. Graves, Indian; R. Weisenhorn, Harley-Davidson; A. L. Hill, Harley-Davidson; I. F. Jacobs, New Era; H. G. Pohl, New Era; Ray Eddy, Indian; H. O. Needham, Merkel; Louis Steffen, Thor; John Stauffer, Merkel; R. A. Shough, New Era; A. A. Kreidler, Merkel; H. L. Cunningham, Merkel; Earl J. Seabold, Merkel; Carl N. Bogan, Indian; Willard Kern, Merkel.

Avondale—R. M. Lewin, Jr., Curtiss.

Pleasant Ridge—S. P. Harker, Indian.

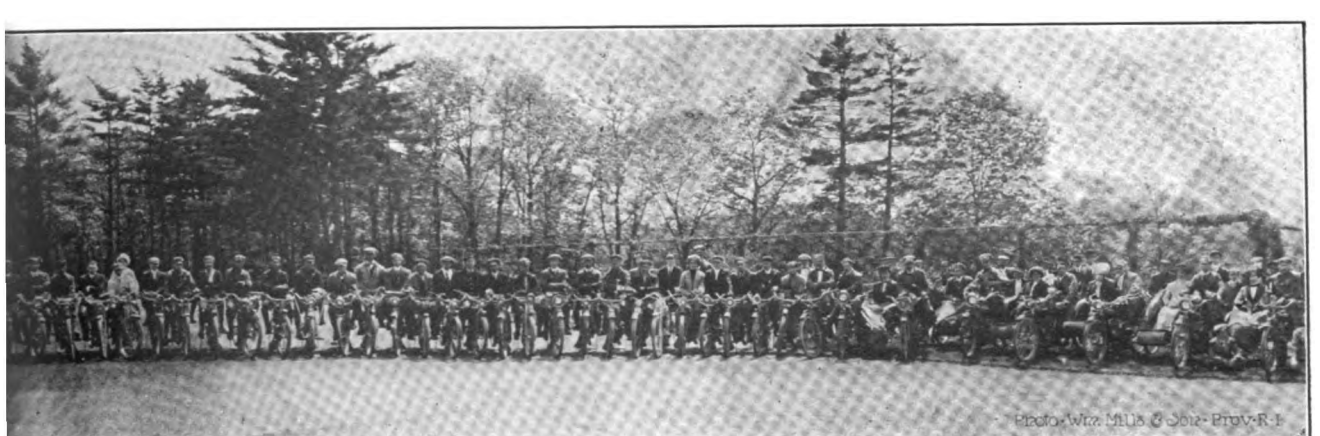
Clifton Heights—George Honold, Harley-Davidson; Clifford Heck, Harley-Davidson.

Carthage—A. Kipp, Merkel.

Oakley—Rudolph Schneider, Merkel; Ben B. Schneider, Merkel.

New Lebanon—Thomas Wollenhaupt, Indian.

Norwood—A. K. Sanders, Harley-Davidson.



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E. E. Ryder, President Rhode Island Motorcycle Club, and Oldest Rider in the State.

Hamilton—Frank W. Davis, Indian.

Covington, Ky.—J. H. Blank, Jr., Merkel; F. Furber, Indian; C. W. Collins, Merkel; Joseph Windstrat, Excelsior.

Alaska Club Coming.

Since motorcycle clubs have been organized in the Philippines and the Canal Zone, the Federation of American Motorcyclists is looking to Alaska to present the next unit in the Insular District. William F. Merchant, manufacturers' agent, broker, dealer and enthusiastic rider, whose address is P. O. box 171, Juneau, is anxious to hear from the riders in that section with a view to the organization of a representative F. A. M. club.

A Message from Estabrook.

E. M. Estabrook, chairman of the F. A. M. membership committee, says:

"Considering the near approach of the annual meeting of the national assembly, perhaps it would be timely to call the attention of the F. A. M. officials and the members generally to the present working conditions of our state units as shown by the official list of county and local commissioners' names by our state commissioners.

"Seventeen states show organization work as follows: One state with 62 commissioners appointed, one with 36, one with 31, one with 23, one with six, two with three, and the balance with one or two assistant workers. This would seem to mean that we have about five states in the F. A. M. who are working along lines calculated to produce the best results. In the balance, the state commissioner is content to do, or not to do, a little local work.

"This is not intended to be a fault finding letter, as the chairman is fully aware of the conditions and circumstances bearing on the work of the state commissioner, for he has 'been there' himself and didn't do any great shucks either. But he did do this much: He appointed a commission in each town, where there was one or more F. A. M. members. There were about 30 members in the state after two years of hard endeavor.

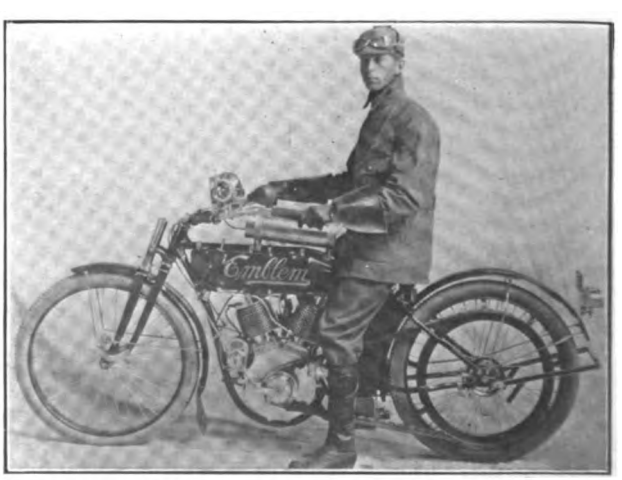
"Such facts or conditions as I lay bare are merely to assist our officers or delegates to a better understanding of the working conditions, in order that they may devise some more efficient system or suggest ways of improving the present one.

"While organization may not prove in all cases that it is efficient and rolling up the membership, still I believe in it and the principle. It offers possibilities at least, while with only one lonely state commissioner spread over a whole state, it makes the F. A. M. look exceedingly thin.

"I believe the rule to work is to appoint a commissioner for every town and hamlet in which we have an F. A. M. member. Every county should have its county commissioner and all cities should have a city commissioner, who would appoint ward assistants.

"In order to bring about this desirable condition of F. A. M. organization, I would suggest that the measure of efficiency of a state commissioner be not by membership results, but by the number of commissioners he appointed to cover his territory as possible workers and assistants.

"This may seem to be taking a radical view, or seeking to rob the state commissioner of some credit, but I do not see it that way. Let us argue this a little: To begin with, the state commissioner is not the only one working in his state; there are the motorcycle journals teeming with interesting news most of which treats of F. A. M. races or other contests, club news, official F. A. M. news or subject matter for which the F. A. M. is responsible. Then, there are the advertisements of the F. A. M. sent out through many manufacturers' catalogues and house organs, and this is largely true of the jobbers and large dealers of the country. We also have some hundreds of F. A. M. clubs who are among our best workers, to say noth-

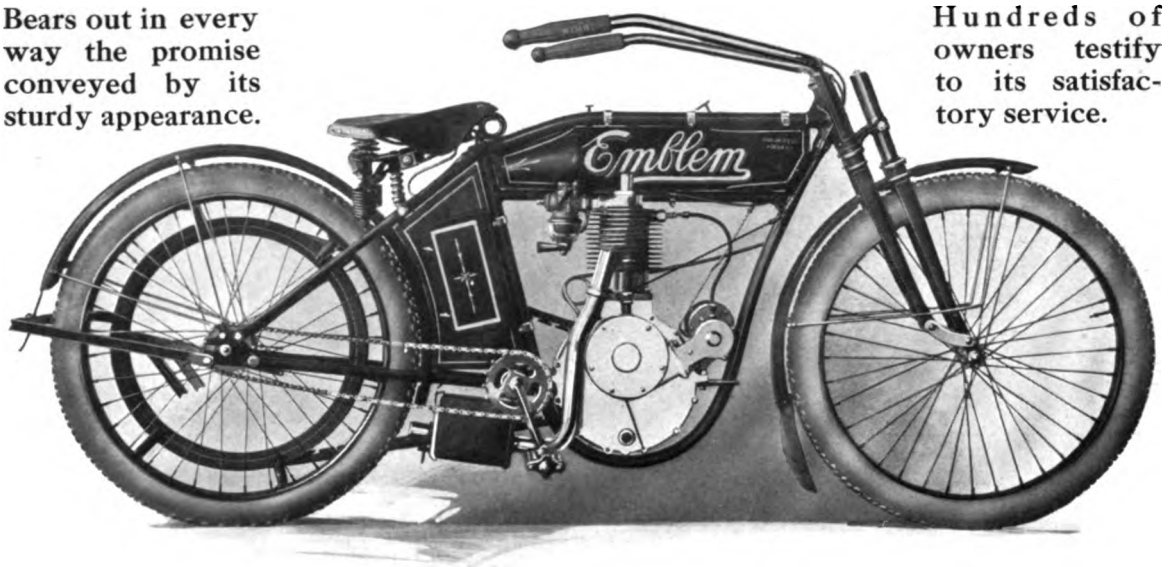


R. P. Colwell, Manawa, Wis., Emblem Salesman for Wisconsin.

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Bears out in every way the promise conveyed by its sturdy appearance.



Hundreds of owners testify to its satisfactory service.

Write Dept. D for Catalogue and Descriptive Literature. Dealers, Ask for Agency Proposition.

THE EMBLEM MANUFACTURING COMPANY

Also Makers of the Famous Emblem Bicycles.

ANGOLA **ERIE COUNTY** **NEW YORK**

ing of some hundreds of club prospects who are continually making good, perhaps unknown to the state commissioner.

"More than this, there are probably many hundreds of dealers who do the F. A. M. a good turn whenever opportunity affords. Then, we have 500 registered repair shops, and these are organizing clubs and taking care of the individual membership with literature always on hand.

"Without brain work or effort the state commissioner who never wets a pen in the interests of the organization he represents—and there are a few of this class—can take to his credit whatever results accrue from this big array of publicity and actual work performed by others whom he knows not, and the press and the members at large accord him all the praise.

"Such district vice presidents as are not in touch with state representatives can also put on something of a front and point with pride to the achievements of this or that state commissioner of the dry pen variety, after reading Secretary Gibson's report of membership gains. There are a lot of F. A. M. men who would never have dreamed how much they had done, except for the reliable figures of the secretary.

"The drift of my remarks should make clear my reason for gauging the efficiency of a state commissioner by something more tangible than membership gains secured by someone else. If we put our commissioners up against the state organization problem measured by commissioners appointed, we shall see what we shall see."

Club Notes, Here and There.

The inaugural run of the Wisconsin Motorcycle Club, Milwaukee, Wis., was held June 2, the members going to Chicago and return.

The New Orleans Motorcycle Club, which was organized recently with 60 members, is preparing plans for a large clubhouse for its exclusive use.

Secretary Gibson is sending announcements to all motorcycle clubs concerning the election of delegates to the national assembly at Columbus, O., July 17-21. Any member may attend the convention, however, and enjoy all the privileges except voting.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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A Pope Rider in Sacramento, Cal., Whose Machine is Equipped with Tandem Seat for a Companion.

More than 100 riders took part in the recent run of the Atlantic City Motorcycle Club, Atlantic City, N. J.

The Albany Motorcycle Club, Albany, N. Y., is planning a number of 200-mile endurance runs for the coming season.

San Jose, Cal., is planning a series of race meets similar to those held at Cresta Banca last year, at which there was an attendance of more than 15,000 riders.

The South Scranton Motorcycle Club, South Scranton, Penn., is planning a race meet for June 12.

Youngstown, O., wants more rigid enforcement of the speed laws and has added a motorcycle for the use of one of its police officers.

The Minneapolis Motorcycle Club, Minneapolis, Minn., has placed its official ban on the use of the cut-out.

Three Washington motorcycle clubs are going to build their own roads. Members of the Aberdeen, Hoquiam and Montesano organizations have voted to co-operate and construct a three-foot roadway between the three cities for the exclusive use of motorcyclists.

National Tour Secretary.

President Hamilton has appointed Guernsey Van Riper of 513 Hume-Mansur building, Indianapolis, Ind., as secretary for the 1912 national tour of the F. A. M. He is at present engaged in working out the entry blanks. Those desiring preliminary information should get into communication with Mr. VanRiper.

Would Organize Club.

William Skinner, with headquarters at the Southern Boulevard Garage, 179th street, the Bronx, New York City, is working up sentiment in favor of organizing an affiliated F. A. M. club among the riders of his vicinity. All motorcyclists are welcome at the garage, and those who are interested in the plan as outlined would do well to get into immediate communication with Mr. Skinner.

New Members for May.

According to Secretary Gibson, 986 new members were admitted to the Federation of American Motorcyclists during May, making a grand total of 15,348. Classified by districts the result is as follows: Lake, 412; Atlantic, 270; Southwestern, 97; Central, 57; New England, 53; Pacific, 40; Peninsular, 37; Insular, 18; Gulf, 13, and Canada, nine.

The result according to states was: Indiana, 125; Illinois, 118; Ohio, 113; New York, 90; New Jersey, 76; California, 73; Pennsylvania, 66; Massachusetts, 36; Kansas, 24; Michigan, 23; Wisconsin, 23; Georgia, 20; Washington, 19; Panama, 18; Missouri, 16; Maryland, 14; Iowa, 14; West Virginia, 14; Florida, 13; Nebraska, 11; Connecticut, nine; Canada, nine; Montana, nine; District of Columbia, eight; Minnesota, eight; Oregon, eight; Louisiana, six; Rhode Island, six; Colorado, four; Idaho, three; Tennessee, three; Texas, three; Kentucky, two; New Hampshire, two; South Carolina, two; Virginia, two; Arkansas, one; Oklahoma, one.

Campbell in Lake District.

Jesse Campbell of Dayton, O., has been appointed vice president of the Lake District, F. A. M., by President Hamilton, to fill out the unexpired term of P. B. Whitney, resigned.

Emblem Only Hill Climber.

In the recent hill climbing contest on Reservoir hill, Kansas City, Mo., there were eight single-cylinder machines, representing six different makes, entered and of these the Emblem, made by the Emblem Manufacturing Company, Angola, N. Y., was the only one to make the grade. This machine was started from a standstill and reached the steepest part of the hill without help from the free engine pulley or the pedals. Reservoir and Prospect hills are selected frequently for private tests, and thus far this year, the only



Herbert Kittle, a Well Known Racer of Los Angeles, and His Sister on an Indian Mount.

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single-cylinder machine to climb either hill has been the Emblem.

Races at Saugus, Mass.

Two motorcycle races were held in connection with the aviation meet at Atwood park, Saugus, Mass., June 1, in which members of the Boston and Lynn clubs took part. The results follow:

Three miles, novice—First, E. C. Dupont; second, E. C. Hains; third, E. W. Putnam (all of Lynn club); time, 4:46.

Ten miles—First, H. F. Smith, Boston; second, Hains, Lynn; third, Charles Martin, Lynn; time, 11:52.

Boyd Takes State Championship.

The annual state championship race on the Tuileries track in Denver was won by Boyd on an Indian. The result of the meet follows:

Two miles, amateurs—First, Hurlburt, Indian; second, Parkhurst, Sears; third, Shepherd, Merkel; time, 2:26.4.

Three miles, professionals—First, Boyd, Indian; second, Bowen, Merkel; third, Cox, Merkel; time, 2:12.4.

Five miles, professionals—First, Bowen, Merkel; second, Cox, Merkel; third, Boyd, Indian; time, 3:49.2.

Three miles, consolation, professionals—First, King, Indian; second, Fleckenstein, Indian; third, Patterson, Merkel; time, 2:20.8.

Seven miles, state championship—First, Boyd, Indian; second, Cox, Merkel; third, King, Indian; time, 5:12.4.

Hasha Wins Prince Cup.

Riding an Indian, Edward Hasha won the Jack Prince sweepstakes cup at the Riverview track, Chicago, May 23. The event was scheduled for six miles but was cut to four on account of the slippery condition of the track. The summary of the meet follows:

Nine miles, class A, professional:

First heat, three miles—First, Hasha, Indian; second, Wolters, Excelsior; third, Balke, Excelsior; time, 2:05.4.

Second heat, three miles—First, Hasha, Indian; second, Graves, Excelsior; third, Balke, Excelsior; time, 2:06.2.

Final, three miles—First, Hasha, Indian; second, Graves, Excelsior; third, Balke, Excelsior; time, 2:07.

Nine miles, class B, professionals:

First heat, three miles—First, W. Samuelson, Indian; second, Armstrong, Indian; third, Humiston, Indian; time, 2:14.8.

Second heat, three miles—First, W. Samuelson, Indian; second, Humiston, Indian; third, Kenny, Indian; time, 2:18.

Final, three miles—First, W. Samuelson, Indian; second, T. Samuelson, Indian; third, Humiston, Indian; time, 2:19.6.

Four miles, amateurs—First, Matthews, Thor; second, Mitchell, M-M; third, Shaw, Thor; time, 4:28.4.

Six miles, cut to four, Prince sweepstakes—First, Hasha, Indian; second, Balke, Excelsior; third, W. Samuelson, Indian; time, 2:44.4.



Six Men Riding a Harley-Davidson, Along Elmwood Avenue in Providence, R. I.

Six Men on a Harley.

An accompanying illustration presents a test applied to a Harley-Davidson mount, made by the Harley-Davidson Motor Company, Milwaukee, Wis., by the Rhode Island agent, J. Clarence Loftes, Providence. The picture was taken as the machine was being driven along Elmwood avenue, and numerous witnesses were present to vouch for the fact. The men are Youngberg, Tromans, Loftes, Page, Gilbane and Korner. Their combined weight was 935 pounds.

ATTENTION MOTORCYCLISTS

Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

B. A. SWENSON

298 Blackstone Street, Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00

(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

AMERICAN F. N. COMPANY **Boston, Mass.**

Branches: 48 Union St., Prov., R. I. 415 Trumbull St., Hartford, Ct.

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The following companies have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Hassett & Rogers, Inc., Amesbury, Mass.; to manufacture automobile bodies; $18,000; incorporators, J. H. Hassett, C. H. Hassett, George H. Collins.

Standard Auto Sales Company, Philadelphia; $10,000; incorporators, R. M. Snyder, C. H. Friars, E. H. Weaver, 717 N. Broad street, Philadelphia.

Acton Tire Repair Company, New York City; $3000; incorporators, Patrick Curry, William Koopman, Lawrence Kerrigan, 759 Seventh avenue, New York City.

Simplex Aluminum Solder Company, Inc., New York City; to manufacture aluminum solder; $25,000; incorporators, C. B. Erkens, 255 West 143rd street; Charles Decker, Henry Bender.

Eiselman Automobile Company, Cleveland, O.; $10,000; incorporators, S. N. Weitz, J. W. Campbell, Harry Pott, H. C. Cummings, Alvin Boehmer.

Automobile Resilient Tire Filler Company, Indianapolis, Ind; $10,000; incorporators, W. H. Disher, A. C. Balfour, Jessie Moffat.

Merchants Motor Service Corporation, Philadelphia; incorporators, G. B. Teaz, William Voss.

White Automobile Company, Indianapolis, Ind.; $2000; incorporators, R. D. Eaglefield and G. W. Fuller.

Pitt Motor Truck Company, Pittsburg, Penn.; $20,000; to manufacture motor trucks; incorporators, J. E. Douglass, W. S. Phillips, F. O. Brandt, J. E. McCalmont.

Eckberg & Place Garage Company, Fall River, Mass.; $7000; incorporators, V. J. Eckberg, Ernest Place, Robert Place.

Lansden Electric Vehicle Company, Boston; $5000; incorporators, A. B. Freeman, Gardner Freeman, William H. Britton.

Smart Auto & Manufacturing Company, Indianapolis, Ind.; $50,000; to manufacture automobiles and parts; incorporators, O. S. Schrader, D. W. Reed, I. H. Shelton.

Storage Battery Safety Lamp Company, Wilmington, Del.; $550,000; incorporators, George Washington May, Artemas Smith, M. E. Dorsey.

Todd Rubber Company of New London, Inc., New London, Conn.; $2000; incorporators, E. J. Todd, Alfred Wurts, A. P. Gunn.

Todd Rubber Company of Waterbury, Inc., Waterbury, Conn.; $2000; incorporators, E. J. Todd, F. H. Potter, A. P. Gunn.

Blue Ribbon Garage Company, Springfield, Mass.; $2000; incorporators, Harry Bland, Albert Karp, J. G. Gottesman.

Jiffy Auto Curtain Company, Chicago, Ill.; $100,000; incorporators, Frank H. Ilse, 1505 Michigan avenue, Chicago.

Suburban Equipment Company, New York City; $10,000; incorporators, Harrison Gray Otis, 2 Rector street; W. L. Otis, Charles A. Braker.

Ball Bearing Novelty Company, New York City; $6000; incorporators, A. B. Greenberg, 874 Longwood avenue, Bronx; Alfred Pioneer, Jacob Solomon.

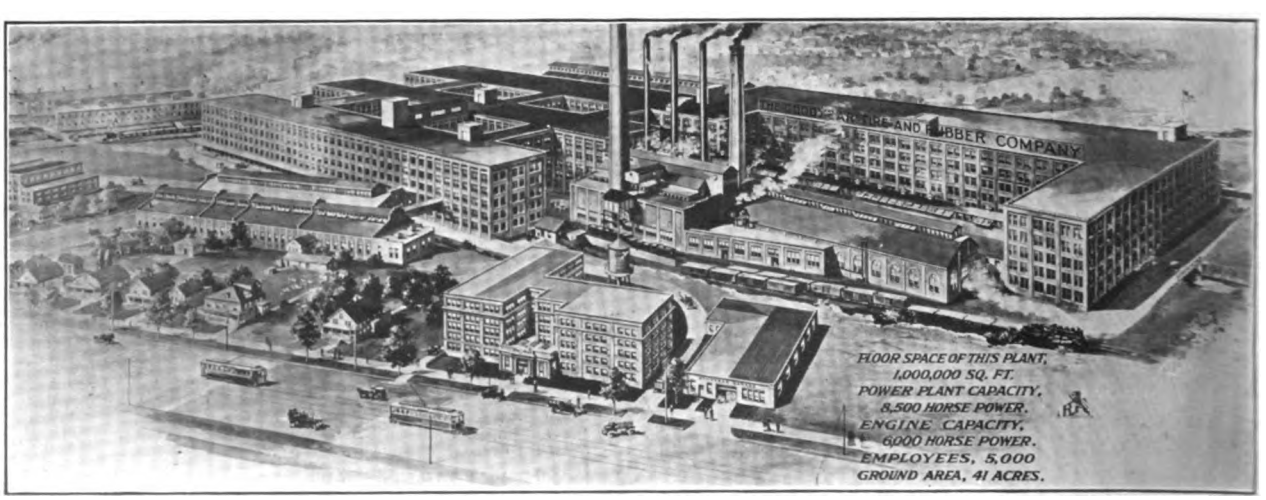
Randolph Motor Truck Company of Delaware; $100,000; incorporator, I. B. Lipson, 105 West Monroe street, Chicago, Ill.

WITH THE MANUFACTURERS.

J. Murray Page, one of the popular men along San Francisco's automobile row, has been appointed manager of the factory branch which the Locomobile Company of America, Bridgeport, Conn., is to establish in Los Angeles, Cal.

C. B. Thomas, formerly with the Studebaker Corporation, has become identified with the Metzger Motor Car Company, Detroit, as special travelling representative. Frederick Wade, who was also with the Studebakers, has become purchasing agent of the Metzger company.

R. A. Weinhardt, formerly mechanical engineer of the



Latest Photograph of the Goodyear Tire & Rubber Company's Plant at Akron, O., Showing New Administration Building and Garage.

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Hener Manufacturing Company, has joined the Continental Motor Company, Detroit.

The Jeffery-De Witt Company, Detroit, recently received an order for 1000 spark plugs from England.

The Cartercar Company, Pontiac, Mich., maker of Cartercars, is now running night and day in order to keep up with orders.

The Juno Motor Truck Company, Juneau, Wis., has been reorganized and new officers elected as follows: President, L. C. Pautsch; vice president, Theodore P. Hemmy; secretary, Henry A. Henning; sales manager, William McDougall.

The Olds Motor Works, Lansing, Mich., has leased a lot in Boston, at the corner of Commonwealth avenue and Cummington street, upon which will be erected a three-story building of reinforced concrete with a floor area of 26,000 square feet. It will be occupied by the Oldsmobile Company of Massachusetts, the New England representative of the Olds Motor Works, and will be operated as a sales and distributing house, with a complete service department in connection.

The Bower Roller Bearing Company, Detroit, is enlarging its plant considerably in order to take care of increased business. Contracts have been placed for new machinery and equipment to cost $50,000.

The Standard Roller Bearing Company, Philadelphia, recently installed new machines at a cost of over $100,000. This move was made necessary to take care of the rapidly increasing business of the company.

The Continental Engine Company of Chicago is to move its plant to Dallas City, Ill., across the river from Burlington Ia. The company is also to be reorganized, Charles Barry, formerly with the Deering Harvester Company, and T. C. Mars, formerly with the Model Gas Engine Works, joining the organization.

The Belvidere Screw & Machine Company, Belvidere, Ill., has increased its capital stock from $100,000 to $200,000, in order to provide for expansion. Contracts have been awarded which will more than double the present factory, which is now running day and night on spark plug and other automobile work. The output for this year will reach the million mark in plugs.

The Brooks Manufacturing Company, Saginaw, Mich., has succeeded to the delivery wagon business of the Duryea Auto Company and is now engaged in the manufacture of light delivery wagons under the Duryea patents. The passenger vehicle business has been taken over by the Duryea Motor Company of Saginaw, which is headed by Charles E. Duryea.

The Long Manufacturing Company, Detroit, Mich., has sold its plant to the Cadillac Motor Car Company and will build a new factory, 270 by 120 feet, on a site which it has bought. Double the floor space of the old factory will be afforded, and the output of the company's radiators will be increased materially.

The Resilio Tire Filling Company, Elmira, N. Y., has secured a plant at First and State streets, where it will manufacture a tire filling compound. George B. Wilcox has been secured as superintendent.

The Matheson Automobile Company has opened a temporary establishment in Philadelphia, at 203 North Broad street, in charge of B. M. Westerman. A permanent factory branch is to be established in that city.

The Eagle Company, Newark, N. J., has discontinued the manufacture of Standard Friction and X-L windshields, and sold its entire stock of those shields to Charles Weidman, New York City. This move was made because the factory space was needed for other manufacturing The company is to confine itself to the Eagle Rain-Vision shield

Hall's Garage, 131 Clinton street, Wausau, Wis., has taken the agency for Truffault-Hartford shock absorbers and other products made by the Hartford Suspension Company, Jersey City, N. J., and in keeping with the policy of the latter concern has established an attaching station in connection with the regular garage business. The building, which is devoted to the needs of automobile and motorcycle owners, is shown in an accompanying illustration.

The Goodyear Tire & Rubber Company, Akron, O., has completed the additions to its factory, which now presents the appearance depicted in an accompanying illustration. Two of the new structures were the administration building and garage. The entire plant has a floor space of 1,000,000 square feet and affords employment for 5000 persons. The business of the concern is handled by 66 direct factory branches in the United States and Canada, in each of which the service system is an important feature. In addition there are a large number of agencies, each of whom is given liberal support by the home office.

The Abbott Motor Company, Detroit, has purchased a plot of land along Beaufait avenue, to the north of the present factory, and is to erect new buildings which will enable a 25 per cent. increase in the output of the company during the coming year.

The Motz Tire & Rubber Company, Akron, O., has opened a branch in Cleveland, O., at 2352 Euclid avenue, in charge of C. R. Serfoss. This move was made necessary by the increasing business of the company in that locality, the Motz cushion tire proving quite popular with Cleveland motorists.

E. C. Howard has been appointed sales manager of the Cadillac Motor Car Company, Detroit, succeeding E. R. Benson, who resigned to join the Studebaker forces.

The Goodyear Tire & Rubber Company, Akron, O., reports that its 1911 sales exceeded the sales for 1910 by 500 per cent., tire equipment for 102,250 cars being produced. This year the company plans to make tires for 250,000 automobiles.

W. W. Farnsworth, formerly with the Motor Wagon Company of Detroit, and before that with the Federal Motor Truck Company in the same city, has joined the Flanders Manufacturing Company, being connected with the advertising department.



Hall's Garage, Hartford Suspension Service Station at Wausau, Wis.

The Cadillac Motor Car Company, Detroit, has secured John Calder, formerly with the Remington typewriter, who will assist in the organization and production work.

Frank Smith, first assistant to Paul Smith in the sales department of the Studebaker Corporation, has resigned and it is rumored that he will shortly join the Metzger Motor Car Company.

Pratt, Carter, Sigsbee & Co., Detroit, has been experimenting recently with a single-cylinder truck of 800 pounds capacity. The car has been put through many long runs, and is to be shortly manufactured in a large factory which has been leased.

J. G. Phipps and C. W. Whitson, Detroit, have brought out a new electric with a 107-inch wheelbase. It is stated that manufacturing operations are to be commenced shortly.

Wallace H. Robertson, brother of George H. Robertson, the well known racing driver, has joined the sales department of the Simplex Automobile Company, New-York City, maker of the Simplex.

The Hagstrom Bros. Manufacturing Company, Lindsborg, Kan., announces the addition of a new department for the manufacture of dies, tools, special machinery, etc., for the purpose of making the numerous specialties produced by this company.

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GARAGE AND DEALER.

Charles Doughman, Ottawa, Kan., has taken the local agency for Lion cars, made by the Lion Motor Car Company, Adrian, Mich., and will conduct a garage and salesrooms in addition to his hardware store.

Winegarten & Holmes has opened a new garage in the Carter block Jottingham, Ill.

The Shelton Garage, Ansonia, Conn., is now in the hands of J. N. Sinsabaugh, he having purchased the interest of Frank Alling, who has gone to New Haven to open a garage.

The Big Rapids Automobile Company, Big Rapids, Mich., is installing new machinery, including a drill press and a lathe. This will enable the concern to handle almost every class of automobile repair work.

The Texas Motor Car & Supply Company, Cuero, Tex., has bought the automobile business of Richter & Cook and is to move into the Knights of Pythias building, which is being fitted up especially for use by the company.

The Morgan Garage at I and Tuolumne streets, Fresno, Cal., was recently sold to A. J. Arnaudon of Mendota, for $45,000. It is a two-story brick building a little over a year old, and will be continued under the same management.

The Pan-American Motors Company, recently organized in San Francisco, Cal., to handle Michigan and Moon cars for the northern Pacific Coast, is to build a new structure at a cost of $300,000 at Golden Gate avenue and Hyde street. It is planned to make it one of the most modern and attractive in the city, the plans calling for what is remarkable in a city establishment—namely, a 20-foot lawn in front. The building will be of steel and concrete, thoroughly fireproof.

The Tire & Auto Service Company is the title of a new concern which is located at 1580 Woodward avenue, Detroit, just beyond the Grand boulevard. The company carries tires principally, but also handles a large line of accessories and supplies.

The Donaldsonville Garage Company, Donaldsonville, La., is erecting an addition to its garage to be utilized as a paint shop, 26 by 38 feet. It will be divided into two rooms, one an air tight and dust proof drying room.

The Dove Machine Company is a new concern in South Lawrence, Mass., occupying a $30,000 brick structure at the corner of Broadway and Groton street. The building is thoroughly equipped with all kinds of machine tools for automobile repair work, including a large power hammer.

The Richardson Tire Company, Hartford, Conn., recently moved into new quarters at 20 Ford street, in order to secure more room to accommodate its rapidly growing business. The firm makes a specialty of tire repairing and carries a full line of supplies.

The Mandel-Frisbee Auto Repair Company, Sioux City, Ia., has just opened a new garage at 312 Pearl street. An automobile livery is being conducted, and the establishment includes a repair shop and painting rooms.

The Maine Motor Car Company, Portland, Me., was recently organized to succeed the Maine Motor Carriage Company. Offices have been taken at 43 South street, where car sales will be handled until Nov. 1, when the garage and accessory department will be turned over to the new company, which has $50,000 capital.

The Five Points Auto Company, Fort Smith, Ark., recently opened for business at 913-15 North A street, with J. R. Braidwood and A. W. Chisholm in charge.

Lusted & King, San Diego, Cal., has leased the establishment at 1140 Second street known as the Modern Automobile Shop, and will continue it under the name of the Pioneer Auto Brokers. Second hand cars will be handled, and a repair shop conducted.

The Florida Appersen Sales Company, Jacksonville, Fla., has moved to 325 West Adams street, taking the quarters formerly occupied by the Miller Automobile Company and securing room for a larger display of cars.

The Hailey Auto Company, Hailey, Id., has been bought by Furcht & Thorp, who will conduct a repair shop and livery business.

The W. P. Barnhart Company, Washington, D. C., has leased the store at 1707 Fourteenth street, N. W., where the Everitt car will be handled after extensive alterations have been made.

Julian Howard, Jacksonville, Fla., has moved from his former location to 532 West Forsyth street.

The W. H. McIntyre Company, Auburn, Ind., has appointed a number of new agents who will handle the McIntyre line of motor trucks in their respective localities. The new agents follow: McIntyre Commercial Car Company, Hartford, Conn.; Mechaley Auto Company, Stamford, Conn; Shinkle, Richardson & Co., Huntington, Ind.; Fox Brothers, La Crosse, Wis.; McIntyre Auto Sales Company, Webster, N. Y.; Imperial Motor Car Company, Nashville, Tenn.; C. E. Swanson, Chicago, Ill.; Syracuse-McIntyre Company, Syracuse, N. Y.; Werick Brothers Motor Car Company, Buffalo, N. Y.; George R. Beeson, Connersville, Ind.; Kingman Plow Company, St. Louis, Mo.; Bradley, Merriam & Smith, Council Bluffs, Ia.; E. Wiley Hill, Butte, Mont,; McKee & Scott, Fresno and Bakersfield, Cal.; McIntyre Auto Sales Company, Albany, N. Y.; Standard Motor Truck Company, Boston, Mass.; D. F. Head, Ithaca, N. Y.; H. H. Maurer, New Berlin, Penn; Lovegrove & Co., Philadelphia, Penn; F. B. Austin, Little Falls, N. Y.; Banta Brothers, Peoria, Ill.; J. J. Aker, Schenectady, N. Y.; Owen M. Smith, South Whitley, Ind.; F. A. Burmeister, Memphis, Tenn.; Hartford City Auto Company, Hartford City, Ind; J. August Schmidt, Gloversville, N. Y.

The Wesco Supply Company, St. Louis, Mo., with branch houses in Birmingham, Ala., and Ft. Worth, Tex., has taken the agency for Hagstrom spark plugs and other products of Hagstrom Bros., Lindsborg, Kan.

Duquesne Garden, Pittsburg, Penn., one of the city's main amusement places, is to be remodelled into a garage which will be one of the largest in the country.

The R-C-H Corporation, Detroit, has signed agency contracts with the following: J. H. Reichhardt Company, Cornell, Ill.; Rudolph Dittmar, Masbach, Ill.; the Capitol Motor Car Company, Raleigh, N. C.; Crescent Garage, Riverside, Cal.; Clark's Garage, Pomona, Cal.; Alfred S. Donau, Tuscon, Ariz.; G. F. Wisegarver, Decatur, Ill.; Weir-Moore Motor Company, Monmouth, Ill.; Fred Fiene, Freeborn, Minn.

The King Motor Car Company, Detroit, has appointed new agents as follows: Coleman Cutchins, Richmond, Va.; Barton Ford Motor Company, Cedar Rapids, Ia., and S. J. Wise & Co., Boston, the last named, for New England. The King car is now being manufactured in a new factory which is being run night and day to fill orders.

The Auto Inn in Columbia City, Ind., at the corner of Van Buren and Washington streets, is now in the hands of Waterfall & Rumsyre, Ralph Widdifield having sold his interest in the firm to Adam Rumsyre.

L. J. Botts has opened a garage and salesroom in Red Oak, Ia., in the Stevens building, corner of Reed and Second streets.

Maurer & Miller, Freeport, Ill., has moved to 17 Stephenson street, where more room is afforded to handle the firm's line of Maxwell and Reo cars.

L. A. Dyson, conducting the Independent Auto Tire & Repair Shop at 106 East 17th street, Rock Island, Ill., has enlarged his establishment by the installation of a complete vulcanizing outfit.

The Fairmount Motors Company, Fairmount, Minn., is now occupying its new garage at Main and Second streets. The building is 110 by 52 feet, and will hold 65 cars.

The Chase Motor Truck Sales Company, Minneapolis, Minn., has opened a new salesroom at 1507 Hennepin avenue, in the automobile district.

The Queen City Garage, Cumberland, Md., is now in charge of W. S. Burger, who bought the interest of A. B. Cochrane. B. H. Bias is assisting Mr. Burger in conducting the business.

The Murray O'Neill Company, New Bedford, Mass., is now fully settled in its new garage at 497-501 County street. The building is well protected against fire, the boiler room being separated from the rest of the departments, while the gasoline room is divided from the brazing department by a concrete wall.

Robert Collins, formerly with the Motor Shop in Trenton, N. J., has opened an establishment at 210 West Hanover street, called the Hanover. A repair shop is conducted and supplies and accessories carried.

The Bruns Automobile Company, Brooklyn, N. Y., has opened a new garage at New York and Atlantic avenues. This is one of the most modern buildings in the city, being completely equipped for the work of a service department.

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NEW HENDERSON CAR HAS NOVEL FEATURES.

THE advent of the Henderson car to the motor vehicle market of America has directed attention quite as much to the producer as to the product, a not unexpected result because of the association of practically all the members of the Henderson Motor Car Company with leading automobile manufacturers of the country. The organization is made up of men who have been prominent in producing and selling vehicles of known reputation, and have not only a knowledge of the demands of the people, but experience that well qualifies them for building cars that will be representative of the industry.

The Henderson Motor Car Company was created by men who carefully studied the market and the requirements of the motorists to determine what class of vehicle would meet a general demand. The investigation was to determine as a business proposition the conveyance that would in the largest measure satisfy the wants of those who now or may utilize motor cars. There were many factors to be considered in reaching a conclusion, chief of which was the design that would have every quality desirable and yet be within the limitations of the class whom it was decided would be the buyers of such machines.

The men composing the company were associated with other prosperous and busy enterprises, and to interest them it was necessary for the promoters to demonstrate as business men to business men that there was not only a need but a demand for a vehicle that would have every qualification for all-around service, and would be enduring and substantial when contrasted with machines of larger power and price. The personnel of the company was selected with a view of creating a progressive and efficient organization, that would be capable of demonstrating the worth of the cars and developing a market for them with reference to the entire country.

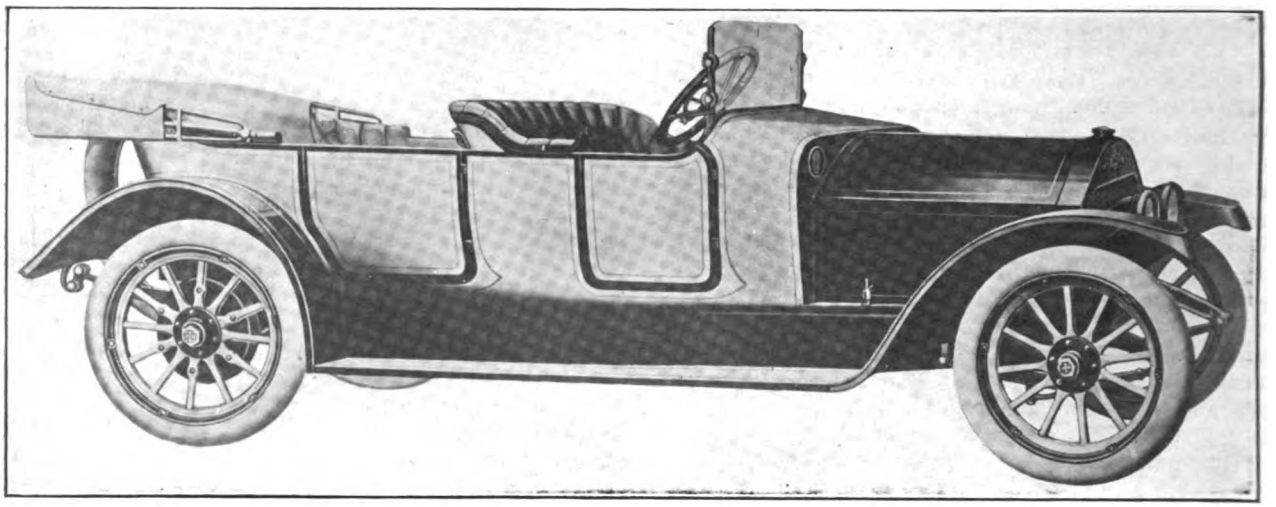
With a knowledge of the conditions for distribution and the necessity of a campaign that would effectively and successfully exploit the car, the company was developed with a view of directing the selling quite as carefully as it was proposed to construct the machines, and with the consummation of the project the Henderson Motor Car Company inaugurated its manufacturing and distributing with men of abundant experience at the head of each department and all in thorough harmony.



Mayor Shank Introducing and Christening the Henderson Car at Its Formal Public Appearance at Indianapolis.

The company is headed by L. Carter of Jessup, Ga., who has interest in many enterprises, and with him are associated R. P. Henderson, L. S. French, C. P. Henderson, C. K. Share, Chester S. Ricker and E. E. Rogers. The president is Mr. Carter, who was president of the Henderson Motor Sales Company. R. P. Henderson is vice president and general manager. He was associated with his brother in the Henderson Motor Sales Company and was for a considerable period of time sales manager of the Parry Manufacturing Company, one of the largest manufacturers of horse carriages in the Middle West. Mr. Henderson is one of the best known men in the automobile in-

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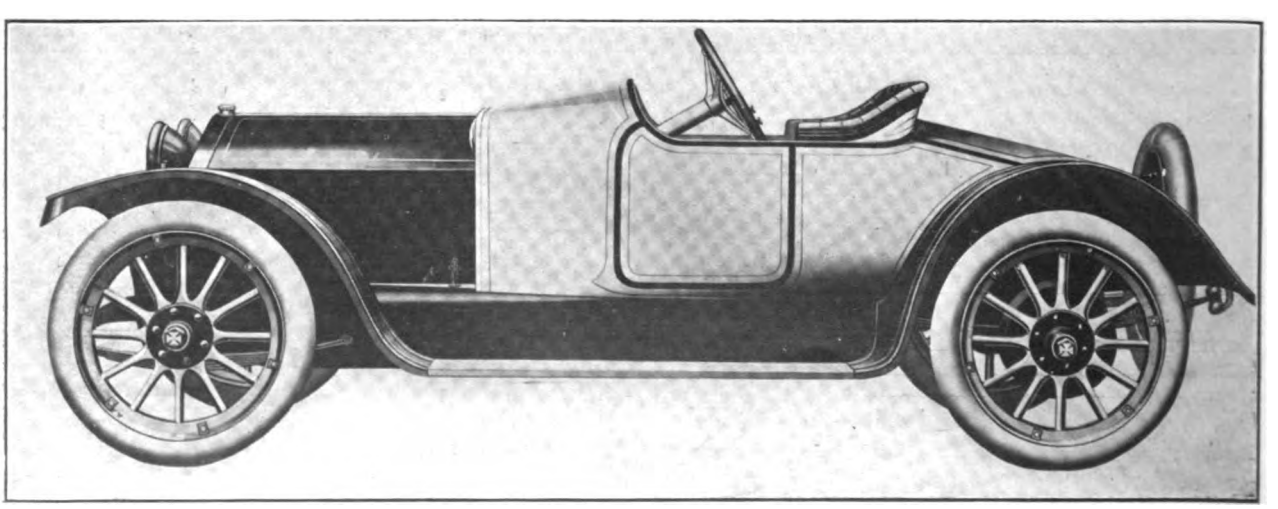


The Five-Passenger Touring Car Body Equipment, Known as Model 46, on Standard Henderson Chassis.

dustry, he having been for years in direct contact with those engaged in the distribution of carriages, and later with those selling motor vehicles. The secretary and director of advertising is Lucius S. French, whose experience in promotion and publicity work has been exceedingly broad, and who has a wide acquaintance throughout the country. He was advertising manager for the Henderson Motor Sales Company. The treasurer is C. K. Share, who was for a considerable length of time treasurer of the Willys-Overland Company and is regarded as one of the best of automobile factory accountants.

The directorate is Mr. Carter, R. P. Henderson, C. P. Henderson, director and sales manager of the Cole Motor Car Company; Chester S. Ricker and E. E. Rogers. The factory organization will be directed by R. P. Henderson, who will be assisted by Charles A. Trask as factory manager, by Chester S. Ricker as chief engineer, and by Fred E. Wilson as sales manager. Of these Mr. Trask was until recently director of one of the largest companies in the group constituting the General Motors Company, is chairman of the committee on papers of the Society of Automobile Engineers, and has by a recent visit to European automobile factories materially broadened his knowledge and become familiar with the most advanced of Continental practises. Mr. Ricker is a member of the Society of Automobile Engineers and a technical writer as well as an engine expert. Mr. Wilson was connected with the Marion Motor Car Company as sales manager and his knowledge of the trade throughout the country is exceedingly comprehensive.

The company has capital of $100,000 and it has leased the factory owned by the National Casket Company at North West and 14th streets, Indianapolis, Ind., for a term of years, this having been used for factory purposes by the company prior to this transaction. The property has an area of five acres and the buildings are three and four stories in height, with frontage of 212 feet in North West street and 106 feet



The Two-Passenger Roadster Body Equipment, Known as Model 44, on Standard Henderson Chassis.

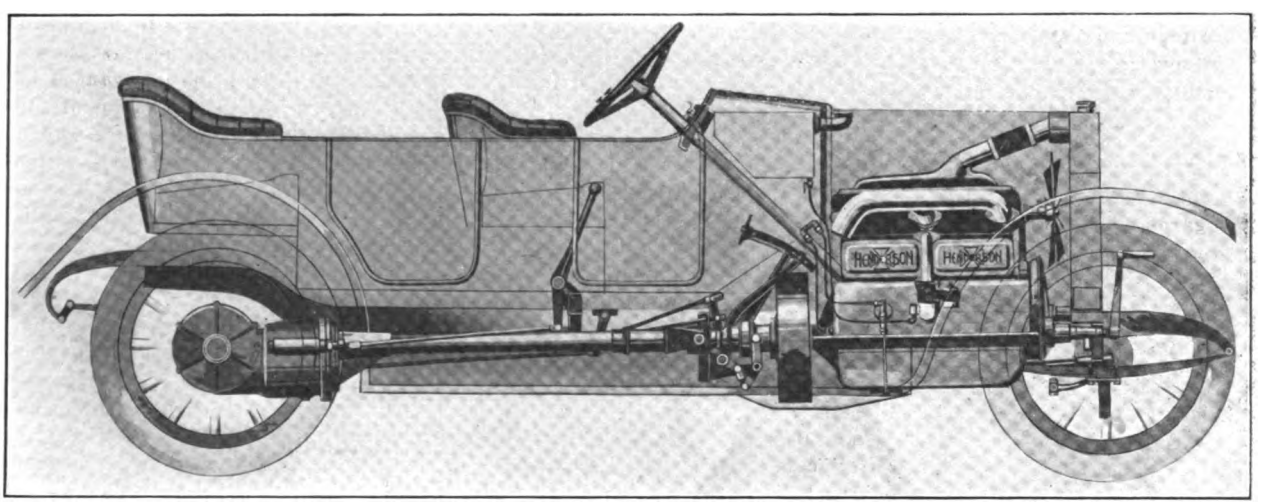
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in 14th street. They are adapted for manufacturing, being well lighted, ventilated and sanitary, and the transportation facilities for receiving and shipping are of the best. There are abundant possibilities for expansion and the capacity of the plant may be increased many times as the demands for cars shall necessitate greater facilities.

The initial Henderson car was formally seen in Indianapolis May 29, when it was presented to the public for the first time, the occasion being the day prior to the second annual international sweepstakes at the Speedway, which event had attracted to that city motorists from all over the country and abroad. So far as is known no automobile was ever introduced to the motoring world with similar formalities.

An automobile parade was inaugurated at University Park and this was made up of a police escort, a military band, and something more than 50 cars representing practically every automobile manufacturer in Indianapolis, as well as a number of representatives of other manufacturers. At the head of the line was the Henderson touring car that was receiving its official welcome, and in this was Mayor Shank and other dignitaries of the city. The cars were decorated with pennants bearing the name of the new car and badges were distributed to thousands, these representing a stork carrying the new Henderson car in its beak. The demonstration was formally concluded at Monument circle, where Mayor Shank made an address, in which he expressed his pleasure to welcome the first popular priced car to be made in Indianapolis, which, in the name of the municipality, he christened "Henderson." He then wrote the words "I Christen Thee Henderson" on the hood of the car with a mammoth pencil. The car, decorated with flowers, was then taken to the Claypool hotel and there displayed in the centre of the lobby until May 31, where it attracted no end of attention from the visitors.

The Henderson car is built as two models, 44 being the roadster and 46 the five-passenger touring car, the difference being in the body equipment, the same chassis serving for both types. The bodies differ broadly and yet they are so designed that the same qualities and the same characteristics appear in both. It should not be assumed that the chassis is in any way experimental. To the contrary it has been designed to principles well established and indorsed by sound engineering practise. That is to say, nothing has been accepted unless it is known that it will add to the endurance, service or appearance of the vehicle. The construction is in every way substantial, there being a large factor of safety in each detail, all of the wearing parts being of unusually large proportions and so designed that there may be ample compensation for wear. Extreme care has been taken to insure endurance of the machine and this has resulted in a design of harmony and balance throughout. The power is ample for all requirements and the vehicle has sufficient speed and accommodation to meet the approval of those who want a serviceable and practical car.



The "X-Ray" View of the Henderson Touring Body and Chassis, Showing Side Detail of the Power Plant and Driving System.

The chassis description will suffice for both models, but each body must be described separately.

The motor is a highly perfected construction of four cylinders, water-cooled, of the L head type, with the cylinders cast en bloc, this being a practise that has been very generally followed abroad and had found much favor with American designers. The motor block is cast of a high grade quality of gray iron and with the intake manifold integral, this simplifying the design and permitting an assembly that is claimed to have especial advantages. The block is formed with the head open so that there is full access to the water spaces, which are unusually large and free from obstructions. The water jackets may be thoroughly cleaned of the core and full insurance made against blow holes and similar imperfections.

The engine block is bored, machined, then aged

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and later reamed and ground to size, this process minimizing the possibilitity of damage from internal stresses. The cylinder bore is 4.125 inches and the stroke 5.250 inches, this giving a ratio of bore to stroke of one to 1.27, and by the standard formula of the Society of Automobile Engineers the rating is 27.2 horsepower. The engine will, however, develop 35 horsepower by conservative estimate. The pistons are of the same material as the cylinder block and after being turned to size are aged and carefully ground. These are channelled for four rings of the eccentric form, which are ground to exact fit on the edges and the outer periphery.

The crankcase is a two-piece casting of aluminum alloy, divided at the main engine bearings and the bottom of the lower section is formed by low webs into four compartments for the splash lubrication, while below this is the oil reservoir, a special pan or sump that is bolted to the bottom of the engine case and which may be readily removed should it be necessary to clean it. The forward end or web of the crankcase carries the end bearings, and the timing gears are covered by an aluminum housing or cover. In the division of the engine base the upper half carries the main engine bearings, which are three in number, both sections being strengthened by bridge work that insures against driving stresses.

The crankshaft is an alloy steel drop forging that is heat treated to show a tensile strength of 120,000 pounds to the square inch. It is formed with three main bearings, the rear being 2.125 inches diameter and four inches length, the centre being two inches diameter and 2.5 inches length, and the forward bearing 1.75 inches diameter and 3.125 inches length, this giving a total bearing surface length of 9.625 inches. The crankpins of the shaft have liberal diameter and unusual length. The entire construction is designed to endure much heavier service than it will ever be subjected to. The crankshaft is mounted in bearings of nickel bronze, for which great service and endurance is claimed. It is removable from the rear of the crankcase; not a difficult operation.



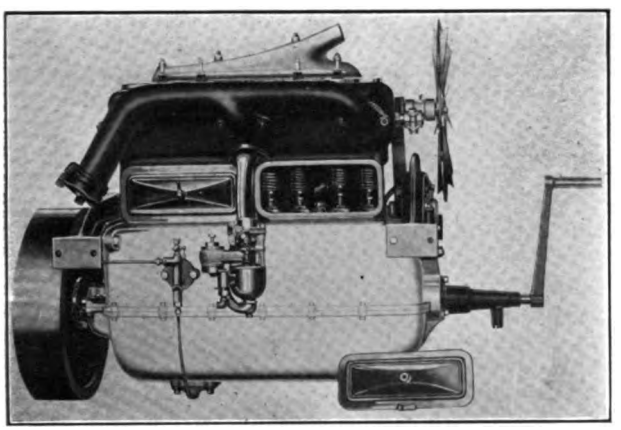
The Factory Buildings at North West and 14th Streets, Indianapolis, Ind., Leased for a Long Term by the Henderson Motor Car Company.

The connecting rods are of the same material as the crankshaft, a fine alloy steel, heat treated, and are drop forged I section. The bearings of big ends of the connecting rods are nickel bronze and are fitted with shims for adjustment, the caps being retained by bolts and nuts. The small ends are bushed with the same bearing metal, and the wristpins, of heavy tube, hardened and ground to size, are secured in the piston bosses by cap screws that project through them. There is no possibility of a wristpin becoming loose.

The camshaft is a drop forging of high quality al-

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loy steel with the cams formed integral. This is heat treated and the cams and bearings are carefully cut and ground to size. This shaft is removable from the



Right Side of the Henderson Power Plant.

forward end of the engine case, and that it may endure under all side pressure leverage and that the bearings may not be subjected to abnormal service they are made unusually large. The front and centre bearings are two inches diameter and 1.25 and 1.5 inches length, respectively, and the rear bearing is one inch diameter and three inches length, there being a total bearing surface length of 5.75 inches. The camshaft bearings are of nickel bronze save the forward bearing, which has a bushing of phosphor bronze.

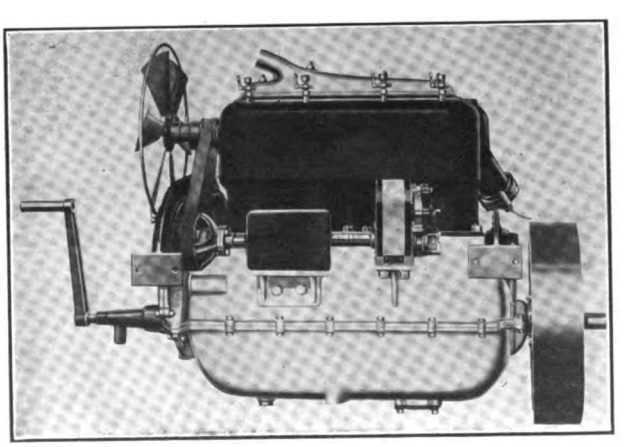
The valves are at the right side of the motor, with ports 2.125 inches diameter, the heads being cast iron with nickel steel stems, electrically welded. The valves have a clearance of .375 inch, this insuring a full charge of fuel being drawn into the cylinders and complete clearing of the products of combustion. The valve stems are operated in cast iron guides which may be replaced when worn. The valve tappets are of the mushroom pattern and are lifted by the hardened and accurately cut cams. The upper ends of the tappet rods are fitted with hardened adjusting screws and nuts to compensate for wear. The tappets operate in substantial guides bolted to the engine case. The valve stems, springs and tappets and the guides are enclosed in pockets formed by webs extending from the cylinder block and by plates that may be clamped into place instantly. This protects these moving parts from accumulations of abrasive substances and much prolongs the life of the mechanism.

The timing gears are of large diameter and wide face and are spiral cut to insure noiseless operation. The left gear drives the electric generator and magneto by an outside shaft, and the fan that supplements the radiation system.

The power plant is cooled by a thermo-syphon system of six gallons capacity, the water circulating through the large water spaces, entering the motor block at the base of the water chamber by a two-inch diameter inlet, and rising and passing out through a manifold with 2.5-inch diameter outlet to the upper portion of the radiator. The motor block head is covered with a large cast plate with which the outlet is integral, the plate being secured to the block by cap screws. The radiation is supplemented by a large fan carried on a bracket at the front of the motor block, the fan shaft being in a bearing that is adjustable by an eccentric to secure efficient belt tension.

The motor is lubricated by a supply of oil drawn from the reservoir beneath the engine case by a plunger pump operated by a bevel gear on the camshaft, and forced through a system of tubes and a sight feed on the toe board in the driver's compartment of the body to the three main bearings of the engine. The quantity of oil is automatically increased with engine speed and the motor bearings are always flooded, the overflow draining into the base of the crankcase and the casing that contains the timing gears. The timing gears are driven in a bath of oil, but the drainage of lubricant fills the pits beneath the big ends of the connecting rods, which sweep into them at every revolution. The splash lubricates the camshaft bearings, cams, tappets and tappet guides, the wristpin bearings, the cylinder and piston walls. As the oil accumulates in the pits it drains, after a constant level has been reached, to the reservoir, where it is filtered and again pumped through the system. The capacity of the oil reservoir is two gallons, a sufficient supply to drive for several hundred miles.

Carburetion is claimed to be a special quality with this engine, through a combination of conditions entering into the design. The inlet manifold is incorporated with the cylinder block and the form of this manifold, the fact that it is heated, and that there is but a very short "riser" attaching the carburetor to the motor, insures a uniformity of the carburetion. The carburetor is a float feed automatic type and it is fitted with a water jacket for heating in the event

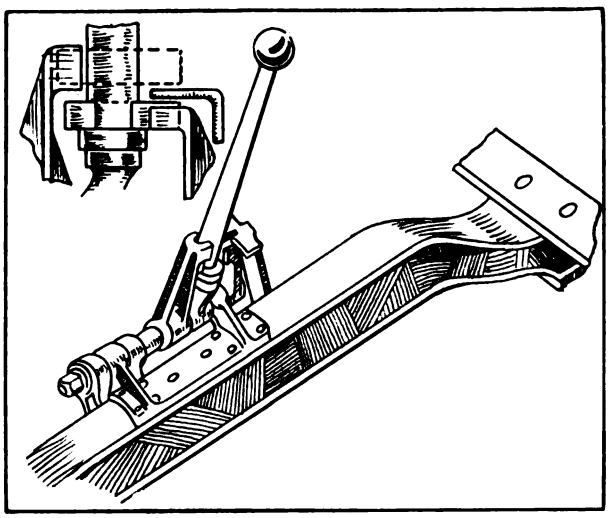


Left Side of the Henderson Power Plant.

of cold temperatures, but this is seldom needed save at very low temperatures, because of the design of the manifold. The statement is made that the motor

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is not only unusually productive in power, but is exceedingly flexible and dependable at all speeds, and that low gravity gasoline, now so frequently sold, can



Henderson Gear-Shifting System.

be used with excellent results.

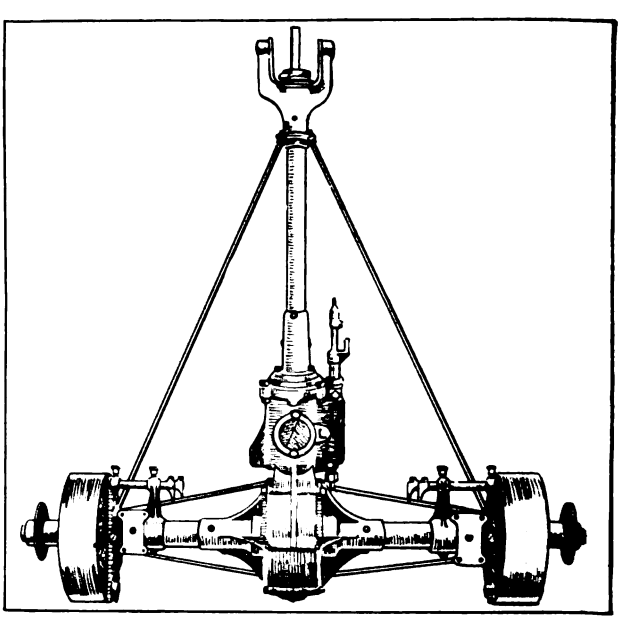
The ignition is by a Remy low-tension magneto that is mounted on a bracket at the left side of the engine case and at the rear end of the outside camshaft, being connected with this shaft by a flexible coupling. The current created by this magneto is sent through a transformer coil mounted on the dash and thence returns to the distributor of the magneto, by which it is distributed to the spark plugs of the engine. This is the Remy system, familiar to many motorists. While this is the usual source of current supply it is supplemented by a storage battery that may be drawn upon for starting, or may be used as a spare.

It may be well, because of the relation of the ignition with the lighting of the car, to explain the method of lighting. This is by the Ward Leonard system, which is a standard equipment and is regarded as being in every way dependable. It consists of a small dynamo located on a bracket at the left side of the engine case that is driven from the outside camshaft. This current is carried to two storage batteries located under the seat of the driver, and from these the current is supplied to the lamps and to the magneto distributor in the event of starting or other need. That is, the generator supplies current for lighting and storage when the engine is running and battery supplies current for lighting when the engine is not running, there being automatic means for controlling the supply.

The battery is not charged until the engine is driven at a speed corresponding to 10 miles an hour, but after that it is charged so long as the motor is operated, an automatic electric switch interposing resistance in the dynamo field so that the battery cannot be overcharged or damaged. The variation of the charging current is practically between the speeds of 10 and 18 miles an hour of the car. The batteries need never be taken from the car and the only attention required is to add distilled water at monthly intervals to compensate for the evaporation of the electrolyte. One of the batteries is used exclusively for lighting and the other for ignition purposes. The lighting is controlled by a switch located on the dash and the driver may instantly light all of the lamps or any combination of them.

The engine need not be cranked as it is equipped with a Disco starter and it may be started as frequently as desired within the limitations of the Prest-O-Lite tank that supplies the gas for the initial explosions. The starter is operated from the seat of the driver.

The power plant is mounted in the chassis frame on heavy arms cast integral with the crankcase and it is suspended so low that there is practically no inclination of the driving shaft, this being a straight line when the car is under load. The clutch is of the cone design incorporated with the flywheel and the cone is 15.75 inches diameter, the face being 2.75 inches width and with an angle of 12.5 degrees. The cone is leather faced and it is actuated by a ball thrust collar that is moved by the conventional pedal. The clutch engages easily and it will not slip or "crab." The pressure is governed by a spring that may be adjusted to obtain any desired tension, merely by removing the universal joint at the rear of the clutch assembly. There is a toggle action interposed between the pedal and the thrust collar so that the foot of the operator is relieved of all clutch spring pressure after the pedal has been moved about two inches. This makes the operation of the clutch a very



Henderson Driving System, Transmission and Rear Axle.

easy process. Back of the clutch is a large universal joint that compensates for every possible distortion of the chassis frame from road stresses.

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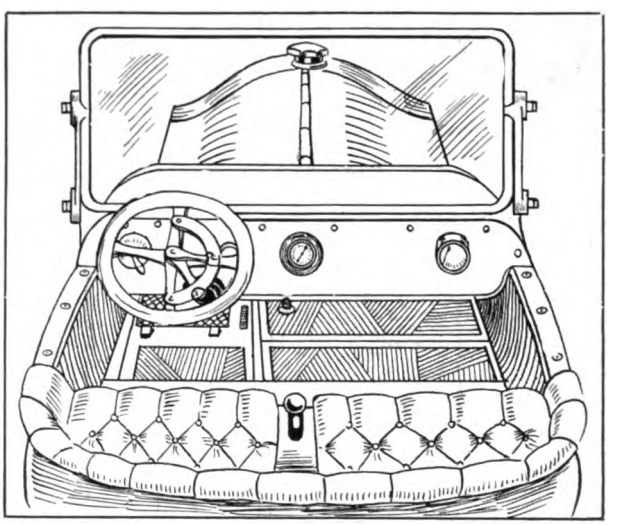
The coupling of the clutch shaft and the main driving shaft is ahead of the forward end of the heavy torsion tube. This tube carries at the forward end a large, wide yoke that is attached to a strong cross member of the chassis frame, and is secured by bolts so that the tube may move with the rise or fall of the rear axle without stresses upon the shaft. The torsion tube at the rear end is bolted to the transmission case, which is bolted to the strong steel shell of the rear axle housing, making a single assembly. This rear construction is the Stutz rear system and it is known as a three-quarter floating rear axle. The gearset is selective sliding type, giving three forward speeds and reverse, the gears and shafts being of selected metal, the gears having wide faces for endurance, and the shafts being mounted on annular ball bearings. The gears are of nickel steel and are so proportioned as to size and pitch that speed changing is easy and practically noiseless. The differential is of conventional design. The driving shaft and the axle shafts are carried on large roller bearings. The axle shafts are of nickel steel and are made with squared ends with conical collars just inside the squared ends that receive the wheel hubs. In the hubs are similarly tapered holes into which the shafts are fitted and are retained by nuts. The axle housing is heavy and the entire construction is very strong.

The chassis frame is a channel section with a width of four inches of pressed steeel, cambered at the front end to afford a wider wheel lock and raised 5.25 inches at the rear under the tonneau seat to permit the use of the springs. This is suspended on semi-elliptic springs 38 inches length and two inches width forward, and three-quarter elliptic springs 50 inches length and two inches width at the rear. The front axle is a drop forged steel I section 2.5 inches depth and 1.5 inches thickness. The steering knuckles are heavy and the wheel spindles are 1.5 inches diameter. The tiebar is behind the axle for protection against contact with road obstructions. The wheels are of wood, artillery type, and are fitted with demountable rims and 34 by four-inch tires. The wheelbase is 116 inches.

The control of the car is by a steering column of Gemmer make, fitted with a 17-inch wheel, the spark and throttle levers being mounted above the wheel on quadrants. The driver sits at the left side of the car and the left pedal actuates the clutch, the "pushing through" or continuation of movement of the pedal disengaging the clutch and applying the service brake. The right pedal, ratchet retained, operates the emergency brake.

The speeds are obtained by a single lever rising through the deck and operating in a slot between the cushions of the driver's seat. This lever terminates in a hard rubber globe. The movement is forward and back, and raising and lowering. Instead of the conventional H slot and the side-to-side movement through the gate, raising or lowering the lever performs this operation. The lift or drop is very small. The connection may be seen in the X-ray view. Lifting the ball an inch and moving it backward two inches meshes the low speed gears; pushing the lever forward, allowing it to drop and again pushing it forward gives the intermediate speed; then drawing it back gives direct drive; reverse is obtained by lifting the lever and then pushing it forward.

The brakes are both internal expanding, the shoes being within drums of 14 inches diameter bolted to the rear wheels. Both sets are operated through equalizers and they may be adjusted by raising the floorboards and turning turnbuckles that are locked with wing nuts. No tools are required for this adjustment. The fuel is carried in a tank of 14 gallons capacity located directly behind the dash and above the extension of the toeboard, being fed by gravity to the carburetor, the quantity being shown by a gauge. Especial care has been taken to insure proper lubrication of all wearing parts, grease cups being the usual means of protection.



Driver's Seat and Control of Henderson Cars.

The bodies are of the straight line torpedo type, with deep cowl and wide doors, the forward entrance being 18 inches width and the rear 20. They are of wood frames and sheet metal, with sightly lines and excellent finish. The upholstery is of high class leather with full spring seat and back cushions, these being comfortably tilted. The front seat is 41 inches wide with four inches between cushions, the rear 47 inches. The mudguards are wide and graceful, being stayed forward by the bar lamp bracket. The wide running board is shielded by an ample splash apron. The dash lamps are set into the dash, and the tail lamp and registration plate holder are arranged in combination with a tire carrier at the rear. The lamps are finished with nickel and black enamel, this being the finish of the hardware of the car.

The equipment of the car, besides what has been described, includes an extra demountable rim, jack, tire pump, tire tools and repair kit, the required tools and a bulb horn.

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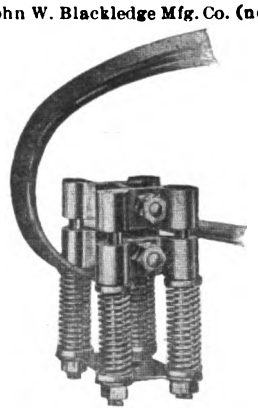
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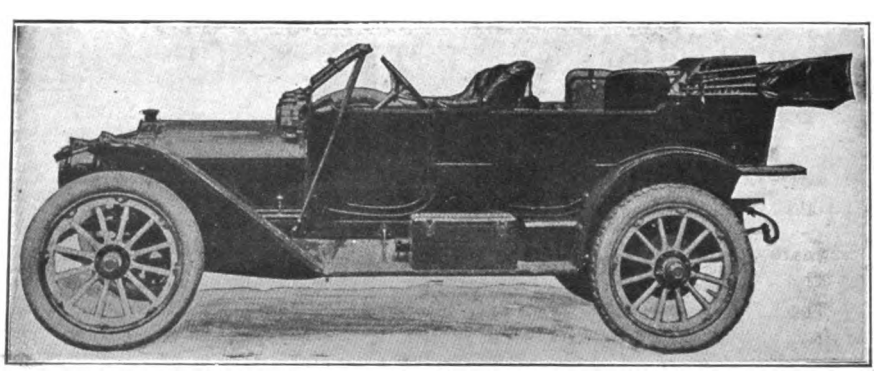
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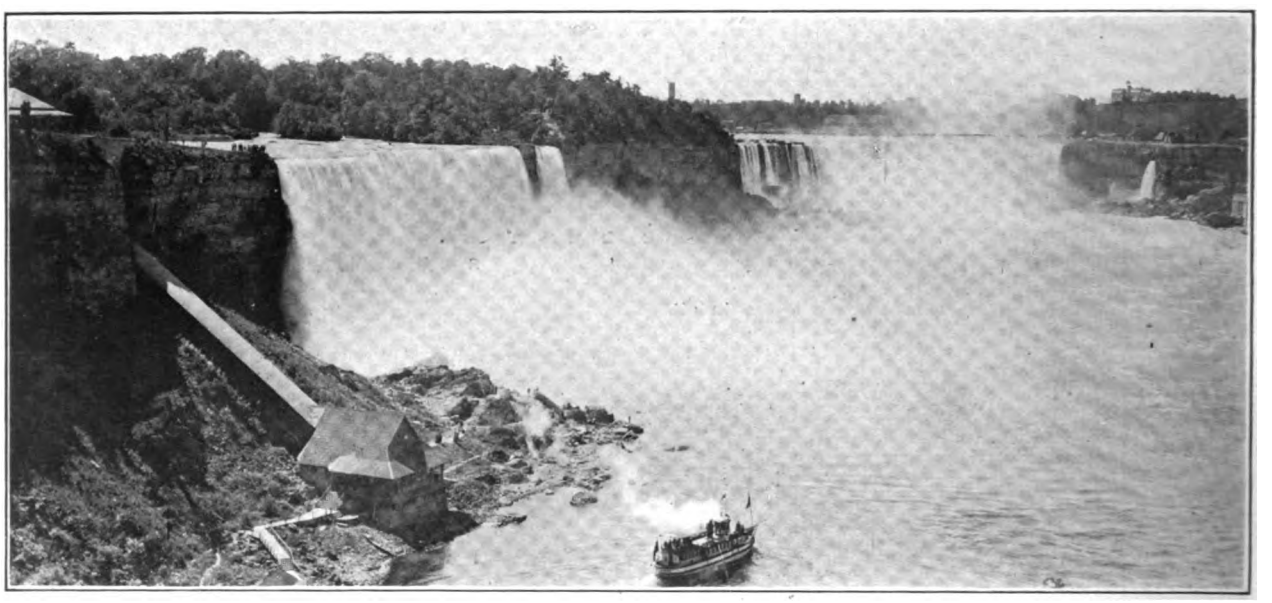
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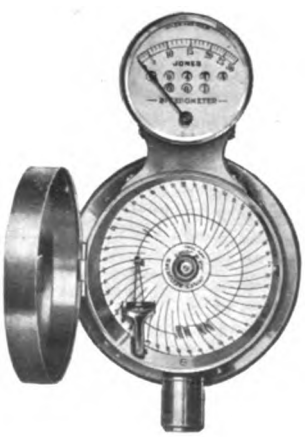
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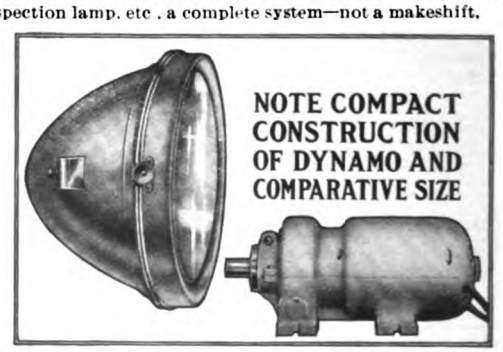
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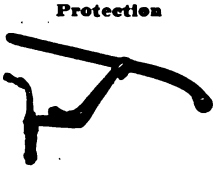
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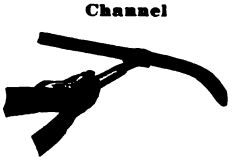


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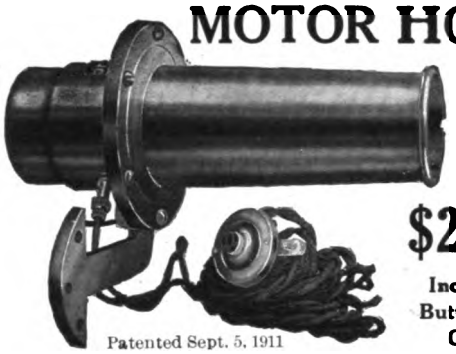
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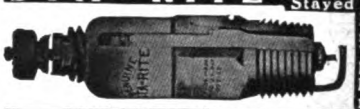
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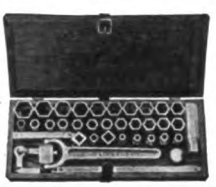
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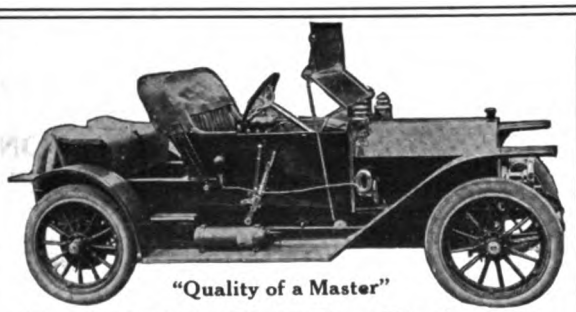


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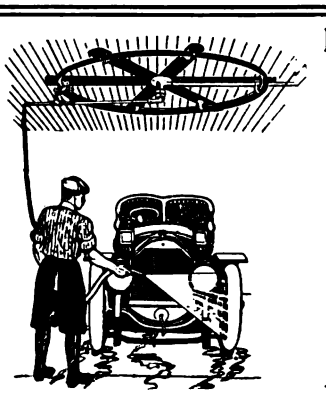
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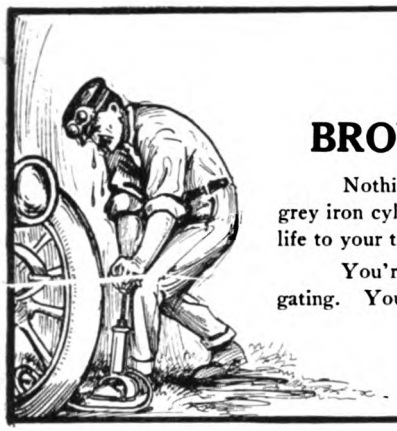
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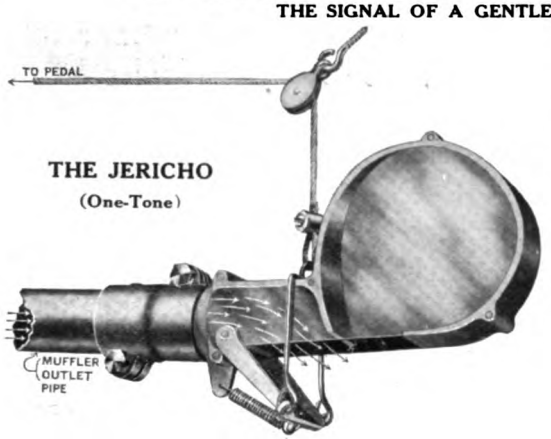
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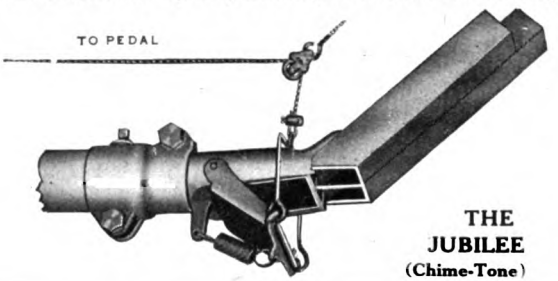


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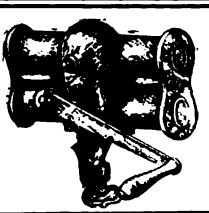
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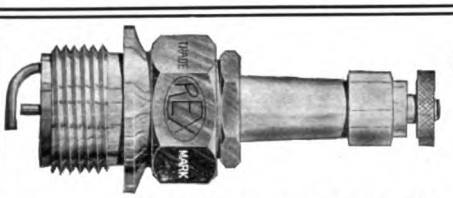
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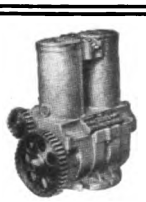
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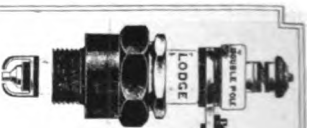


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National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.

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Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Duplex.)

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Williams Foundry & Machine Co., Akron, O.

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Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Diamond.)

CARBURETORS.

Sumner, George, Inc., 1841 Broadway, New York; 755 Boylston St., Boston (Rayfield.)

CARS—GASOLINE PLEASURE.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas-Knight.)
Branch: N. E. corner Broadway and 64th St., New York City.
Berkshire Motors Co., Cambridge, Mass. (Berkshire.)
Brush Runabout Co., 3 West 61st St., New York City. (Brush runabout, Liberty-Brush.)
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Columbia Motor Car Co., 3 West 61st St., New York (Columbia.)
Dayton Motor Car Co., 3 West 61st St., New York (Stoddard-Dayton.)
Haynes Automobile Co., 166 Main St., Kokomo, Ind. (Haynes.)
Henderson Motor Sales Co., Indianapolis, Ind. (Cole.)
Eastern Distributors, Colt-Stratton Co., Broadway at 68th St., New York City.
Herreshoff Motor Co., 620 Harper Ave., Detroit, Mich. (Herreshoff.)
Hupp Motor Car Co., 1268 Milwaukee Ave., East, Detroit, Mich. (Hupmobile.)
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Ideal Motor Car Co., Indianapolis, Ind. (Stutz.)

Imperial Automobile Co., Jackson, Mich. (Imperial.)

Inter-State Automobile Co., Dept. N, Muncie, Ind. (Inter-State.)
Branch: 153 Massachusetts Ave., Boston, Mass.

Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)

Kissel Motor Car Co., 174 Kissel Ave., Hartford, Wis. (KisselKar.)

Knox Automobile Co., Springfield, Mass. (Knox.)

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Lenox Motor Car Co., Inc., Boston, Mass. (Lenox.)
Branches: New York, Boston, Chicago.

Maxwell-Briscoe Motor Co., 3 West 61st St., New York City. (Maxwell.)

Mercer Automobile Co., 1100 Whitehead Road, Trenton, N. J. (Mercer.)

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National Motor Vehicle Co., 1033 22d street, Indianapolis, Ind. (National.)

Nordyke & Marmon Co., Indianapolis, Ind. (Marmon.)

Paige-Detroit Motor Car Co., The, Detroit, Mich. (Page-Detroit.)

Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: 660 Beacon St., Boston, Mass.,; Broadway and 57th St., New York City; Michigan Ave. and 25th St., Chicago, Ill.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

R. C. H. Corporation, 107 Lycaste St., Detroit, Mich. (R. C. H.)

Reo Motor Car Co., Lansing, Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Selden Motor Vehicle Co., Rochester, N. Y. (Selden.)

Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)

Studebaker Corporation, Detroit, Mich, (E-M-F, Flanders.)

United States Motor Co., 3 West 61st St., New York City. (Brush, Maxwell, Sampson, Stoddard-Dayton, Columbia.)

Warren Motor Car Co., Detroit, Mich. (Warren-Detroit.)

White Co., The, 828 E. 79th St., Cleveland, O. (White.)
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Willys-Overland Co., Toledo, O. (Overland.)

CARS—STEAM PLEASURE.

White Co., The, 828 E 79th St., Cleveland, O. (White.)
Branches: See Cars — Gasoline Pleasure.

CARS—GASOLINE COMMERCIAL.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branch: See Cars—Gasoline Pleasure.

Available Truck Co., 2334 Hamilton Ct., Chicago, Ill. (Available.)

Bessemer Motor Truck Co., Grove City, Penn. (Bessemer.)

Brush Runabout Co., 3 West 61st St., New York City (Brush.)

Cartercar Co., Pontiac, Mich. (Cartercar.)

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches: New York, Chicago, Boston, Philadelphia, Kansas City.

Grand Rapids Motor Truck Co., North St., Grand Rapids, Mich. (Hoosier Limited.)

Hupp Motor Car Co., 1268 Milwaukee Ave., East, Detroit, Mich. (Hupmobile.)
Branches: See Cars — Gasoline Pleasure.

Jarvis-Huntington Automobile Co., Huntington, W. Va. (Jarvis-Huntington.)

Knox Automobile Co., Springfield, Mass. (Knox.)

Mais Motor Truck Company, Indianapolis, Ind. (Mais.)

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Peerless Motor Car Co., The, Cleveland, O. (Peerless.)
Branches: See Cars — Gasoline Pleasure.

Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)

Reo Motor Car Co., Lansing, Mich. (Reo.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York City. (Sampson.)

Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y.. (Sullivan.)

United States Motor Co., 3 West 61st St., New York City. (Sampson, Brush, Stoddard.)

Victor Motor Truck Co., 1010 Ontario St.. Buffalo, N. Y. (Victor.)

Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Anderson Electric Car Co., Detroit, Mich. (Anderson.)

Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York City; 178 Devonshire St. Boston, Mass.

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit, Mich. (G. M. C.)
Branches. See Cars, Gasoline Commercial.

General Vehicle Co., Long Island City, N. Y. (G. V.)

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Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branch: See Cars—Gasoline Pleasure.

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Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: See Cars—Electric Commercial.

Knox Automobile Co., Springfield, Mass. (Knox.)

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United States Motor Co., 3 West 61st St., New York City. (Sampson.)

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Leather Tire Goods Co., Suspension Bridge Sta., Niagara Falls, N. Y. (Woodworth Treads, Kant-Skids.)

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Miller, Chas. E., 97-103 Reade St., New York City (Brampton.)
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Boston Clock Co., 16 State St., Boston, Mass.

Chelsea Clock Co., 16 State St., Boston, Mass.

CLUTCHES — AUTOMOBILE FRICTION.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford cone.)

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Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee, Wis.

Prest-O-Lite Company (Prest-O-Carbon Remover.) See under Acetylene Tanks for address of main office and branches.

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

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Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

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Goodnow Mfg. Co., 754 Old South Bldg., Boston, Mass. (Gasoline Gallon.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Tire Pressure and Gasoline Tank Gauges.)
Branches: In all principal cities.

HOISTS.

Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

HORNS.

Automobile Supply Mfg. Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)
Dean Electric Co., Elyria, O. (Tuto.)
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JACKS AND LIFTING DEVICES.

Canton Foundry & Machine Co., Canton, O. (Universal Combination Auto Jack and Emergency Truck.)
Hartford Suspension Co., 146 Bay St., Jersey City, N. J.
Branches: 1700 Broadway, 212-214 W. 88th St., New York City; 325 Columbus Ave., Boston, Mass.; 1437 Vine St., Philadelphia, Penn.; 1458 Michigan Ave., Chicago, Ill.; 289 Halsey St., Newark, N. J.; 1524 Grand Ave., Kansas City, Mo.; 801 Woodward Ave., Detroit, Mich.

LAMP COVERS.

Hopewell Brothers Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LAMPS—HEAD, TAIL AND SIDE.

Gray & Davis, 55 Lansdowne St., Boston, Mass.
Hawthorne Mfg. Co., 29 Spruce St., Bridgeport, Conn. (Old Sol.)

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

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Gray & Davis, 55 Lansdowne St., Boston, Mass.
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Remy Electric Co., Anderson, Ind. (Remy.)
Sager Co., J. H., 271 South Ave., Rochester, N. Y.

LOCK SWITCHES.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland, O. (Automatic.)

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Bretz Co., J. S., 250 W. 54th St., New York City (U. & H.)
Kimball Manufacturing Co., The, Motor Mart, Boston, Mass. (Mea.)
K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O.
Marburg Bros., 1777 Broadway, New York City (Mea.)
Remy Electric Co., Anderson, Ind. (Remy.)
Splitdorf Electrical Co., Walton Ave. and 138th St., New York City.
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MATS, ETC.

Sidwell Pedal Mat Co., 245 Columbus Ave., Boston, Mass. (Pedal.)

MEASURES, ETC.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Simplex.)

MOTORCYCLES AND SUPPLIES.

American F. N., Co., Boston (F. N.)
Branches: 49 Union St., Providence, R. I.; 415 Trumbull St., Hartford, Conn.
Emblem Mfg. Co., Angola, N. Y. (Emblem.)
Hawthorne Mfg. Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)
Liberty Rubber Co., Orange, N. J. (Motorcycle, Rubber-Mend.)
Swenson, B. A., 298 Blackstone St., Providence, R. I. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.
International Automobile Association, Sheldon M. Booth, Old South Bldg., Boston, Mass.

MOTORS AND POWER PLANTS.

Hazard Motor Mfg. Co., 785 Coates St., Rochester, N. Y. (Hazard.)
Western Motor Company, Marion, Ind. (Rutenber.)

OILS, GREASES AND OTHER LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York City (Colonial.)
Branches: Boston, Mass.; Fall River, Mass.; Philadelphia, Penn.
Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)
Eagle Oil & Supply Co., 104 Broad St., Boston (Eagleine No-Karbon.)
Fiske Bros. Refining Co., New York City (Lubriplsine.)
Branch: Pittsburg, Penn.
Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.
Havoline Oil Co., 17 Battery Place, New York City (Havoline.)
Branches: Pacific Coast — Kohl Bldg., San Francisco, Cal.; Western—People's Gas Bldg., Chicago, Ill.; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O., Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.
Haws, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 899 Boylston St., Boston.
Kellom & Co., Chas. F., 113 Arch St. Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.
Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York Lubricating Oil Co., 116 Broad St., New York. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle. Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.
New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York City (Polarine.)
Branches: In all cities.
Texas Company, The, 7 West St., New York City.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.
Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
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Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

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Wolverine Lubricants Co., 80 Broad St., New York City (Wolverine.)
Branches: 1402 Michigan Ave., Chicago, Ill.; 224 Milk St., Boston, Mass.; 119 North Front St., Philadelphia, Penn.; 702 Candler Bldg., Atlanta, Ga.

OIL AND GREASE PUMPS, GUNS, ETC.

Randall-Faichney Co., Boston, Mass. (B-Line.)

PATCHES.

Liberty Rubber Co., Orange, N. J. (Cementless.)

PRIMING PUMPS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y. (Crone.)

PUMPS, TIRE.

Brown Co., The, Syracuse, N. Y., (Brown Impulse.)

Clarke Pump Co., 1489 Washington St., W. Newton, Mass. (Crown.)

Hawthorne Mfg. Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RIMS — REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittlesey Demontachable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)
Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

RUBBER CEMENT.

Liberty Rubber Co., Orange, N. J. (Liberty Patching.)

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago (National.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland, O. (L B A)
Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")
Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

Sumner, George, Inc., 1841 Broadway, New York; 55 Boylston St., Boston (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Kimball Mfg. Co., Motor Mart, Boston (Lodge Double-Pole.)

Randall-Faichney Co., Boston, Mass. (Mac-Kae.)

Progressive Mfg. Co., The, Torrington, Conn. (Black Eagle.)

Rex Ignition Manufacturing Co., 1779 Broadway, New York (Rex.)

Splitdorf Electrical Co., Walton Ave. and 138th St., New York City.
Branches: See Magnetos and Magneto Supplies.

SPARK PLUG TERMINALS.

Randall-Faichney Co., Boston, Mass. (Mac-Kae Universal.)

SPEEDOMETERS, ETC.

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)
Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia, Penn.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

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CLASSIFIED BUYERS' GUIDE---Concluded

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St. Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1197 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Diamond Rubber Co., Akron, O., (Diamond.)

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims — Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17 1-2 Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator.) See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.

Leather Tire Goods Co., Suspension Bridge Station, Niagara Falls, N. Y. (Woodworth treads, repair boots and emergency stops.)

Liberty Rubber Co., Orange, N. J. (Treadmend and Everstick.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRE REPAIR OUTFITS.

Liberty Rubber Co., Orange, N. J. (Mend-Do and Rubber-Mend.)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Diamond Rubber Co., Akron, O. (Diamond.)

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCK BODIES.

Lynch Manufacturing Co., Hammond, Ind.
Branches: East Chicago, Ind.; South Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Mfg. Co., 1756 Cranston St., Providence, R. I.

TURNTABLES.

Canton Foundry & Machine Co., Canton, O. (Universal.)

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Brets Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Garage and Individual.)
Branches: In all principal cities.

Williams Foundry & Machine Co., Akron, O.

WASHING DEVICES.

Perfect Mfg. Co., Albany, N. Y.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis (Prest-O-Welder.)
Branch: See Acetylene Tanks.

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.

Cutter, George A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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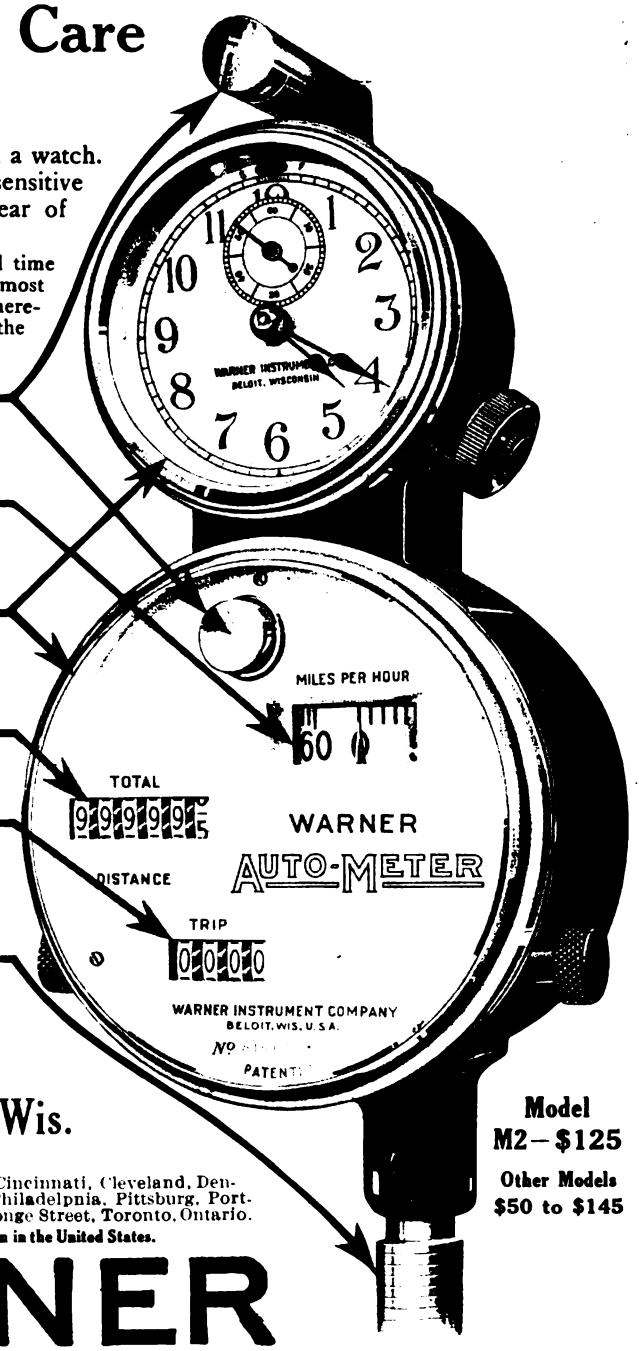
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ON May 4, 1912, the District Court for the Southern District of New York again affirmed the validity of the Truffault Patent, and held that the FOSTER SHOCK ABSORBER was an infringement, and issued an injunction restraining its further manufacture, sale and use. Thus another infringer of our rights has been disposed of.

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SHOCK ABSORBER

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VOL. XXXIII. No. 10

AUTOMOBILE JOURNAL

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June 25, 1912

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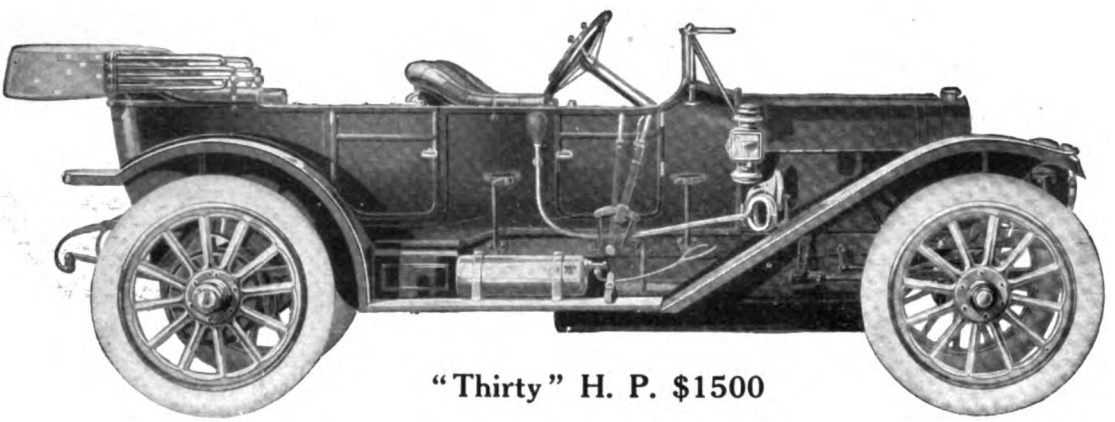
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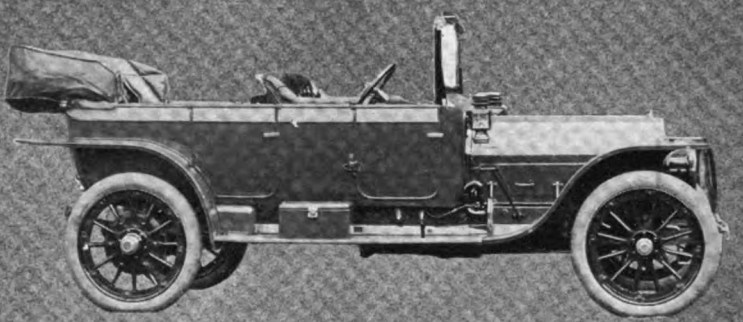
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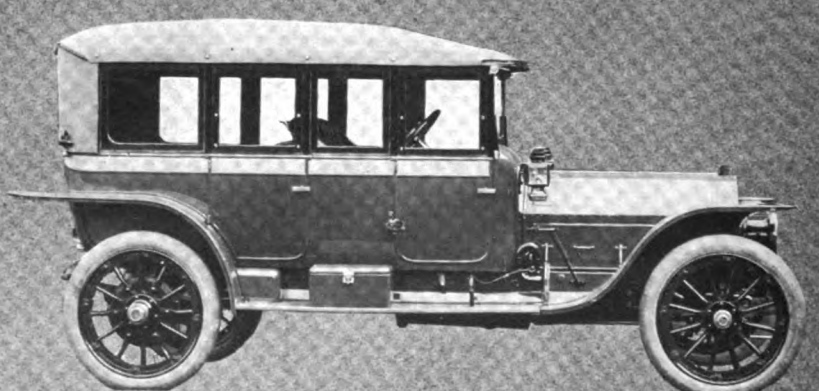
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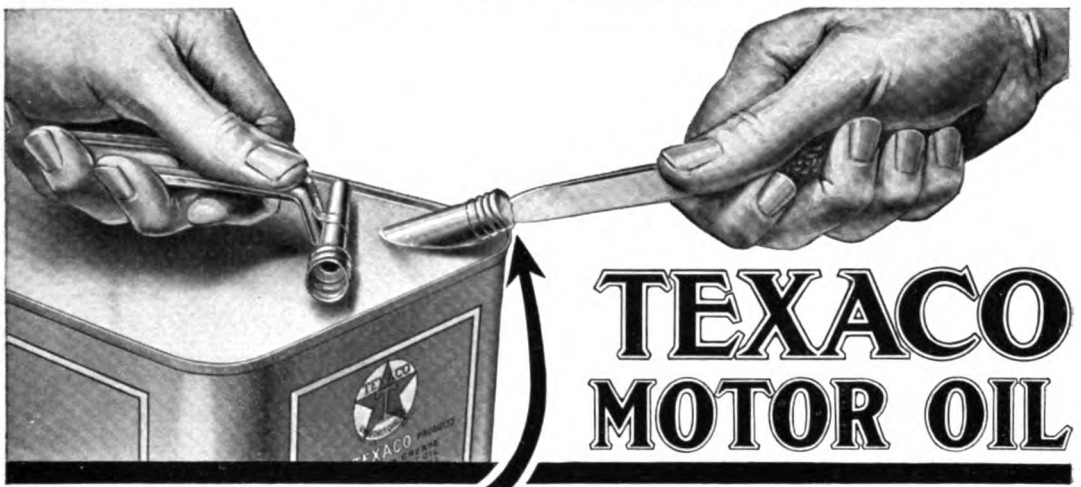
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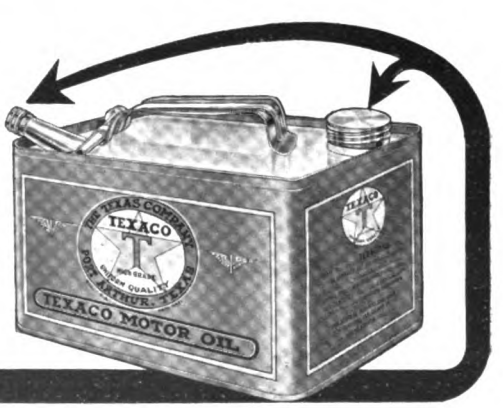
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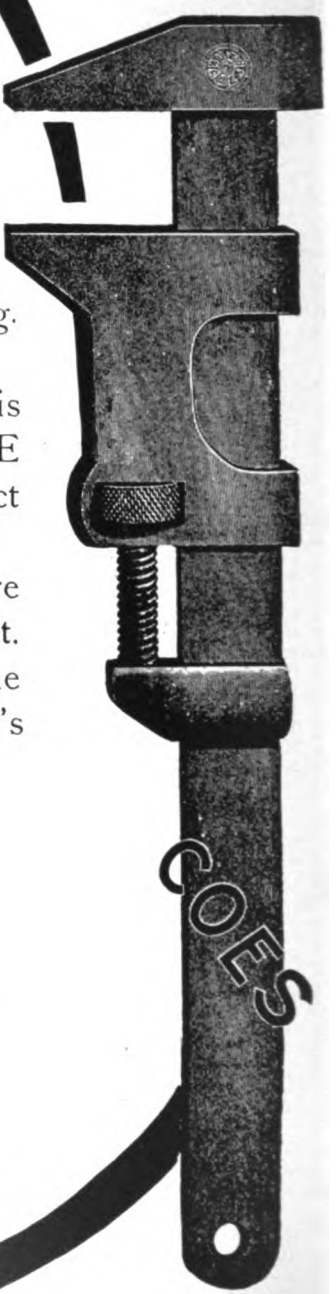
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FOR the season of 1913 we announce our three famous standard models: the "American Traveler," at $4500; the "American Tourist," $2350; the "American Scout," $1475, *all fully equipped.*

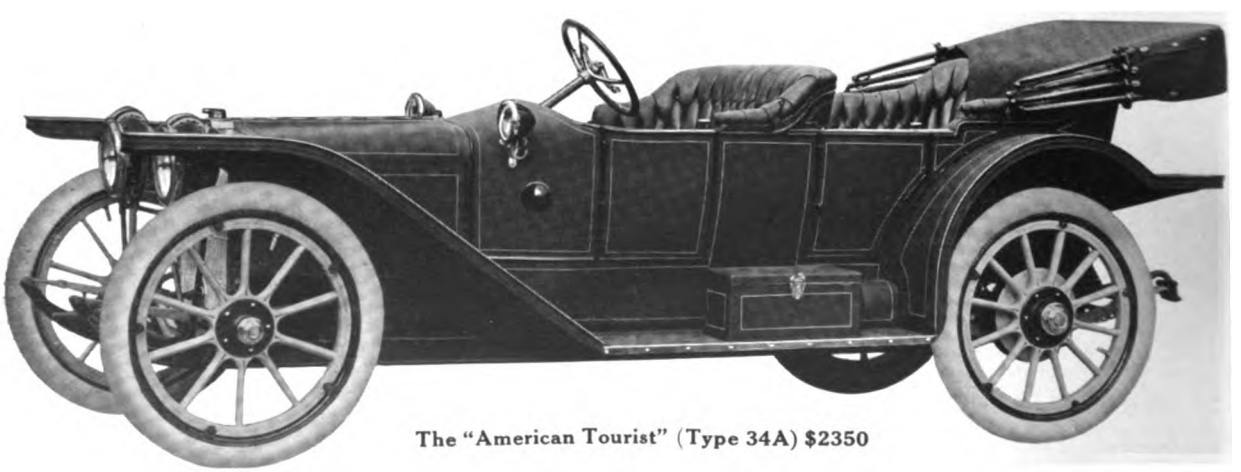
No manufacturers of high grade motor cars in the country can boast the increased demands which have come in recent months to the makers of the "American Underslung." They are the accumulated sales of eight years of education on the part of the pioneer manufacturers of the most modern principle of all in automobiles. ***The increase in sales of the "American Underslung" during the last ten months was 211 per cent. greater than in the ten corresponding months of a year ago.***

The superiority of the last word in motor car design is now not only conceded, but demanded by the habit-freed public. It was once looked upon as an experiment which should make good; now a car without it appears old style---antiquated. It is the safe, practical, graceful and stylish car the veteran motorist demands.

The "American Underslung" differs in constructive principle. The frame---the very backbone of the car---is slung under the axles instead of being placed over the axles, and the result is that the very drawbacks of the conventional overhead car are completely eliminated.

The low center of gravity means *safety* and added comfort.

American Motors Company
INDIANAPOLIS, INDIANA



The "American Tourist" (Type 34A) $2350

Four passengers. Wheel base 118 inch, tires, 37x4 inch, front and rear on Q. D. demountable rims.
$2350 includes regular equipment as follows: electric light dynamo outfit complete with generator and storage battery supplying five lamps; $50 Warner speedometer; fine plate-glass wind shield; Disco self-starter; fine mohair top and curtains; high tension magneto and storage battery; one extra rim; shock absorber; robe rail; foot rest; horn; jack; tools and tire repair outfit.

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NOT SILENT---but, "a noise so faint that one can scarce distinguish it from silence."

AMERICAN UNDERSLUNG 1913

Establishes Sales Record

The straight line drive means *less wasted power.*

The larger wheels mean easier riding, tire economy and *maximum road clearance.*

The underslung frame permits the *direct* and *practical* introduction of all these distinct advantages.

And on top of these guaranteed practical advantages, you have the most superbly and gracefully designed, and most handsomely finished car made. These big, strong, powerful cars are beauties. They are just as fine as we can make them. The exquisite body work is magnificent. Every "American Underslung" is as carefully made as a special job.

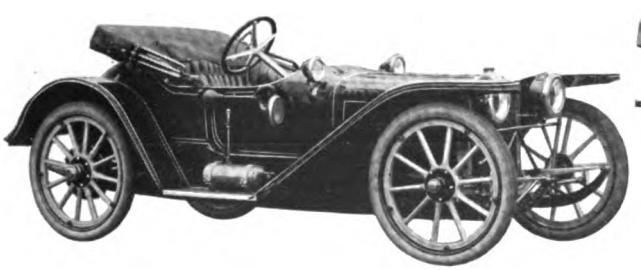
This year we have equipped the "American Underslung" with the finest accessories made. It is all in keeping with the elegance of the splendid new models. Nothing has been too good for us to secure and all is made regular equipment---not as extras. "American Underslungs" are known as fully equipped cars.

Our complete 1913 line can be seen in all of the principal cities. We began deliveries on Types 34A and 22A on June 17, and on Type 56A July 3.

Write us for a handsome 1913 catalogue and a simple treatise on the "Advantages of Underslung Construction."

American Motors Company

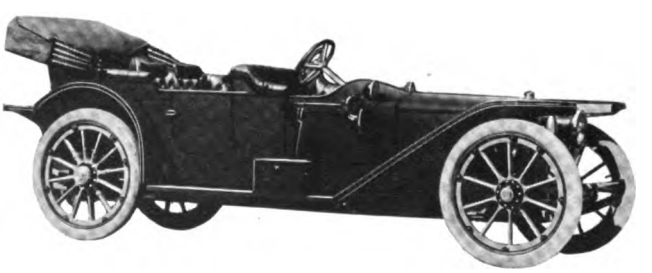
INDIANAPOLIS, INDIANA



The "American Scout" (Type 22A) $1475

Strictly a 2-passenger car. Wheel base 105-inch; tires 36x3 1-2 inch; front and rear on Q. D. demountable rims.

$1475 includes regular equipment as follows: $50 Warner speedometer; fine plate-glass wind shield; Disco self-starter; electric dash and tail light supplied by a large storage battery; gas head lights supplied by Prest-O-Lite gas tank; fine mohair top and curtains; high tension magneto and storage battery with coil; one extra rim; combination circular tire holder and luggage box; horn, jack, tools and tire repair outfit.



The "American Traveler" (Type 56A) $4500

Six passengers. Wheel base 140 inches; tires, 41x4 1-2 inch, front and rear on demountable rims. Springs—front, 40-inch; rear, 54-inch

$4500 includes regular equipment as follows: combination electric lighting dynamo and self-starter, all five lamps electric; $50 Warner clock combination 100 mile speedometer; fine plate-glass wind shield; fine mohair top and curtains; high tension magneto and storage battery; two extra rims; shock absorbers; foot rest; robe rail; horn, jack, tools and tire repair outfit.

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4400 Miles With HARRIS

TRADE MARK REG. U.S. PAT. OFF.

OILS

Before it became necessary to clean the soot-deposits from the motor.

We print herewith an excerpt from a commendatory letter from a user of HARRIS OILS. This is the most forceful evidence we can produce regarding the unusual efficiency of HARRIS OILS.

OTTUMWA AUTO COMPANY

Ottumwa, Iowa,
Dec. 22, 1911.

A. W. Harris Oil Co.,
Providence, R. I.

Gentlemen:—

"We have averaged fully 3000 miles on Ford cars to one cleaning out of the carbon, this we believe you will readily agree with us, is so far **beyond any results obtained by any ordinary oil on the market** that there could not even be a comparison. We have had Fords go as high as 4400 miles before it was necessary to clean out the carbon and the condition of the motor at the time of cleaning the car was easily good for another 1000 miles and then would have been in even better shape than it would have been possible at 800 miles use with common oil."

Yours very truly,
OTTUMWA AUTO CO.
Per H. J. Lytle.

We are constantly receiving letters of this character. HARRIS OIL users seem more than pleased to tell us about the quality of our product. We have just published a handsome folio containing 42 fac-simile letters from users of HARRIS OILS. Why not send for it? Get the evidence of the men who buy and use HARRIS OILS—after all, that is the supreme test.



A. W. HARRIS OIL CO., 326 S. Water St., PROVIDENCE, R. I.

143 No. Wabash Ave., CHICAGO, ILL.

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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

	"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA" 2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
3½-in. Auto Clock.....	28 00	30.00	45.00	Only made in
3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—**Add $3.00 to above Price Lists.** (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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Stutz $2000 car defeated the highest priced cars made at home or abroad

"THE CAR THAT MADE GOOD IN A DAY"

At the Indianapolis Speedway Decoration Day the Stutz had three entries.

It was one of the smallest cars in the Five Hundred Mile race. Merz, who finished fourth, averaged more than seventy-six miles an hour for the full 500 miles. Len Zengel averaged seventy-three miles an hour and won sixth place in a Stutz. Gil Anderson averaged over 80.88 miles an hour for 200 miles, when he went off the track on account of a blown tire.

Considering the fact that the Stutz sells for $2000 and has defeated the highest priced cars made at home and abroad, the showing made at Indianapolis is one of the marvels of motordom.

Last year at Santa Monica the STUTZ won third place—at Fairmount second place—and in the Bakersfield road race the STUTZ won first place, one hour and twenty minutes ahead of its nearest competitor. In this year's races at Santa Monica the STUTZ cars finished fourth and fifth---ahead of all American cars.

Write today for the "Story of the Sturdy Stutz."

The STUTZ has no equal at the price---$2000. It is the mechanical equal of any car selling at any price.

Our booklet, "The Story of the Stutz," tells you all about the STUTZ advantages---the 120 inch wheel base, 4 3-4x5 1-2 motor with large valves that will develop fully 50 h. p., the Stutz rear system---and many other strong points that will appeal to you at once.

At least investigate---write today for free booklet.

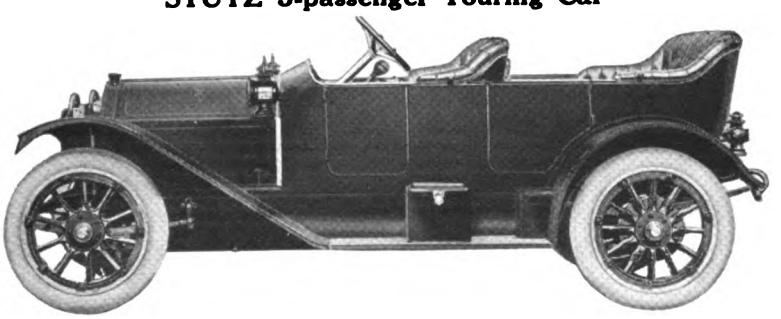
Ideal Motor Car Company

Manufacturers of Stutz Cars

INDIANAPOLIS, INDIANA

Dealers: We have a good proposition for you—write or wire us quick.

STUTZ 5-passenger Touring Car



Other models selling at $2000—Stutz Roadster, Stutz 4-passenger Touring Car, Stutz Bear Cat Roadster.

Free Book Coupon

Ideal Motor Car Company A-5

Indianapolis, Indiana.

I am interested. Without obligation on my part, please send me at once, free and postpaid, your booklet, "The Story of the Stutz," illustrating and describing the different Stutz models.

*Name*_____

*Address*_____

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A New Stewart Speedometer with Grade Indicator from the World's Greatest Speedometer Factories

No Finer Speedometer Ever Built



Model B $50
Model B-1 $85
(Clock Combination)

FACTS AND FEATURES

This instrument operates on the magnetic principle. A perfectly balanced dial cup is positioned in jewel bearings in the field of a *permanent* magnet and is acted on by the Foucault or eddy currents from a permanent magnet when the latter is rotated. As is well known, this torque or pull on the cup is directly proportional to the speed at which the magnet is rotated. The indicating figures are cut directly on the dial. (*We are owners of the early patent on speedometer with rotating dial.*)

This New Instrument Differs from Other Magnetic Speedometers

First, and of vital importance, is the improved magnet (*developed by Stewart engineers*)—the magnet in the form of a *closed ring*. Every engineer and electrician will appreciate this real improvement. A continuous metallic path for the flux is thus assured that insures *absolute permanence*. A *keeper*, as it were, is *constantly* provided. In fact, the keeper is an *integral part* of the magnet itself.

This ideal form of magnet permits of entirely dispensing with the field plate, or field ring, heretofore used, thus greatly simplifying the mechanism and permitting greatly increased space in the case, thus accommodating a liberally proportioned temperature compensator.

This temperature compensator is an exceedingly simple arrangement of a bi-metallic coil that, responsive to temperature changes, actuates a quadrant arm carrying the spring. The action is direct and positive; having virtually no resistance to overcome, no load to lift or sustain, the action is dependable.

Temperature Compensators and Grade Indicators Are Exclusive Features of Stewart Speedometers

The grade indicator is an integral part of the instrument. The dial, actuated by a unique mechanism, indicates exactly the grade that the car may be ascending or descending at any time. A valuable feature, and one greatly appreciated by automobile factory engineers, who see in it great possibilities for a more rational use of speed change levers on their cars.

A New Odometer of the Highest Grade

Large size number wheels driven by a train of large coarse-pitched, actuating gears, no springs. The simplest, highest cost and highest grade odometer ever used in this class of instrument.

The Equipment

Stewart Speedometers are fitted with the strongest flexible shaft. This we believe everybody concedes. We have been for more than 20 years the largest makers of flexible shafting in the world. The swivel joint, *first used on Stewart Speedometers*, and now widely copied, is another detail on which we spend more money than others.

Our swivel joint is made of hardened steel forgings (not castings), unbreakable, and will outlast the car to which it is attached.

***The forged swivel joint is an exclusive feature of Stewart Speedometers.* We have spent during the past year over $100,000 providing buildings and machinery for producing *this one item* of speedometer equipment, that we might be enabled to make a high grade, unbreakable drop forged steel joint at a cost that would not prohibit using them even on our lower priced instruments.**

The world's greatest authorities on magnets and magnetism have approved of this new system. We will furnish to those interested reports of tests made by technological experts showing the marvelous accuracy of these instruments.

Clock Combinations

We point to improvements and features that can be purchased only in combination with Stewart Speedometers. We use a Seth Thomas clock, rim wind and rim set. Stop for a minute and think what this means. To wind it, you merely turn the rim of the clock—no key to hunt for; no taking off the bezel each time you wish to wind or set it. To set the clock, you merely pull out and turn the same rim—no unsightly knobs to destroy the beauty of the clock or openings in the case—sure to permit the entrance of water and dust—liable to put the clock out of commission.

Our experience with other makes of clocks used on speedometers has proven that Seth Thomas clocks are the best for the purpose.

Factories

Stewart Speedometers are made in the largest speedometer factories in the world. The buildings were designed and built for the purpose; they are of the highest grade construction, completely protected from fire by automatic sprinklers and other devices. The factories cover an entire city block and have a total floor space of about four acres. Nearly 600 expert workmen, exclusive of a factory office force of 60, and a shipping room force of 50, are employed. We pay the highest wages and salaries. Machine equipment is the finest obtainable, the automatic screw machine department comprising over 60 machines. From the ponderous double acting presses, used for drawing up the case or shell, to the finest jewel lathes, every piece of machinery is the most suitable for the purpose that money will purchase.

Service Stations

The Stewart & Clark Manufacturing Company operate a chain of service stations extending from Boston to San Francisco, as well as in London, Paris, Australia, Africa and New Zealand. Stewart Speedometers are not put on the car and ignored. They are guaranteed for five years, and with service stations all over the world it is possible for car owners whose cars are equipped with Stewart Speedometers, to get unequaled service.

Product

It is the aim of the management to make Stewart Speedometers the finest that money will produce.

The Choice of Most Car Manufacturers

The factory engineers of 108 automobile factories have investigated Stewart Speedometers and approved of them as standard or special equipment on their 1912 cars. Equipment contracts for 1913 cars are being placed with us in such numbers as to indicate that most cars using speedometers will be Stewart equipped, contracts won in competition with all other makers—won on the merit of the instrument.

The most accurate speedometer ever produced

Stewart Speedometers are Guaranteed for Five Years ***Send for Catalogue***

Stewart & Clark Manufacturing Company

1828-1848 Diversey Boulevard, Chicago, U. S. A.

New England Distributing Office . . 174 Columbus Avenue, Boston, Mass.

BRANCHES—Detroit, Chicago, San Francisco, New York, Boston, Cleveland, Philadelphia, Kansas City, Los Angeles, Minneapolis, Indianapolis, London, Paris.

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The Passing Of The Gas Lamp

Even the very moderate-priced cars are now electrically equipped.

Gas lamps served their purpose admirably before the coming of the GRAY & DAVIS Dynamo.

All motor car lighting improvements have had their inception in the GRAY & DAVIS factories.

It was only natural that the big step forward in automobile illumination should also be a GRAY & DAVIS product.

GRAY & DAVIS

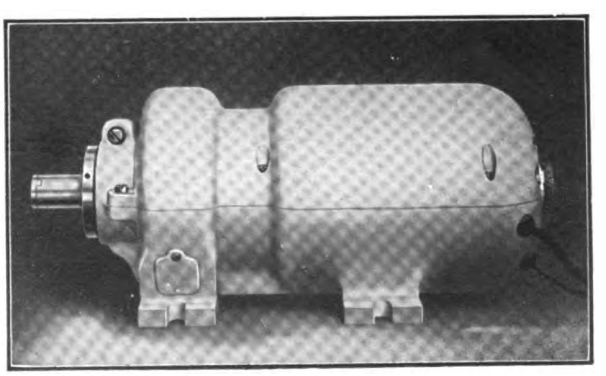
DYNAMO and ELECTRIC LAMPS

Stand today pre-eminent among automobile lighting systems. The fact that a car carries GRAY & DAVIS equipment is more than an indication of quality.

It proves beyond question that the manufacturer has honestly endeavored to build into his car the best the market affords—regardless of price.

GRAY & DAVIS products are sweeping the field. Manufacturers, dealers and owners now seek GRAY & DAVIS equipment.

Tell your dealer that "ordinary" lighting systems won't do. Insist upon GRAY & DAVIS Lighting Dynamo and Electric Lamps.



GRAY & DAVIS, Inc.

Manufacturers of Automobile Lamps

55 Lansdowne St. Boston, Mass.

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Overland

PRICE is the piovtal point in any automobile transaction. A man expects quality although his better sense may tell him he is taking a long chance at the price.

Our Model 60 Overland sells at $1200.

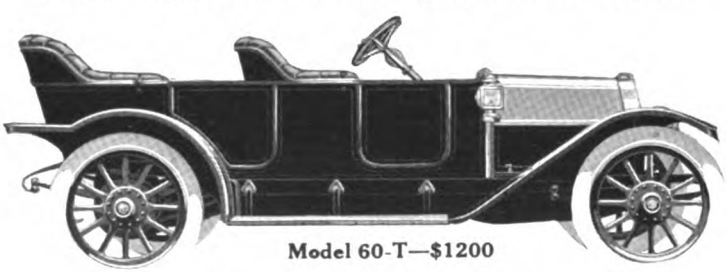
We want to thoroughly imbue you with the confidence that this Model 60 is sold at a lower figure than any other similar car, but not at a price which jeopardizes the value—a price which might make quality—a doubtful proposition.

Only a duplicate of the Overland factory could produce a car at $1200 of similar capacity, power, silence, speed and comfort. The Overland plants have no duplicate in size or efficiency.

Model 60 is the car you should investigate. It will prevent you paying $1500 for the same value.

Write for book K-46.

The Willys-Overland Company, Toledo, Ohio



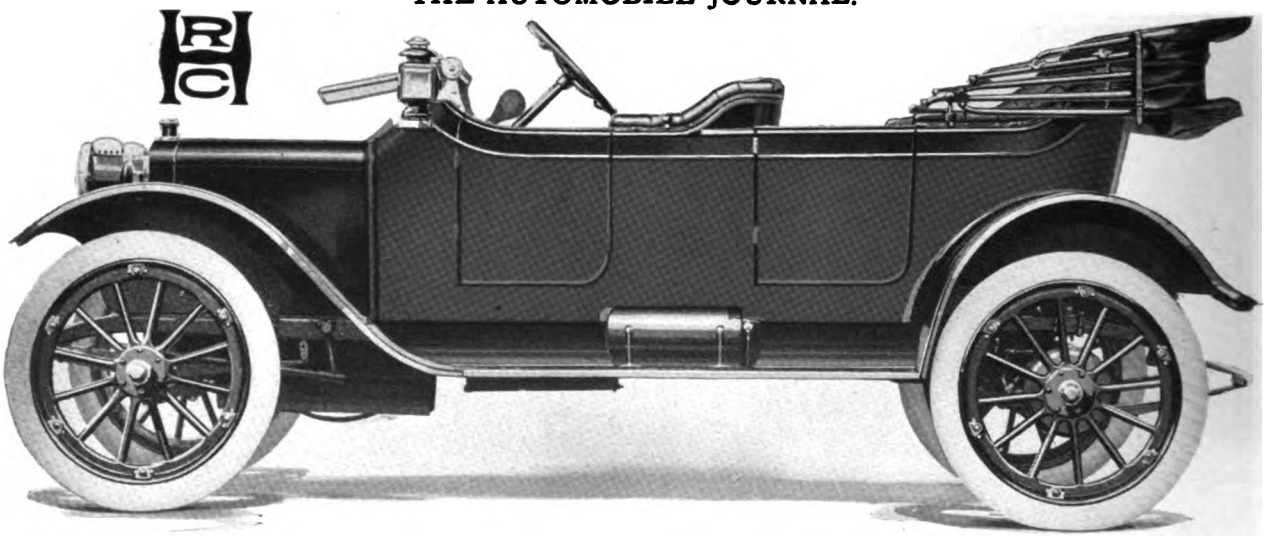
Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

R-C-H

"Twenty-Five"

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32 x 3½ tires, demountable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy curtains, adjusted in an instant, making the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

STANDARD MODEL

$850 F. O. B. DETROIT

Top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

STANDARD MODEL

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

General R-C-H Specifications

Motor—4 cylinders, cast en bloc - 3 1-4 inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

IN a recent 3000-mile trip through the Middle West, the writer met and talked with a number of automobile dealers, selling all makes of cars.

One of them—handling a car priced at well over a thousand dollars—made an illuminating remark. Said he: "I'm tired of explaining to people why my car is as good as the R-C-H—let alone better. I don't wish your man here any hard luck; but if he moves away or has a fortune left him, you can bet that next year I'll be in a position where the other fellow will have to do the apologizing."

Our increased output for the coming season will enable us to make dealership arrangements with a number of additional dealers on "the greatest car for the greatest number."

And when you're handling the R-C-H, your sales work consists in showing the car, not in apologies or explanations. Suppose you write us and see if we can't get together.

R-C-H CORPORATION 107 LYCASTE STREET **Detroit, Michigan**

BRANCHES: **Atlanta, 548 Peachtree St.; Boston, 563 Boylston St.; Buffalo, 1225 Main St.; Chicago, 2021 Michigan Ave.; Cleveland, 2122 Euclid Ave.; Denver, 1520 Broadway; Minneapolis, 1206 Hennepin Ave.; New York, 1989 Broadway; Philadelphia, 330 No. Broad St.; Detroit, Woodward and Warren Aves.; Kansas City, 3501 Main St.; Los Angeles 1242 S. Flower St.; Walkerville, Ontario, Canada.**

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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 10 JUNE 25, 1912 Price $1.00 the Year

DANGERS THAT MENACE ROAD TRAFFIC.

Unguarded Railroad Crossings, Fast Highway Trolleys, Obstructed Vision and Lack of Signals Threaten Public Travel---Need of Better Guide Boards.

HIGHWAY traffic today demands a control and regulation that does not now obtain. This supervision is necessary for proper protection of the people, as to property and life. But it is equally imperative to protect the traffic against dangers that constantly exist and which are quite beyond the jurisdiction of the authorities that can regulate the travel by street and road of vehicle and pedestrian. This is not meant to reflect upon any particular class and it is not specifically directed, but it is intended to bring to the attention of those who have real interest conditions demanding such change and remedy that so far as is practical there will be proper safeguards provided and a definite policy for the future adopted.



No. 1—Typical Electric Road Grade Crossing, the Approach of Cars from Left Obstructed by Bank, Shanty and Poles.

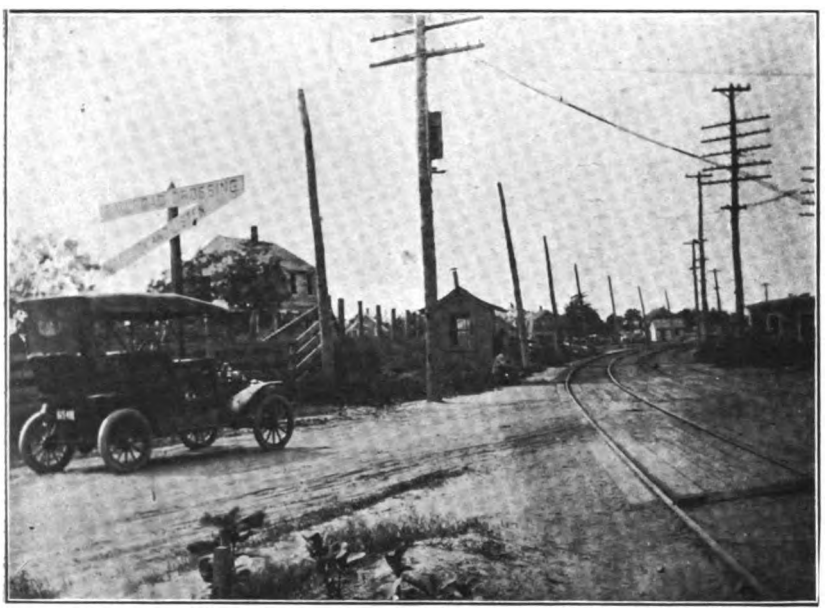
It may be maintained that there is sufficient law, and that the statutes are in a measure, at least, satisfactory. That may be so from one point of view, but the requirements of today are entirely different as contrasted from those of a decade ago, and with a knowledge based on experience the present is not too early to bring about what will, even were all agreed, require years of time and much patient and thankless endeavor by those who have the welfare of the public in mind.

Innumerable dangers constantly menace those who travel by highway vehicle, and these are increasing each day. No one can justly point to individual responsibility for this condition. That there is a lack of the protection that should obtain is due to the fact that the public has been willing to tolerate what all are aware is dangerous and must eventually result in loss of life and destruction of property, because it becomes accustomed to and accepts as a matter of course what

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never should have been permitted to exist.

In one sense, and perhaps that is the better ground from which to present the case, the people are all



No. 2—Sharp Curve Approaching the Crossing, Showing the Danger Not Apparent to the Car Seen in No. 1.

negligent and have contributed to conditions that have become intolerable because of the probabilities of fatalities and financial loss. As those from whom reasonable protection is expected are public service corporations it can be pointed out that it is not reasonable to expect that proper safeguards can always be denied, and it is also well to believe that with the attitude of the people toward such associations the cost of litigation and damages that may be required would probably more than equal the initial cost and the maintenance of a satisfactory protection.

Without question the better form of control would be universal laws, so far as the different states of the nation are concerned. It is in every way practical to enact measures that would serve all states equally well. There need not be the complicated legislation that exists in some of the commonwealths, but what is wanted is a common sense law that would apply everywhere and would be understood by all. State statutes sound reasonable when applied by the politician, but it should be remembered that there are 48 different laws, and not even a legal expert can advise of them all. This being so it would be much better if there were one law for all the people and the politicians were to advocate such legislation because of the actual benefit to the public.

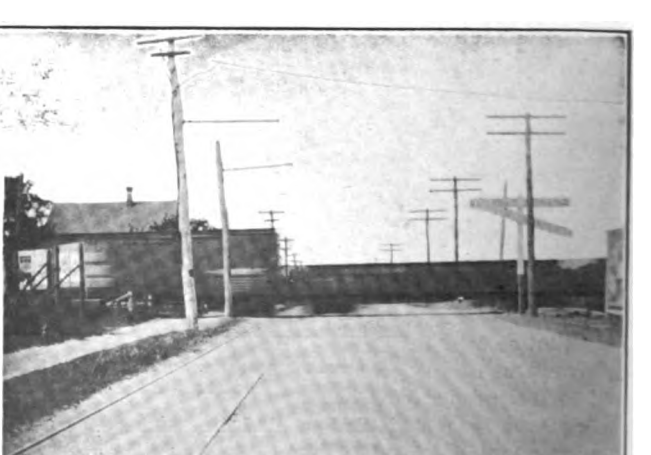
While it might not be possible to secure the enactment of a single regulation it is well within the range of possibilities to secure the passage of a law that would be uniform. The reasons why this should be are many. To illustrate:

Highway traffic has increased immeasurably during the past decade. The public is aware of the extremely large number of motor vehicles in use, but is not informed of the ratio of increase of service wagons during this period. There is another factor that is entirely lost sight of—that the mobility of the automobile and the mileage it can cover in a given time decidedly increases the traffic. That is to say, that the mileage of a specified number of motor cars would be perhaps five times that of a similar number of animal vehicles, and if measured by the miles travelled the number would be surprisingly large.

The really heavy traffic of pleasure vehicles is during the late spring, summer and autumn, but there is not the same variance in volume of service wagons,

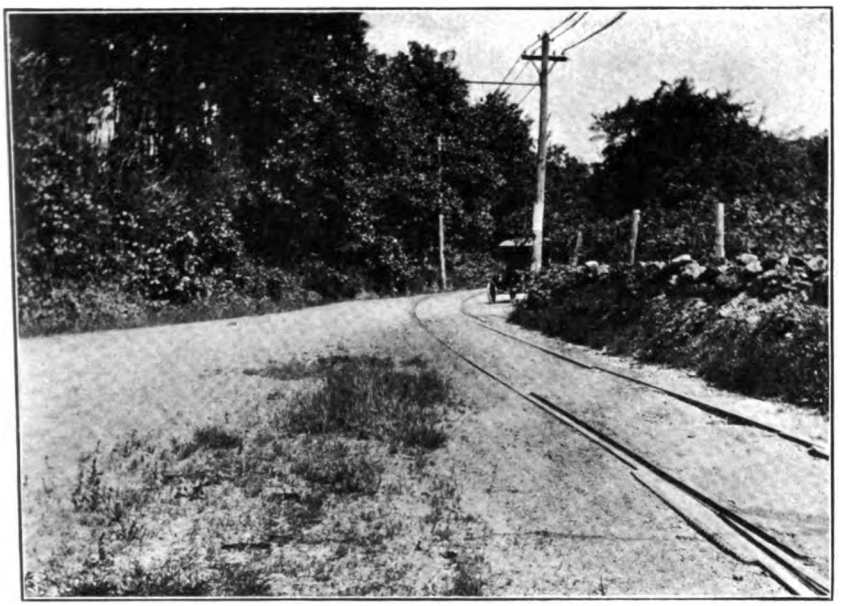


No. 3—Grade Crossing with All Views of Approach from Either Side Shut Off by Buildings and Billboards.



No. 4—The Train Passing the Crossing Shows to What Extent a Vehicle Driver Can See Approaching Trains.

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No. 5—Where a Bank and Trees Cut Off Sight of a Trolley Car That May Suddenly Appear on the Wrong Side of the Road and Then Cross It.

although there is decidedly more haulage during the months when the use of conveyances for recreation and pleasure is promoted largely by weather conditions. It is not possible to demonstrate the maximum and minimum of traffic in any single highway, but even casual observation will establish the facts to one's satisfaction.

The vehicular travel has been surprisingly increased in the principal or trunk roads. These highways have been the most improved and traffic has been diverted to them from roads not as well surfaced. But it is also patent that travel has also been turned to ways that were formerly used but little, these being the avenues to and from suburban and country residences, and summer colonies.

During the decade referred to there has been very large increase in steam and electric railroad traffic. Not only has there been much new trackage but cars and trains are operated more frequently. Suburban railroads have been wonderfully developed and with the main lines the trains are more frequent and are run faster. Where tracks cross highways at grade the speed of express and local trains, and their frequency with a larger road travel, has multiplied the dangers to an extent little realized. Most of the roads of this character are on private rights of way and that the cars and trains are operated at high speeds no one will deny.

The railroads afford some degree of protection where the public has made a demand that could not be denied, but it must be admitted that this is not always adequate, while it may be justly maintained that as a rule the means are both inefficient and insufficient. This view may not be taken by the railroad official, and yet no fair man will justify what is unquestionably dangerous. There is a burden of responsibility placed upon the owner and driver of road traffic that is shirked by those who manage and control the railroads.

There are state laws that require signs at railroad crossings that are assumed to be sufficient warning. Such signs are visible during the day, but not during the night. Taken the year through there is practically half the time when such signals cannot be seen. There are other crossings where gates are raised or lowered during the day by watchmen. At night these are not attended. Another class of crossings are prac-



No. 6—City Grade Crossing Where a Gate May Be Held Up to Allow Traffic to Pass After Warning Has Been Given.



No. 7—Motor Car Stalled on the Crossing Track and the Gates Down, Indicating That a Train Is Coming and the Car "Trapped."

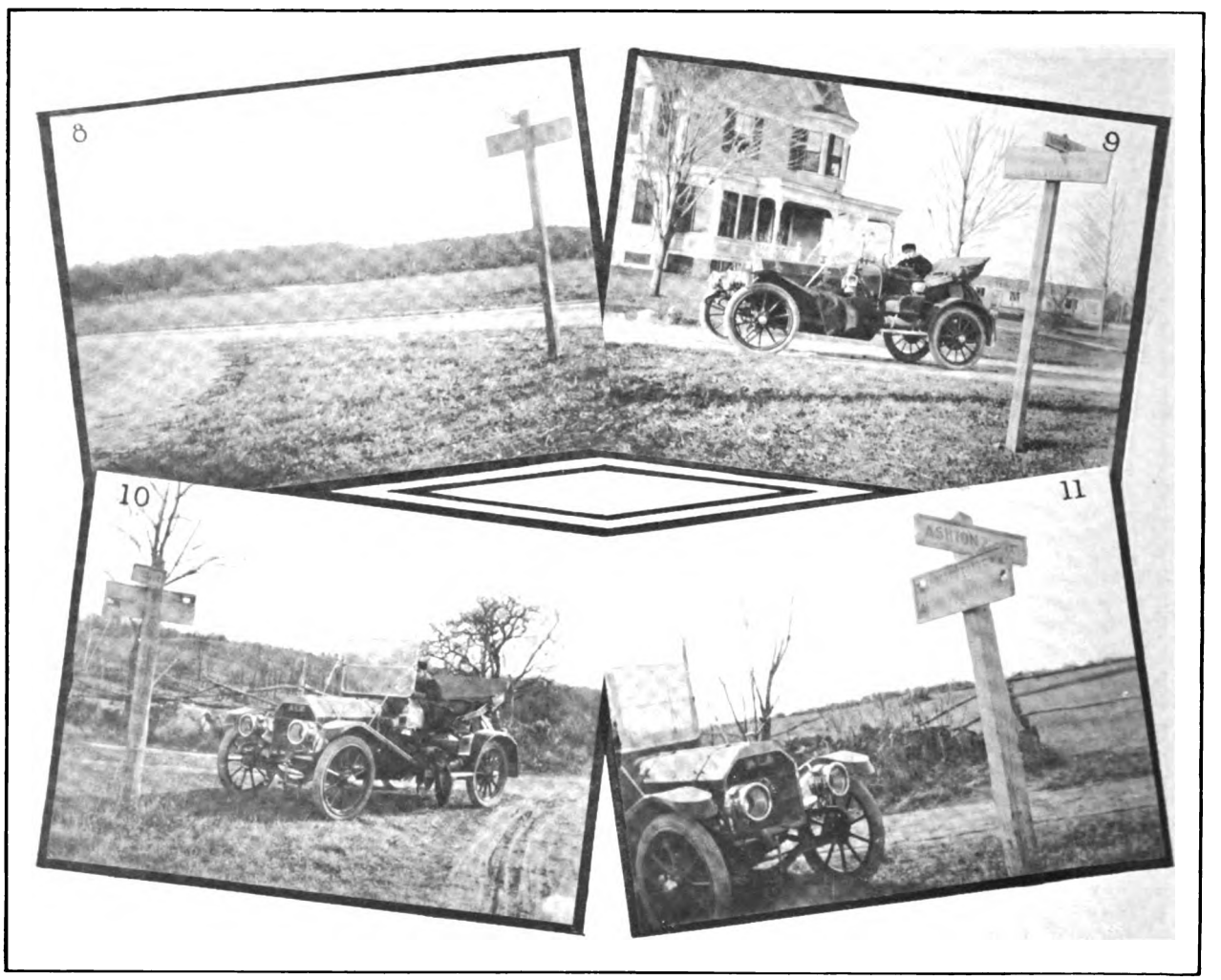
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tically unattended. There are, to be sure, in the cities and towns, gates and watchmen on duty day and night, but these are a comparatively small proportion of the number.

The assumption is that on approaching a crossing with a railroad the driver of a road vehicle shall stop, look and listen. The theory is that the driver of the locomotive or the electric car shall make a warning signal that will be sufficient to allow those on the track or crossing to pass to safety. It is not possible to indicate when a train or car may be expected to reach a crossing, so that the highway traveller must always stop, look and listen, or suffer the consequences that follow.

But assuming that all of the instructions of the visible-by-day-and-invisible-by-night plan are followed, there are factors that would seem to place some of the burden upon the corporation. For instance, in the event that a stop is made and listening does not reveal the approach of a train or a car, the road traveller may be expected to go ahead. Should sight and hearing not indicate the proximity of danger the driver may proceed. In other words the sight and hearing of the public is expected to be its protection, and the sign is a notice to employ these senses.

This being so then the public ought to have the necessary means to protect itself, and this demands a change of conditions that will permit such safeguarding beyond a question of doubt. By this is meant that at these crossings, if nothing else is to be done, there should be such changes made that there will be both visual and aural signals. The reasons for two forms of warning is the possibility of one failing. There should be required of each train or car such whistle or bell sound that there could be no confusion, to be made such a distance from the crossing that it could be heard in ample time. There should be another form of signal that could be seen, such as a



Signs Meant for One-Way Traffic: No. 8, Inscription on Both Boards on But One Side; No. 9, How the Directions Can and Cannot Be Read; No. 10, Guide Board Can Only Serve When Traveller Alights; No. 11, Equally Inconvenient When Approached from the Second Direction.

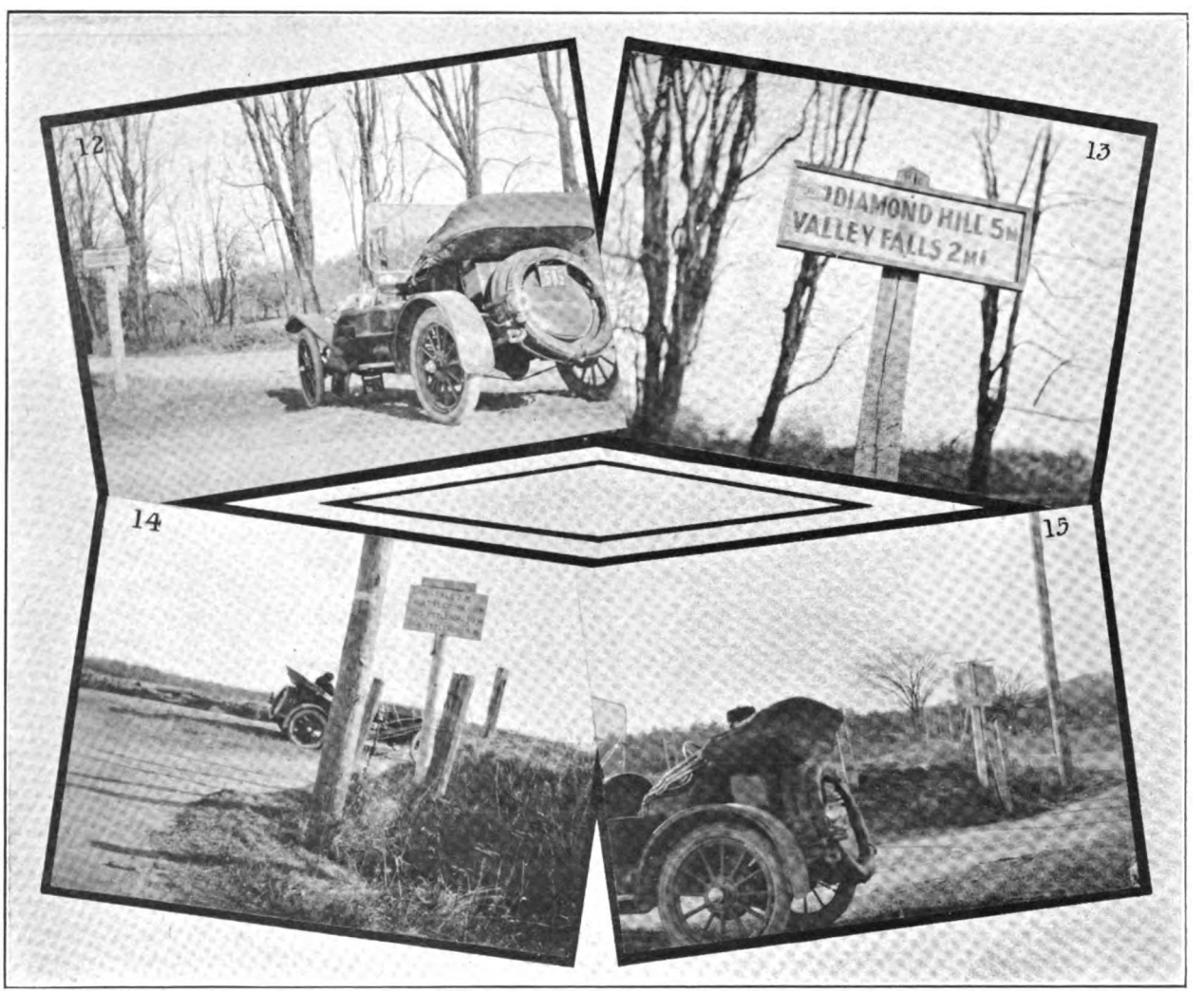
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semaphore arm falling and rising, or a lamp lighted and extinguished, in the absence of more certain warning.

Practically all railroads employ a block system wherever it is considered necessary. By this a signal is shown at either end of a block indicating to the trains approaching that there is a train or a car within the block, and prohibiting entrance to the block so long as the signal is displayed. These are generally electric installations that are automatic in their operation, can be maintained at comparatively little expense, and are dependable and reliable. There is apparently no good reason why such systems could not be adapted to guard the highway traffic and the railroad as well. In the event of this being impracticable it is possible to install automatic bell signals that can be sounded while a train is approaching for any desired distance, and operative at all times. It is also entirely practical to utilize a light such as is employed in the block system, which shall be lighted when the car or train is within a specified distance and extinguished when the crossing has been passed.

In any event automatic signals can be regarded as being sufficient to afford a reasonable protection, and while the initial cost of these might be objected to by the corporations, there is no argument that the maintenance expense would be large, and further than this with the increase of both highway and track traffic it is apparent that there would be no expectation of the installation of more costly methods, unless there were unusual and unexpected development. There is no desire to restrict the speed of the trains and the cars but with faster time and more frequent operation the demand would seemingly be for greater care and better supervision.

There is little disposition manifested by the cor-



Where Travellers' Conveniences Cause Inconveniences: No. 12, Single Sign, Admirably Placed, Refers to But One Way; No. 13, Only One Side of the Board Utilized, and Both Are Equally Valuable; No. 14, Elaborate Directions Given for a Cross Road and Main Highway Neglected; No. 15, Must Drive the Car Past Road to Read the Sign.

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porations to protect the public unless the people unquestionably require it. This makes necessary that a provision be incorporated in the law authorizing the official of jurisdiction to determine what form of signal may be best adapted to the condition dealt with—not the installation of what is cheapest and will protect the railroad against damage suits. There should be no temporizing tolerated. The principal difficulty will be, as it always has been, to secure the action of officials vested with discretionary power in the proper enforcement of law, especially when decision means more or less initial expense for the railroad corporation. No public service enterprise is desperately striving to incur expenditure for protecting the people. It is seldom that such concerns will spend money unless compelled to do so. While antagonism is not openly manifested it can be affirmed as a matter of general principle that the policy that "a crossing unprotected helps pay dividends" is always approved by railroad officials.



No. 16—One of the Principal Thoroughfares of the State with a Direction Board Placed by a Car Manufacturer and an Insignificant Cross Road Splendidly Posted.

But while what has been stated may be applied to both steam and electric railroads it is obvious that there is quite as much danger from the cars of the electric roads that are operated on private rights of way, because they are operated with great speed and usually cross highways at grade. Such crossings are more frequent nearer the commercial centres and there is decidedly a larger volume of traffic. Not only this, the approaches are often obscured by trees, brush, buildings, bill boards, banks and other obstructions to vision, to say nothing of curves. Attention is directed to a specific condition in illustration No. 1. This shows a car stopped within 15 feet of a crossing of a high speed electric railroad where two roads converge, another way paralleling the track at the right. There is a slight grade on which the car approached the crossing. At the left the railroad makes a sharp curve and the view is shut off by the bank, the flagman's shanty and the telephone poles. At the right there is a view of the track for a short distance. Approaching from the other direction on the road at the right the curve is obscured by the house and embankment at the fork, and on the road at the left the shrubbery and the building prevent sight of the railroad. In illustration No. 2, which was made from beside the track, the curve and the character of the obstructions may be plainly seen. When the car was stopping the flagman waved his flag, which would be understood as a signal for the driver to proceed, and in a few seconds a ponderous electric car rushed around the turn at high speed.

It will be noted that there is a familiar railroad crossing warning, and a flagman, who can be seen seated on the steps of the shanty in illustration No. 2, but for all that it was in all probability the making of the picture that prevented an accident on this particular occasion, for the waving of a white flag could not be understood by the motorist as meaning anything else than safety for himself. Many have had narrow escapes from accident at this crossing.

Illustrations No. 3 and 4 direct attention to another crossing of a much travelled highway and a railroad with a private right of way. There are days when at least a thousand motor cars pass this crossing, to say nothing of considerable haulage by heavy vehicles and horse carts and wagons. Illustration No. 3 shows that the single track has the customary warning signs, between which the track extends across the street. Approaching from the opposite direction there is a curve by which car may turn to or from the track in the road, and there is nothing to indicate the turning of these cars, nor is there warning of the approach in the main track. The view of the track across the highway is shut off at the right by an enormous billboard, and at the left by a high growth of bushes and trees, and a billboard, so that a car cannot be seen until it is so close that it could be avoided only by a miracle. The approach from the opposite direction in the road gives no better view of the track because of the billboard at the left and the houses at the right. The real condition can be judged from illustration No. 4, which shows a freight train moving over the crossing and the actual distance the track can be seen beyond the street lines.

While these conditions are shown by day it should be understood that they are much more menacing at

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night when there is neither lights nor flagmen, no signals of any kind that can be distinguished by the eye, and the cars are operated with very irregular headway, because they convey people to and from a large place of amusement and until late in the evening. The possibility of accident from a car turning from the highway into the private right of way track may be judged from the fact that suburban cars are always equipped with high power headlights, and every motorist knows the speed at which a light is approaching cannot be judged with accuracy. The possibilities of a large car swinging across the highway directly in the path of an automobile, with the headlight burning, might also be confusing.

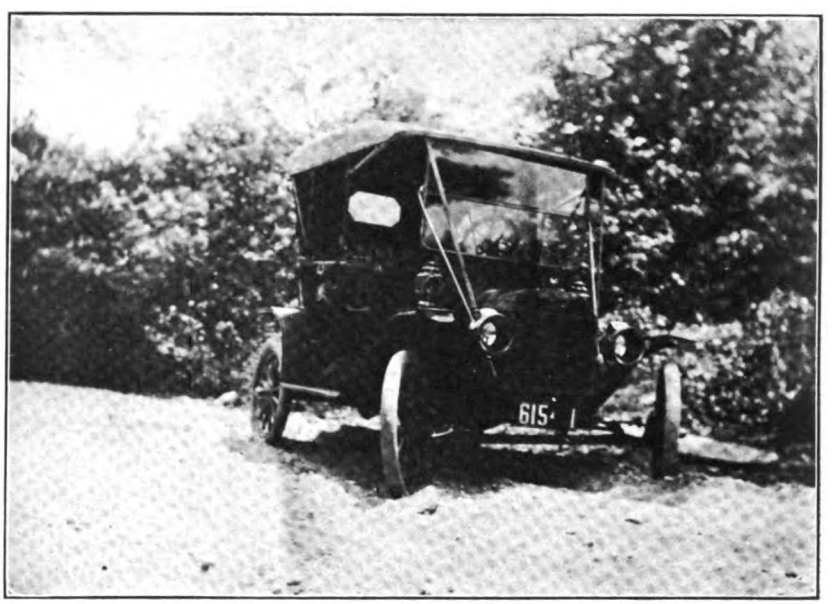
Illustration No. 5 shows where a high speed highway trolley track crosses a road after making a "short cut" at a turn, and nothing can be seen of the electric car until one is within a few feet of the track—so close in fact that there is unusual danger unless one is aware of the conditions and drives extremely carefully. Yet there is no protection whatever afforded the public at this place.

Illustration No. 6 shows a railroad crossing at grade in a city where no less than 125 trains pass in either direction daily, and this, it will be noted, is protected by gates that are lowered at an automatic signal given when the trains are at least a quarter-mile distant, and probably a minute in advance of the time of arrival, but these gates do not fall simultaneously and it is possible for a vehicle to be on the track with one gate down and the other partly lowered. This picture shows a car being driven over the crossing with the nearest gate lifted for it to pass, and illustration No. 7 shows the car stalled on the crossing with both gates down. While such an incident is unusual it is not impossible for a vehicle to be practically trapped and the machine and driver in great danger because of the gate keeper permitting the traffic at the crossing to pass after the signal for the gates to be lowered has been given.

The conditions illustrated cannot be controlled by city or town laws or ordinances. These must be dealt with by statutory provisions, which ought to be so specific that there can be no possibility of evasion.

State laws, as a rule, make provision as to the manner of locating and maintenance of direction boards, which are especially necessary for those who are driving through sections of the country that are unfamiliar. The towns are usually required to erect posts and reasonable signs at points where roads diverge and converge, at intersections and wherever a traveller might be uncertain of direction, these to indicate the distance to one or more villages, towns or cities, with a hand or arrow specifying the way to take to reach the places named. These signs are serviceable by day if well painted and lettered, but exposed to the weather they must be given every care to serve a useful purpose. Unless reasonably conspicuous they cannot be found at night unless one is familiar with the way—in which event they are seldom needed—and are utterly useless. Besides this they are seldom so placed that they can be read without alighting from a vehicle, especially if there be more than one sign on the same post.

These signboards are occasionally erected for advertising purposes, in which case they are not dependable and not often well located. Sometimes some of the automobile clubs have established directions along well travelled routes, and occasionally a cross road is well posted while a main highway is neglected. There is no objection to signs being placed as frequently as people desire, but whatever is intended for information for the public should be in every way dependable.



No. 17—An Example of Municipal Road Repairing—Loose Gravel Heaped 15 Inches Deep in a Road for Vehicles to Consolidate, Making the Way Almost Impassable.

The main reason why the roads are so poorly provided with signs is the lack of proper supervision. The matter is left to different towns and cities and to officials who are negligent or derelict in their duties, and so long as there is no actual revolt by the people conditions are not remedied. System ought to be applied first of all and each road should have whatever directions should appear to be required by the traffic. It is not to be expected that the traveller can depend upon casual or indifferent statements. There should be authority with every sign, and in addition to the

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facts that direction signs should bear it is well within reason to expect that all curves, descents and places of possible danger shall be so plainly shown that there could be no mistake.

Illustration No. 8 shows a sign where a cross highway and a main thoroughfare meet. There is a triangular plot where the travellers have turned at either side of the sign into the principal road. This post carries two signs, the larger indicating the main way, and the smaller the cross road. The cross road sign can only be read by passing at the left of the post toward the main highway, and the larger board cannot be read until one is in this highway. Approaching the cross road from the other side of the sign one must drive past it to read it, and turning from the cross road toward the right neither sign can be read. Besides this there is but one distance given. Were the direction board mounted on the top of the post, and if it were triangular, it would meet most of the requirements. As it is, a traveller must stop and alight, or drive around it, which is a condition shown by illustration No. 9.

A similar instance of how a sign should not be located is shown by illustration No. 10, where a motorist in a cross road encounters a guide post that cannot be read unless the driver alights, or guesses and takes the chance of driving into the wrong direction, and being compelled to turn, a somewhat difficult undertaken in most country roads. Not only this, the sign is badly weather beaten and hardly legible, and a couple of charges of shot blown through the larger board does not add to its legibility. Were this sign of trianglar shape and on top of the post practically every purpose would be served. Illustration No. 11 shows how obscure a sign of dilapidated condition would be at night.

Illustration No. 12 shows a signboard at a fork in a main highway where the next point and the distance is given for one road at the fork, but no information whatever is given about the other. A traveller driving into the main road from the unmarked way would of necessity be compelled to alight to read the sign. If the sign were properly inscribed this would not be necessary, and it is reasonable to assume that the inscription might have added but a few cents to the original cost. Illustration No. 13 shows the sign itself, which is sufficiently specific, but serves for but one road.

Illustration No. 14 shows a sign that contains no less than four directions on one board, relative to one of two intersecting roads, and practically no information about the other, which, by the way, is by far the most important, being traversed by 50 vehicles to one being driven over the other. The location of the sign is at a corner and is not to be criticised, but the condition of the paint is such that it is hardly legible unless one is close to it.

Illustration No. 15 shows how difficult it is to read the directions for the cross road unless the sign is passed. Illustration No. 16 demonstrates how a cross road is admirably defined and the distances well given, while the main highway, which in this instance is one of those most travelled between New York and Boston, is designated by a sign put up by a motor car manufacturer to advertise his machines. That such conditions exist is surprising, but unfortunate.

Illustration No. 17 is that of a road in one of the most prosperous of Massachusetts towns, directly connecting with one of the main trunk highways, which has been "improved" by dumping loose gravel to a depth of about 15 inches upon it. The soil is a red clay and the road is cut into the ground perhaps a foot. Into this path was heaped the gravel, it being the evident intention of the "road builder" that the traffic should cause consolidation. Because of the hard soil the gravel did not settle and it now is about as poor a section of road as one could conceive. It will be a matter of time before the gravel will be spread over the cut in the soil and when the clay shall become softened with water it is probable the gravel will disappear and the path will be quite as bad as before work was done on it. It is a condition decidedly unexpected in a state that has been regarded as a leader among the commonwealths constructing highways, and it illustrates the ignorance and folly quite characteristic of municipal road construction. It has no special place in the argument for highway traffic protection, but it demonstrates one of the reasons why the main roads are used and the vehicular travel multiplied upon them, and emphasizes a statement made earlier in the article.

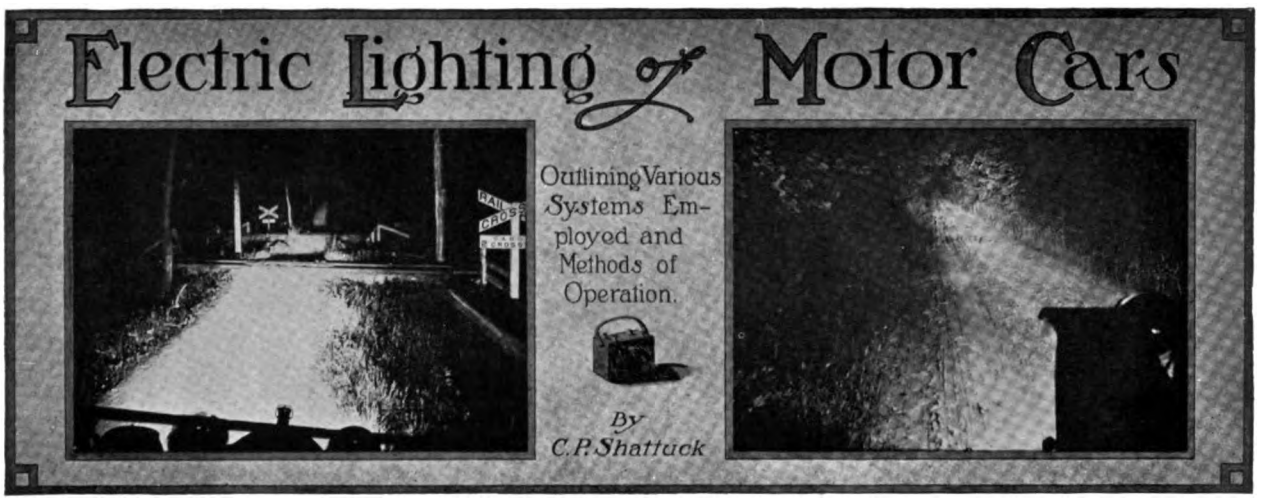
BERRY ROCKWELL MADE MANAGER.

Berry Rockwell, one of the veteran advertising men in the automobile field, has been appointed general advertising manager of the United States Motor Company, with headquarters in New York City, succeeding Gridley Adams, resigned. Mr. Rockwell held a similar position with the Maxwell-Briscoe Motor Company of Tarrytown, N. Y., previous to the formation of the United States Motor Company.

WILLYS-OVERLAND BAND ON VACATION.

Leaving Toledo, O., June 12, the entire band of the Willys-Overland Company of that city, comprised of boys and men from the various departments of the immense plant, started on what is to be a month's vacation, which will take them through several western states and to 24 of the principal cities of the territory. The outing is complimentary by the company and among the cities where visits will be made and concerts given are St. Louis, Memphis, New Orleans, Galvestoh, Houston, Dallas, El Paso, Tucson, Los Angeles, Sacramento, San Francisco, Portland, Salt Lake City, Cheyenne, Rawlins, Kansas City, Des Moines, Colorado Springs, Denver, Minneapolis, Milwaukee and Chicago. The band is under the direction of Herr Gustav Koehler, one of the most capable musicians of the Middle West.

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Part X—K-W Lighting System.

HAVING in mind the desire of a large number of owners to understand thoroughly every working detail of their cars, including the fitting of auxiliary equipment, the K-W Ignition Company, Cleveland, O., has produced an electric lighting system which is particularly noticeable for its simplicity and adaptability. Special attention also has been paid to the matter of easy installation, the design being such that the current producer may be located at any convenient place, operated from any moving part of the power plant, and actuated either by belt, friction wheel or chain.

The K-W lighting system is the result of extended experimentation, covering a period of years, in which every effort was made to secure a thoroughly dependable source of electric energy, which could be supplied to the motoring public at a moderate cost. In bringing about this desirable feature, two other important factors have been considered at the same time.

Simplicity and Adaptability.

As is more or less well known, many motorists hesitate to install a mechanical generator of this type, on account of the alterations that may be necessary to the power plant, quite as much as because of the expense involved. This applies particularly to those who do not own the modern car, in which provision usually is made for such installation. The K-W system entirely eliminates this objection, due to the fact that it may be installed in any convenient place, as previously indicated.

The other prime requisite is simplicity, and the absence of complicated parts is a very distinct feature with the K-W lighting magnetos which generate a low-tension alternating current. They may be operated in either a clockwise or anti-clockwise direction, and without regard to polarity; that is, the wires may be attached to either terminal of the device. Such construction permits of installation without a knowledge of electricity, as the wiring of the car is very simple, the company's diagrams being followed easily.

All magnetos are constructed alike with the exception that the exterior of the six models is designed somewhat differently, this being merely for the convenience of installation and driving. Models A L, F L, M L and E L are equipped with pulleys for a flat belt drive, while models U L and D L are friction driven. The model U L magneto depicted at Fig. 65 is a type that is most universally used because of its ease of installation, it being provided with a special hinged bracket base.

Its vertical thickness including base is 4.5 inches

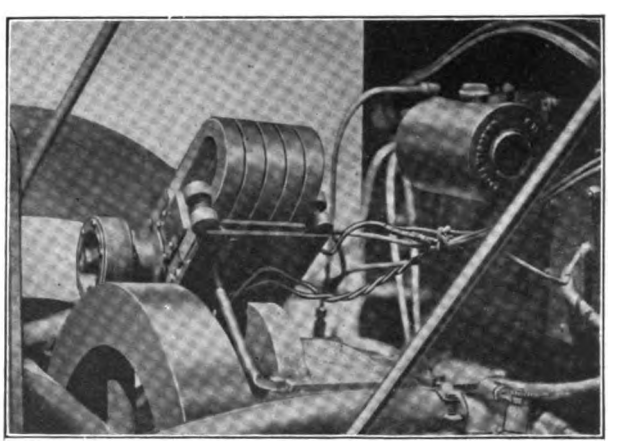


Fig. 64—Depicting the Adaptability of the K-W Lighting Magneto Which May Be Operated at Any Angle.

and its horizontal length is 10. Its width, including shaft and friction wheel, is 8.75 inches and weight 23 pounds. It will be noted that the device is fitted with a flexible spring which maintains the proper contact of the friction wheel with the flywheel or other part driving the member.

Construction of Magneto.

Throughout, the construction of the K-W magneto is commendable for its simplicity. Its principle is patented and differs from other instruments in that the armature shaft, instead of revolving around wires

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wound longitudinally, has a stationary spiral winding of copper ribbon as illustrated at Fig. 66.

The rotor changes the direction of magnetic flux through the winding, four times a revolution, and produces four powerful waves of alternating current each revolution of the magneto. The company claims that this inductor type of generator will produce from two to three times as much current for given weight and size as any other magneto. No commutator or brushes are utilized to collect the electricity generated, the current flowing through the terminals of the

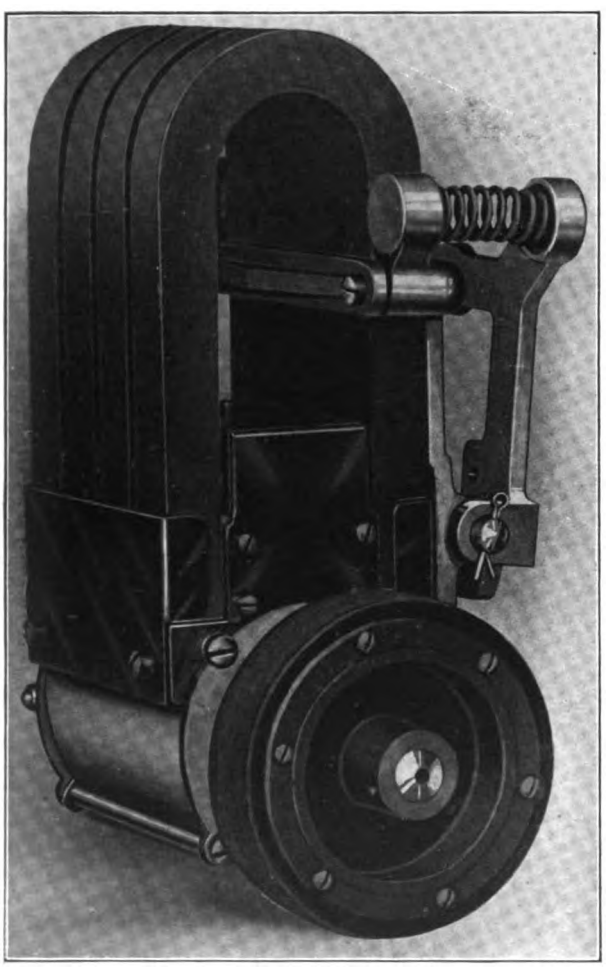


Fig. 65—Model U L K-W Magneto, Driven by Friction, Its Wheel Being Automatically Held to Proper Contact.

winding, which extends through the top of the pole pieces in which the rotor revolves, and the posts are securely connected to binding posts located at the end of the magneto.

The rotor revolves in two sets of high grade ball bearings and does not come in contact with any other part on the magneto as all other components are stationary. The magnets are of a high grade steel and are guaranteed not to demagnetize or lose their strength unless disassembled by an inexperienced person or because battery current is passed through the winding. The generating components are housed in a brass casing, fully protecting the parts from foreign elements, and it is pointed out by the maker that any amount of spray or rain will not interfere with its operation. Throughout, the highest grade of material and workmanship is incorporated and all magnetos are covered by an unusually broad guarantee.

Control of Current.

Unlike some lighting devices the current developed by the K-W magneto is not controlled by governors, cut-outs, springs, etc. It is electrically regulated and the method is one of the many features of the generator. A magneto is like a dynamo in principle, only up to a certain point when a considerable difference exists. With the K-W inductor type the current output does not depend wholly upon speed of magneto, because it is amperes instead of volts that really heat the lamp filament and create the light. The principle of the K-W is that of operating at a speed sufficient to secure that voltage necessary to overcome the resistance of the lamps and force all amperage that the magneto is capable of developing through the tungsten metal. Regulation is assisted by employing lamps of proper amperage.

As the K-W magneto has permanent magnets, its magnetic field is fixed and invariable and it is stated that when the current output is reached it does not increase with the speed above that point, because of the fact that the field cannot increase. The winding is specially adapted for lighting purposes and an air gap between the rotor and the pole pieces is so adjusted as to make them self-regulating to a very close degree, this arrangement caring for the variable speeds of the automobile.

The company points out that its success with road lighting outfits is due to the careful consideration of the lamp problem. The bulbs must be of the right size or capacity to develop full candlepower when they are absorbing the entire electrical output of the magneto. This condition is usually attained when the automobile is operating at approximately 12 miles an hour on the high gear. Below this speed the lamps burn slightly less brightly but will furnish an ample light at all speeds above eight miles an hour, which rate is maintained in traffic and usually on lighted city streets where the utilization of the headlights is not essential.

Lamp Loads.

The K-W lighting magneto will maintain a group of lamps to the extent of 40 candlepower and will light brightly two six-volt, three-ampere, 20 candlepower bulbs. It is stated that these when fitted to the headlights manufactured by the company will give a 2000 candlepower beam. This increase of light is due to the reflecting material utilized in the construction of the parabola reflectors which are of hand burnished silver.

Developing an alternating current, the magneto cannot be employed to charge storage batteries, and

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the company recommends that the generator be utilized for supplying current to the headlights and that the side and tail lights be supplied with a storage

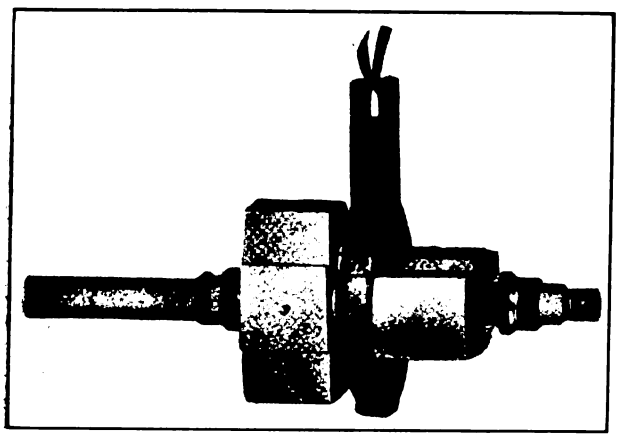


Fig. 66—Outlining the Simplicity of the Construction of K-W Magneto, Which Is Electrically Regulated and Has a Fixed Magnetic Field.

battery, inasmuch as a 60 ampere-hour member would furnish current for a considerable period at a slight expense, and that the battery could also be utilized for ignition purposes if desired. This system provides lighting when the automobile is inoperative or when driving through the city where the use of the powerful headlights is not needed.

As it is desirable to economize battery current and to utilize that produced by the generator to light the tail lamp when the motor car is in motion, the company makes use of an ingenious arrangement of the tail lamp, this consisting of double bulbs. One is connected in the battery circuit while the other is included in the magneto circuit, the method of wiring being outlined at Fig. 67. The advantage of this system is obvious. Should the magneto bulb become broken, the battery lamp may be switched on, or vice versa.

Lighting and Ignition.

While the lighting magneto may be employed for ignition purposes, it must be utilized in connection with a coil and timer, and the K-W Ignition Company suggests that when the device is being used for lights at night, batteries be employed for ignition during these few hours. The magneto will develop ample current to take care of both systems at the same time, but on account of the difficulty of properly balancing the ignition system so that neither the lights nor ignition will draw more than its share of current, the maker does not recommend their use together.

In explanation it is stated that the current developed by the magneto is much stronger than that of the battery, but if the resistance of the lamps becomes less than that of the combined coil and timer, the current, like water, will flow along the path of least resistance, or through the lamps, and the ignition is liable to be affected. Such a condition would not be through any weakness of the current generator, but through a high resistance of the timer or coil circuit. A method of wiring is suggested at Fig. 68 C, but as the company states, it is not likely to be as satisfactory as the separate ignition system.

Wide Range in Installation.

One of the commendable features of the K-W lighting magnetos, in addition to their compactness and light weight, is their ease of installation. They may be operated at any angle, an arrangement that appeals to the motorist who attends to the upkeep of his automobile. Model U L is provided with a special hinged bracket base and is operated by friction. This design lends itself readily to attachment to the majority of power plants. When this magneto is fitted it is rigidly attached, as the spring device insures proper contact of the friction wheel at all times, requiring no attention whatsoever. The hinged base may be taken off and replaced on another side of the magneto, bringing the friction wheel in another position.

Sometimes there is room between the radiator and the motor to attach an eight-inch pulley on the crankshaft and a smaller pulley on the magneto and drive by belt. Models A L, F L, M L, and E L are designed to be operated by a flat belt and these members are fitted with a special coil spring device which automatically maintains the tension of the belt. Model E L has the pulley at the top and may be equipped with a friction wheel if desired. Model M L is fitted with a slotted base, this permitting of an easy adjustment of the position of the magneto which is designed to be driven by belt.

Model F L is the same as A L except that it is inverted, has a rounded base and its magnets are an inch shorter. It is designed for installation where there is not room for mounting above the flywheel of the power plant. It is equipped with a special bracket

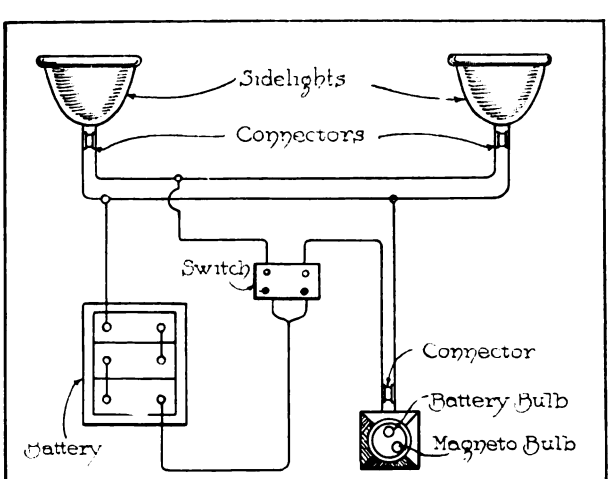


Fig. 67—Wiring Diagram for Side Lamps and Tail Light. Note the Double Bulb Arrangement of Rear Signal.

for bolting to the frame of the car or to a brace, according to requirements. The friction wheel tension spring may be so fitted that it will push the wheel

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away from the base of the magneto, instead of toward it as with the standard equipment.

On some cars the flywheel is so enclosed or so inaccessible that it is practically impossible to mount a magneto in any other way than to take the drive from the fan shaft. This method is recommended in preference to the utilization of a belt operating over several pulleys. When the thermo-syphon cooling system is employed and the power plant does not permit of the friction wheel magneto, the generator may be mounted upon the frame and a flat belt fitted to the flywheel of the motor.

Although sprockets and chains may be employed the company points out that its Aqua belting is stretch and water proof and is silent in its operation. As all of the belt models are fitted with a special tensioning device, the magneto will be driven properly at low or high ratios. The wide variety in design makes the K-W lighting magneto adaptable to any make of motor car and the installation may be performed by the operator without altering the power plant or the fitting of expensive attachments.

finish is brass, although nickel or black may be had, these being extra.

The double bulb tail lamp is made of heavy polished brass and is four inches high and 4.5 wide. The ruby lens is 2.25 inches in diameter and the clear lens three inches. It is equipped with screw base candelabra sockets for two bulbs as previously explained. In addition to these the company markets a wide variety of lamps, including dome, bracket, inspection, speedometer, etc., as well as electrical attachments for oil lamps.

The wiring plans are very simple and a lighting equipment may be installed easily by those not familiar with electricity. At Fig 68 B, is depicted the method of wiring the generator when headlights and a speedometer light are employed.

In addition to manufacturing lighting magnetos the K-W Ignition Company produces a lighting outfit especially adapted for the model T Ford. The outfit is inexpensive and consists of a pair of eight-inch headlights with parabola reflectors, two tungsten bulbs, 12 feet of wire, all soldered to the lamps, a

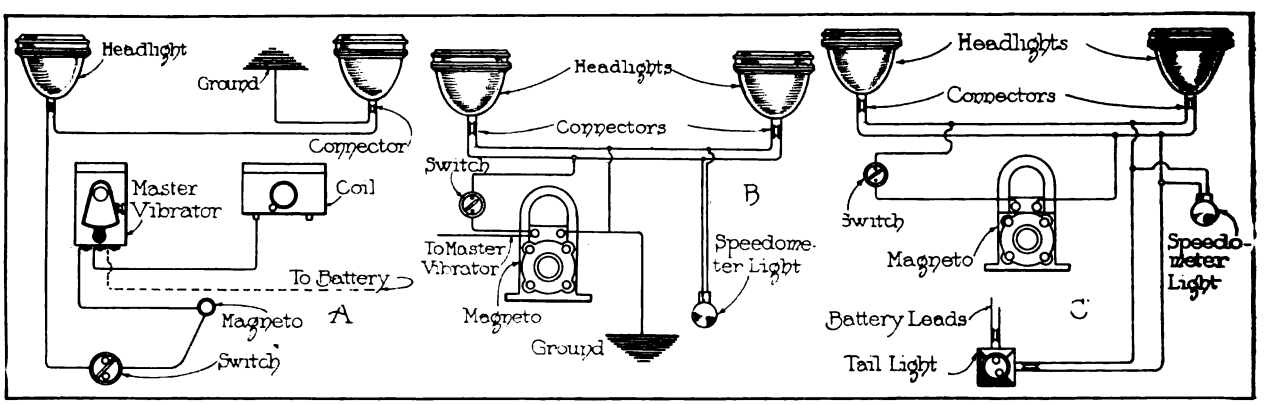


Fig. 68—Wiring Plans of the K-W Lighting Systems: A, Outfit Designed for Ford Cars; B, Method of Lighting Headlights and Speedometer Lamp by Magneto; C, Combined Lighting and Ignition.

The company supplies a complete lighting outfit, this consisting of the magneto, one pair of high grade headlights with hand burnished silver parabola reflectors, two Mazda six-volt, three-ampere bulbs of 20 candlepower each, 10 feet of duplex lighting wire, lighting switch and complete instructions for installation. If desired the magneto may be purchased separately. The K-W Ignition Company has made a considerable study of bulbs and recommends the use of what is known as the National Electric Lamp Association's style G 16.5 lamp, which is 2.0625 inches in diameter.

The K-W headlights are made either straight body or bullet shape, constructed entirely from one piece drawn from steel dies, and are free from soldered joints. The reflectors are set in the door against a felt ring, making the lamp moisture and dust proof. The focus, which is adjustable, is 1.125 inches and all lamps are provided with Ediswan sockets which prevent the bulb from becoming disconnected with the socket and throwing the load on one lamp. The Diamond switch and an instruction sheet for installation. The wiring diagram is outlined at Fig. 68 A and it will be noted that provision is also made for the installation of the K-W master vibrator.

(To Be Continued.)

QUICK TIRE CHANGE.

An interesting feature in connection with the recent 500-mile race at Indianapolis was the speed with which tires were changed on the various cars. The winning National made a record of 30 seconds, while men in the press stand timed a change on De Palma's Mercedes in 23 seconds. All the machines to finish with the exception of the Fiat, were equipped with Michelin tires, made by the Michelin Tire Company of Milltown, N. J. The concern has followed racing so closely and with such success that it realizes the importance of detail in handling tires in the pits, and employees of the company have worked this out to an exact science.

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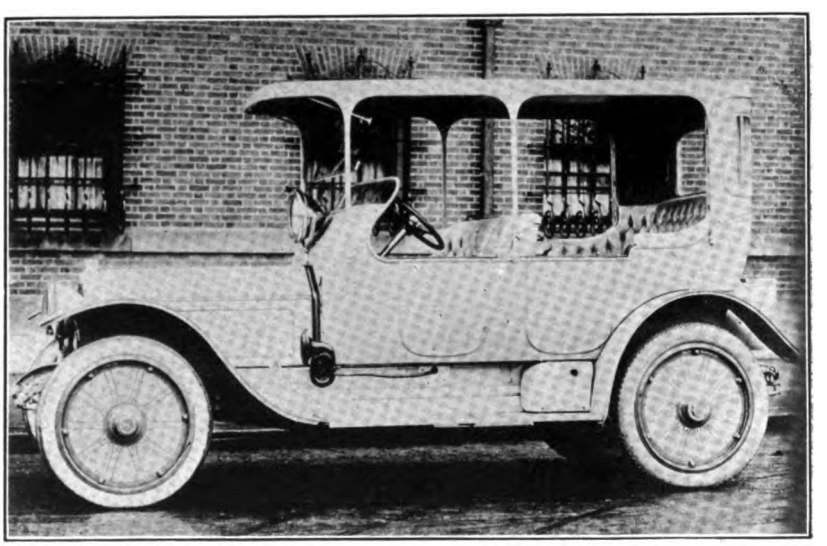
SPECIALLY CONSTRUCTED PEERLESS.

Having adopted a policy of installing in its service branches throughout the country equipment capable of practically building a car, the Peerless Motor Car Company, Cleveland, O., is able to undertake the construction of any special vehicle that a purchaser may desire. An accompanying illustration presents a Peerless 38-Six chassis on which the Boston branch recently fitted a body and other special equipment quite unlike any other car. In this respect, at least, the machine went to the purchaser as a thoroughly custom made product.

It will be noted, for instance, that the wheels have an individuality all their own. The spokes are entirely covered with metal discs, concave from hub to rim and painted to represent concealed spokes. There are openings in the covering to allow access to the tire valves, etc. The dash is exceptionally high, and is made of aluminum, being integral with the front of the car. It is topped by a celluloid panel six inches high. A slight concavity in the centre of the dash permits of mounting an extra headlight so arranged that every time the steering wheel is turned the light is turned correspondingly. In this manner, the beam always points in the direction the car is about to take.

The top is stationary. It resembles a limousine without sides or windows. The supports are hollow and serve as water pipes carrying off all rain and preventing it from dripping onto the occupants or the other parts of body. When not in use, the windshield folds up under the front of the top.

The entire construction was designed by the purchaser and carried out under his direction in the Peerless Boston branch. Besides being a splendid example of the coach maker's art, the completed vehicle ably demonstrates what may be expected when work of this nature is submitted to the branches maintained by this company.



Neat and Attractive Special Body Design Fitted to 38 Horsepower Six-Cylinder Peerless Chassis.

WIRE WHEELS MEAN LONGER LIFE.

The subject of wire wheels is interesting manufacturers of automobiles and tire makers throughout the country. Many of the manufacturers, it is claimed, are considering seriously the fitting of their product with such wheels. According to J. C. Matlack of the Ajax-Grieb Rubber Company, Trenton, N. J., wire wheels mean longer life to the tires and greater comfort to the rider, as the more elastic combination of wire and rubber would eliminate the stiffness that is noticeable in a wooden wheel with a hard inflated tire.

NEED FOR TIRE CHAINS.

After investigating the matter of automobile accidents, several highway commissioners have come to the conclusion that many of these could have been avoided by the use of tire chains. One commissioner finds that 90 per cent. of the accidents reported to him were caused by cars, not equipped with chains, skidding into collision with other vehicles or stationary objects. The following extract from his report is of particular interest to motorists:

"It is surely self-evident that no one may properly be called an efficient and safe driver of a motor car unless he has at all times complete control over the machine which he is driving. No person driving over a slippery road has complete control of a motor car, with wheels equipped with nothing but the ordinary rubber tires. In an emergency, he cannot apply his brakes with full force without starting his car spinning about a slippery road, likely to land in the ditch or against the nearest tree.

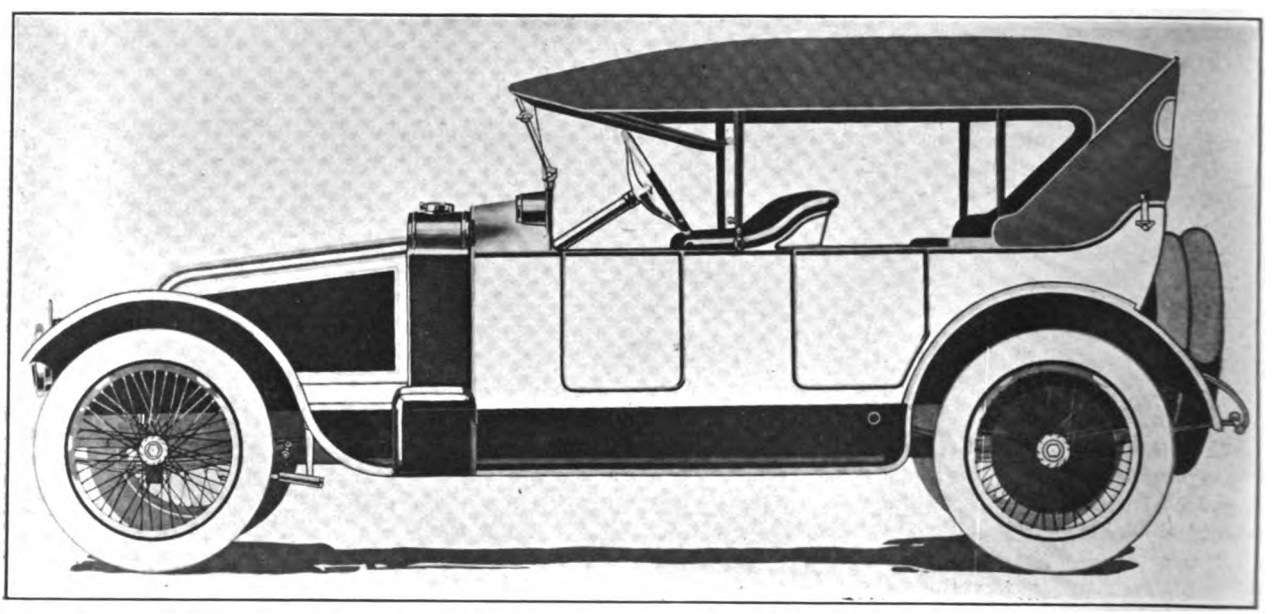
"Any man who will take the trouble to study the reports of automobile accidents, will see by a mere glance over the figures that at least 90 per cent. of all accidents to motor cars are caused primarily by skidding. It is often difficult to tell after an automobile accident exactly what was the cause. When a car skids into a ditch and is found with a broken axle, there is often doubt as to whether the breaking of the axles sent the car into the ditch.

"There is just one way in which a motor car can be adequately controlled on a slippery road, and that is by tire chains properly adjusted to the four wheels of the car. Equipped with tire chains, not the slightest difficulty will be experienced in gaining complete control, and such a thing as skidding will be impossible."

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KEETON CARS HAVE TWO CHASSIS TYPES.

THE Keeton Motor Company, recently organized at Detroit, Mich., to manufacture the Keeton four and six-cylinder cars, has increased its capital stock from $10,000 to $300,000, and has practically completed negotiations for a brick and concrete factory building and arranged for factory equipment that will make possible the production of a very large number of machines. The statement is made that the company expects to manufacture 15,000 cars for the 1913 season, of which it is proposed that 90 per cent. shall be of the six-cylinder type. The officers of the company are: President, F. M. Keeton; vice president, W. G. Houck; treasurer, W. V. H. Moore; secretary, N. T. Brotherton; directors, F. M. Keeton; W. G. Houck, C. B. Shaffer, W. Brotherton and W. W. Wuchter. The Keeton Motor Company is distinct from and has no connection with the Croxton-Keeton Company, the latter organization being formerly licensed by F. M. Keeton to build French types of cars. Jene J. Lablanc is the Paris engineer and representative of the company, and Ralph H. Brown is the factory engineer.



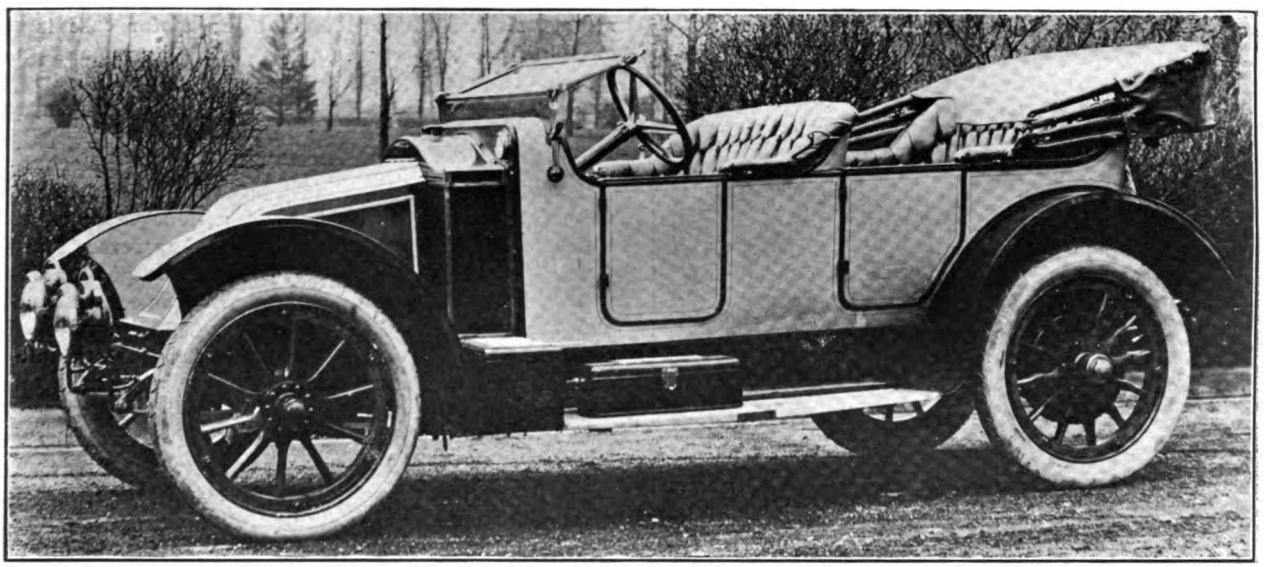
The Keeton Six-Cylinder 42-48 Horsepower Touring Car, Having Option of Wire Wheel Equipment, Showing the Features of Body, Hood and Top Design.

The purpose of the company is to produce cars that will be distinctive in appearance, constructed of high grade material to designs that have been developed to secure protection of all wearing parts, adequate adjustment for wear, and accessibility for examination and work. It is said to be the only French type of car built in America and it has exclusive features in the construction of the motor, which is of the small bore, long stroke type, a patented thermo-syphon system of cooling the engine, a brake construction that is held to be unusually efficient, as well as left side drive, centre control, self-starting equipment, electric lighting, option of wood or wire wheels, and other qualities that are characteristic of the most advanced designs and constructions.

The company is building two types of chassis, the four-cylinder and the six-cylinder, and these have motors that are of the same bore and stroke, the four being rated by the S. A. E. standard at 22.5 horsepower, and the six at 33.75 horsepower. The bore to stroke ratio is one to 1.40 and this affords a considerable increase of power production above the standard, so that the 32-38 horsepower and the 42-48 horsepower, respectively, claimed for the two engines is conservative. The same construction is used in each chassis save that the four-cylinder has a wheelbase of 120 inches and the six-cylinder 131 inches, and consequently an increased length of chassis frame and engine, as well as larger body equipment, there being heavier forward springs for the larger machines. The six-cylinder chassis will be fitted with Riverside touring bodies, with Meadowbrook roadster bodies, and with a Tuxedo coupe body, as regular equipment.

Because of the principal differences between the two chassis being only in length of motor and of chassis frame, the description that follows specifically refers to the four-cylinder construction. The motor is of the L head type with the cylinders cast en bloc of a fine quality of gray iron, the design being unusually symmetrical and sightly, with the water jacket and the carburetion and exhaust manifolds integral. The bore is 3.75 inches and the stroke 5.25 inches, and the

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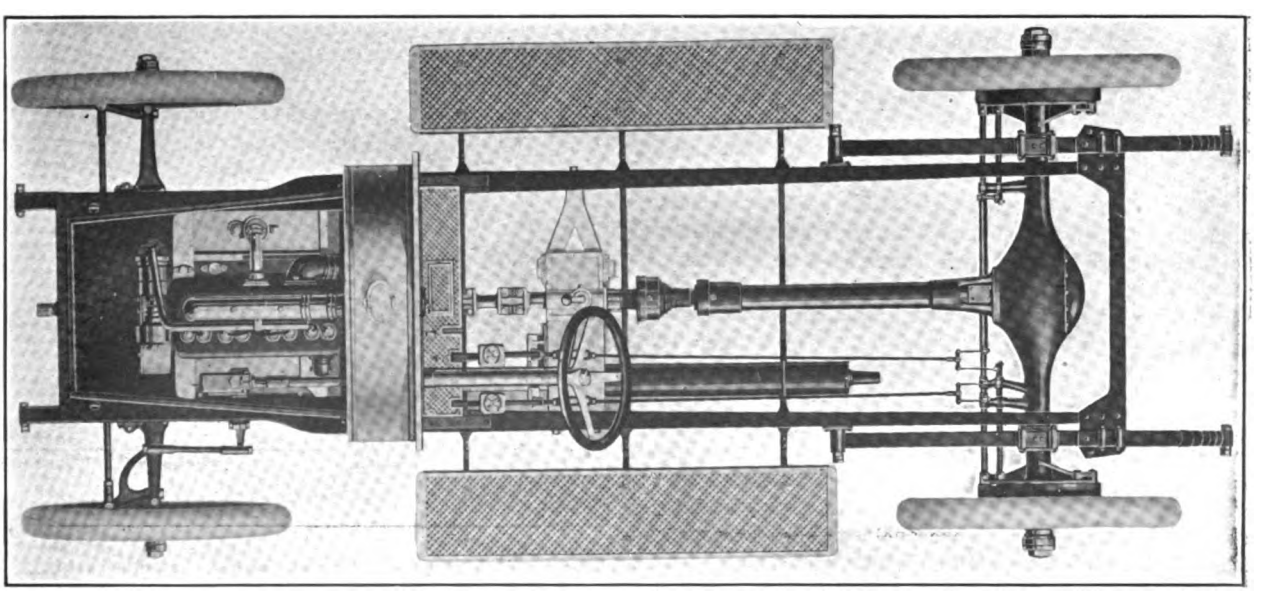
The Keeton Four-Cylinder 32-38 Horsepower Touring Car, with the Regular Equipment, Illustrating the Features of the Construction.

cylinders are offset .5 inch. The valves are at the left side and the valve stems and guides are within recesses formed by webs at the centre and each end of the block, these recesses being covered with plates retained by winged nuts.

The water spaces are extremely liberal and there is a large opening directly over the cylinder heads which is closed by the ample outlet manifold. Through this opening the jacket may be effectually cleaned of sand and scale. The exhaust and carburetor manifolds may be similarly cleaned. The block is long and the deep crankcase makes the motor seem to have unusual height. The crankcase is of aluminum, cast in two sections, with a reservoir bolted to the bottom and a housing that covers the timing gears. The cylinders are bored, reamed, aged and ground to size, and specially treated to neutralize stresses from casting or machining. The pistons are turned, aged and ground to an accurate fit and are similarly treated.

The fuel inlet is through a long, straight lead from the carburetor to the cylinder block, at the centre of the right side of the casting, and the exhaust is at the rear of the block at the left side. The water inlet to the block is at the rear at the right side of the water jacket base. The water outlet manifold is a large casting that covers the cylinder heads and it is retained to the block by three heavy bolts.

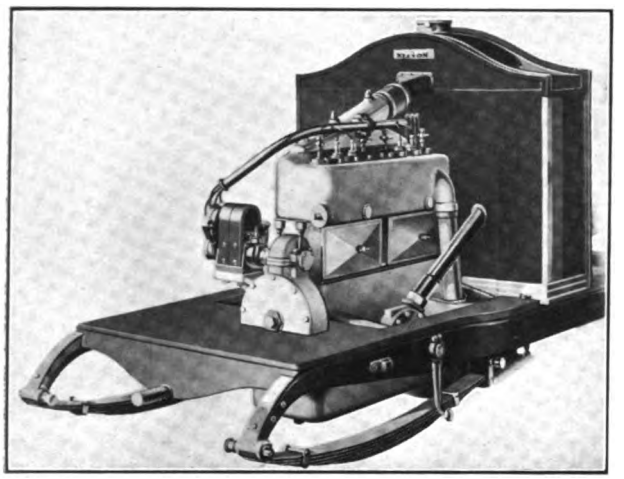
The crankshaft is drop forged from nickel steel,



Top View of the Keeton Four-Cylinder Chassis, Showing the Large Engine Web and Deck, the Transmission, Rear Axle and Brake Construction.

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2.25 inches diameter, and it is mounted in three bearings, the forward bearing being 2.75 inches length; the centre bearing 2.5 inches length, and the rear



The Left Side of the Keeton Power Plant, Enclosed by the Wood Deck, Showing the Magneto Cable Leads, the Exhaust Pipe and the Accessibility of the Valve Mechanism.

bearing four inches length, this giving a total bearing surface of 9.25 inches for the four-cylinder motor. The bearings are of a special alloy metal. The camshaft is a special steel drop forging one inch diameter and it is carried on three bearings, the forward being 2.1875 inches length, the centre 2.5 inches length, and the rear bearing is a New Departure journal that takes the thrust of the shaft in either direction. The other camshaft bearings are of a special alloy metal.

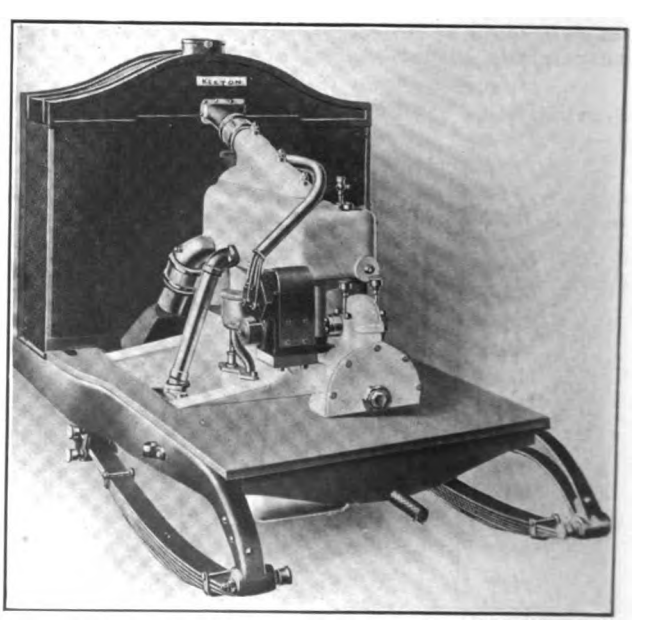
The connecting rods are drop forged from a special alloy steel and are unusually long, this, with the length of stroke and offset cylinders, minimizing the side thrust on the cylinders. The crankpins are the full diameter of the crankshaft and the bearings are a generous length, the connecting rods being retained by bolted caps that are adjustable for wear with shims. The wristpins are large, of special steel, hardened and ground, and have large bearings of special metal in the piston bosses.

The valves are with ports 1.625 inches diameter and the valves are a special quality of gray cast iron, treated to yield unusual endurance, and with stems of carbon steel electrically welded to the heads. The valve stems are operated in cast iron guides that may be replaced when wear is manifest. The springs are sufficiently strong and the motor is so efficiently cooled that these are not affected by the heat. The cams are accurately cut, hardened and ground, and the tappet rods are of special steel, similarly fitted, that are operated in cast iron guides. The tappets are fitted with hardened adjusting screws and nuts to compensate for wear. While these parts are enclosed they are easily accessible for the removal of the plates covering them.

The timing gears are of hardened steel, of wide face and are cut spiral to minimize the noise of operation. At the forward end of the motor case is a circular case or cover housing these gears, and on this housing is a bracket for the magneto, the drive being from the gears directly above the crankshaft centre.

The engine is lubricated by a combination mechanical force feed and splash system. Bolted beneath the motor case is a reservoir of 3.5 gallons capacity, in which is a sump or well surrounded by screen, into which inlet of the pump is fixed. The base of the engine case is divided by a web, carrying the centre main and the centre crankshaft bearings. The bottom of the lower section of the casting is cast to form pits beneath the crankpins of each cylinder with ducts for drainage from the one to the other.

The lubricant is drawn from the reservoir by a plunger pump that may be adjusted to any predetermined capacity and it is then forced through a tube within the engine case. This tube is perforated at intervals and at each cycle of the pump the oil is forced in streams over the main and the crankpin bearings. These streams are sufficient to flood these bearings and the excess drains into the pits in the bottom of the crankcase. As the connecting rods sweep into these pools the oil is distributed by splash to the camshaft bearings, cams, tappets, tappet guides, wristpins, wristpin bearings, the cylinder and piston walls, and the drainage from the forward bearing maintains a constant level in the pocket formed in the base of the timing gear housing. The oil contained in the reservoir will suffice for 1000 miles driving, but in addition to this is a reserve tank of five gallons capacity that is connected with the engine case, and oil can be forced from the tank to the oil reservoir of



The Right Side of the Keeton Motor, Demonstrating the Enclosed Timing Gear, the Transverse Magneto Drive, the Magneto, Carburetor, Intake and the Water Manifolds.

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the motor by a hand pump that is conveniently located on the heel board. The total oil capacity of the engine and the reserve is 8.5 gallons.

The motor is cooled by a patented system that is said to be unusually effective. It is stated that after the most severe tests the water has never been found to be heated to more than 170 degrees. The radiator is located, as is the dash, behind the motor. It is a cellular type of large size. The water is circulated through the motor and the radiator by large connections that afford an unobstructed flow. The flywheel constitutes a fan blower of considerable capacity. As may be noted the engine is surrounded by a deck that completely covers that part of the chassis usually left open. This deck prevents any draft of air downward and the flywheel forces a strong current of air from the rear below and through the radiator and out at the sides. This is in reverse of the Renault system by which the air is drawn from the sides through the radiator under the hood and downward under the car. The Keeton motor cooling is said to effectually prevent the heating of the floorboards of the forward compartment, and it eliminates the usual need of ventilation of this division of the body.

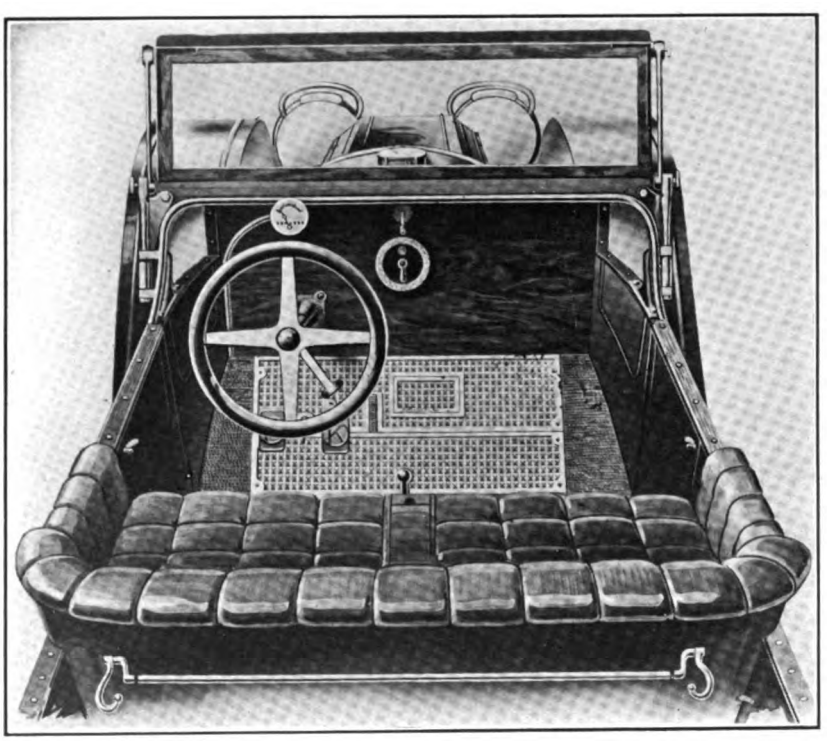
The fuel is atomized by a carburetor of the float feed automatic type that is said to afford a uniform mixture at all speeds and to be in every way efficient. The carburetor is located below the deck surrounding the motor and it is supplied by gravity flow. It is fitted with a hot air intake and a jacketed intake pipe, so there is no difficulty with carburetion at temperatures at which the car may be driven.

The ignition is a dual system, employing either the Bosch or Eisemann magneto with a fixed spark, and with a six-volt, 80 ampere-hour storage battery for starting or for reserve. The fixed spark has been adopted because it is the belief of the designer that this has proven in every way satisfactory and does not leave the car at the mercy of the inexperienced man. The spark is adjusted to the point of maximum efficiency before the machine is sent from the factory. The fixed spark is very general practise abroad.

The lower section of the engine case is extended back of the motor itself, this extension forming a housing for the lower half of the flywheel, and this housing is also united with the dust pan so that the engine is thoroughly protected against water, mud, dust and road accumulations.

The flywheel is formed so that it serves as a blower and it is also incorporated with the multiple disc clutch, composed of 48 saw steel discs that are driven in oil. The clutch engages easily and is free from "grabbing" and other objectionable conditions. It is said that this clutch has been examined after 125,000 miles driving and found to be practically unworn.

The clutch shaft is coupled to the transmission shaft by a large universal joint that compensates for all chassis distortion and fully protects the motor. The transmission has a selective sliding gearset, known as the Mercedes type, giving three forward speeds and reverse, and the shafts are chrome vanadium steel of large diameter and mounted on imported annular ball bearings, that take all end thrust. The gears are of the same metal, of such size and width that they will endure under the hardest service. Both gears and shafts are heat treated. The controlling mechanism of the gearset is a single lever mounted on the top of the case. The case is bolted to the chassis frame by three arms and is easily accessible through lifting the floorboards.

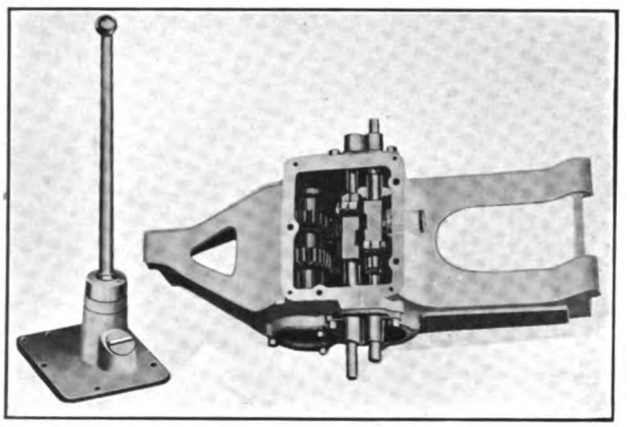


View of the Front Seat of the Keeton Four-Cylinder, Illustrating the Control Members and the Dash Installations.

The transmission case supports the driving system, the main transmission shaft being coupled to the driving shaft by a large universal joint. The squared forward end of the driving shaft is fitted into the universal joint. The universal joint is just ahead of the forward end of the torsion tube, which is with a seamless wall .15625 inch thick, and 2.5 inches outer diameter. Into this tube is fixed an imported annular ball bearing that carries the driving shaft, and there is a similar bearing at the rear end. The driving shaft

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is 1.375 inches chrome vanadium steel. The driving pinion is taper fitted to the shaft and is secured to it by a Woodruff key, castellated nut and cotter.



The Keeton Transmission Gearset, Showing the Supporting Arms, with the Cover Carrying the Control Lever Removed.

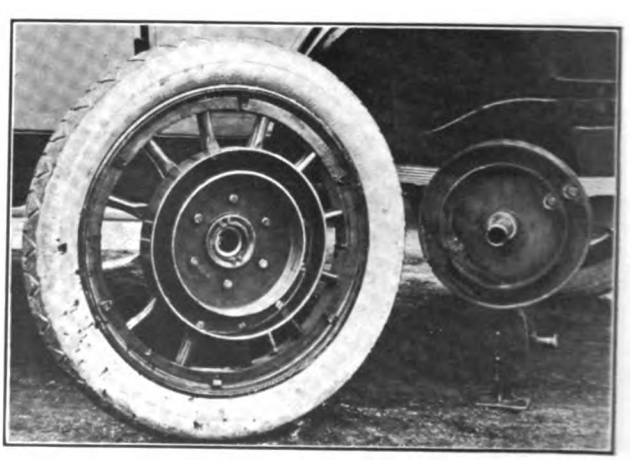
The torsion tube is bolted to the forward side of the rear axle housing, this shell being of pressed steel with a larger cover plate at the rear. The differential is a Brown-Lipe production, with nickel steel gears and it is mounted on imported annular ball bearings. The rear axle is a full floating type with a case of pressed steel, with axle shafts 1.375 inches diameter of chrome vanadium steel. The front axle is a chrome nickel steel drop forged I section, heat treated for endurance, with large yokes and steering knuckles, and heavy wheel spindles, the tiebar and steering linkage being of unusual strength.

The wheels are 34 inches diameter, artillery type, of selected hickory, with large hub flanges, 1.75-inch spokes, the rear spokes being bossed where the brake drums are bolted to them. The wheels are shod with 34 by four-inch tires forward, and 35 by 4.5-inch rear. The purchaser has the option of wire wheels with the six-cylinder cars, it being maintained that the wire construction affords greater resiliency, longer life to the tires, are lighter in weight and can be repaired or trued if damaged. Outside of the motor all bearings are the annular ball type, this insuring against material loss of power through friction.

The chassis frame is a pressed steel channel section of liberal width and depth, being cambered from a point about midway of the motor length to the forward spring horns, and raised five inches at the rear to permit the use of a special type of spring and to secure low centre of gravity. The frame is strongly braced by the web of the engine and the supporting arms on which it is mounted, the radiator frame, three cross members and the end members, besides the deck about the engine and the heavy aluminum toe board. The rear cross frame member is extended beyond the side members and to these ends are attached the springs, affording an offset, so that the frame is suspended between the rear springs instead of above them. The rear springs are three-quarter elliptic 50 inches length and two inches width, and the forward springs are 36 inches length and two inches width, of a special quality of alloy steel designed for automobile spring construction. The cars are claimed to have unusual riding qualities because of the wheelbase length, the quality of the springs and the manner of suspension, while there is a road clearance of 12.25 inches, despite the low centre of gravity. The weight is so distributed that skidding is minimized and the cars are extremely steady when driven at high speeds.

The cars are driven from the left side, this following foreign practise, as well as a design that is finding much favor with automobile engineers and with the motorists. The steering column is of unusual length and rake and it is carried through the radiator, the lower support being firmly anchored in the heavy web of the motor case. The steering gear is of the worm and gear type, with large thrust bearings either side of the worm, all of the moving parts being enclosed in the housing. The gear is adjustable for wear and is operated with an 18-inch hand wheel, there being a throttle lever with a handle that is fitted to one's fingers just below the wheel.

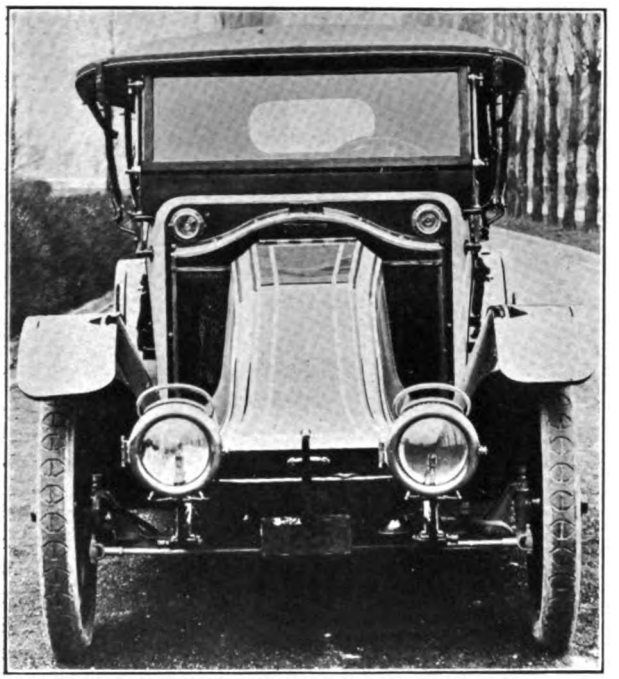
The control of the car is by two pedals and a single hand lever. The left pedal operates the clutch, and its connection is so designed that while the foot pressure to a certain point will disengage the clutch, "pushing through" the pedal will apply the service brake. The right pedal actuates the emergency brake. By a ratchet device this brake may at any time be set. The brake construction is unusual and is said to have high efficiency. The brakes are of the internal expanding type, with floating shoes, and are operated on concentric drums, this design having every desired quality, it is claimed. The construction differs from the usual forms because of the entire



The Concentric Brake Drum of the Keeton Cars and the Floating Brake Shoes, the Outer Being the Service and the Inner the Emergency Brake.

mechanism being carried on the rear axle. The brake shafts extend completely across between the brake drums and the linkage system is such that the brak-

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Front View of the Keeton Four-Cylinder Car, Showing the Symmetrical Appearance of the Hood, Radiator and the Dash with Its Inset Lamps.

ing leverage is applied equally upon each drum. There is a single rod between each pedal and the linkage, so that the pull is always direct and positive. The service brake is within a drum 16 inches diameter and two inches face, and the emergency brake is within a 12 inches diameter drum with two inches face. The brake shoes are faced with thermoid and cannot be burned by service. All of the brake adjustments can be made by lifting the floorboards of the car.

The control lever, by which the speed ratios are obtained, is located in the centre of the car at the right of the driver, being in every way convenient. The head of the lever is moved not more than three inches in changing speeds. The foot accelerator is connected with the hand lever throttle control on the steering wheel. The gear reduction is 3.5 to one with the touring cars and three to one with the roadsters, if this is desired. This gives from three to 60 miles an hour on high speed.

Great care has been taken to lubricate all moving parts, grease cups being provided for bearings not otherwise reached by lubricants. The wide web of the engine and the deck, and the extension of the engine case and the dust pan protect the driving system from water, mud, dust and the like.

The cars are now designed for acetylene gas head lamps, electric combination and oil dash and tail lamps with storage battery for these, all lamps being furnished in brass and black enamel. A combination motor starter, ignition and lighting system from a dynamo is now being tested.

The bodies are of sheet steel with wood frames and are of the fore door type, roomy and commodious. The touring cars have five passengers capacity; the roadster two, with tire deck and space for carrying two coat cases, and the coupe three passengers. All boards are cast aluminum. The hood is the Renault type and is decidedly graceful, and the bodies, the long sweeping fenders, the unobstructed running boards and the ample splash aprons thoroughly harmonize. The steps are cast aluminum.

In finish three combinations are given: The one is with body and hood of royal blue with white striping and black molding, with chassis of French silver gray with blue stripe; the second is with body and hood of brewster green, white striping and black molding, with chassis of brewster green with white stripe, and wheels of natural wood; the third is with body and hood of royal maroon, with ivory white striping and black molding, with chassis of Mercedes red and black striping. The upholstery is of first grade leather, long grain, black glossy finish, with ample seat and back cushions of the highest quality of hair, making for comfort in riding.

The standard equipment, besides that already specified, includes a special design mohair top, dust cover, special rain vision windshield, speedometer, electric lamp lighter, electric horn, extra demountable rim, tire irons to carry two extra tires, auxiliary oil and gasoline tanks, full set of tools, pump, jack, tire repair kit, robe and foot rails. The fuel capacity of the touring car is 19 gallons of gasoline with four gallons reserve, and five gallons of lubricating oil; of the roadster, 30 gallons of gasoline, with five gallons reserve, and five gallons of lubricating oil. The weight of the touring car, completely equipped, is 2850 pounds, and of the roadster, similarly equipped, 2650 pounds.



Rear View of the Keeton Four-Cylinder Car, with the Tire Holder, Lamp and Number Plate Holder Installed.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

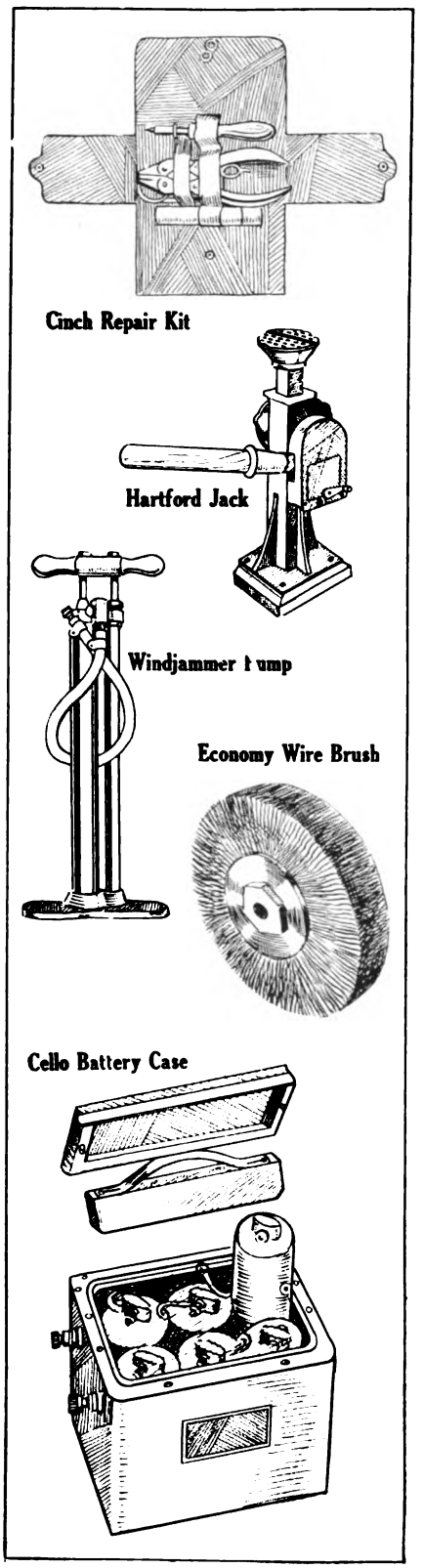
The Cinch Tire Repair Kit, marketed by the Hailstone & Winmore Company, Northampton, Mass., is a device with which it is claimed an inner tube may be repaired when punctured in a very short time without removing the member from the wheel. The outfit comprises a number of rubber plugs, a cutting tool, a wire spreader and a pair of patented pliers. The patching plug is made in two parts, having a space between the sections, and so devised that these may be compressed, thus sealing the aperture in the inner tube. The wire spreaders are utilized for temporarily enlarging the puncture and for making easy the insertion of the plug which is of rubber and metal. It is stated that an inner tube may be repaired in less than a minute, that it will not leak and that the repair is permanent.

★

The Hartford Auto Jack, manufactured by the Hartford Suspension Company, Jersey City, N. J., maker of the Truffault-Hartford shock absorbers, will appeal to motorists who desire a jack which will lift a heavy car without undue effort. The working parts are constructed of solid chrome nickel steel fitted in a casing of tough malleable iron and it is pointed out that the tool will survive the roughest treatment. It operates up or down, these movements being possible by the moving of a small lever, and as the positions are indicated there is no guesswork when utilizing the device.

★

The Windjammer Automobile Tire Pump, manufactured by the Bridgeport Brass Company, Bridgeport, Conn., is said to differ from those of usual construction as to disassemble the device it is only necessary to unscrew one nut. The cylinders are constructed of heavy gauge seamless brass tubing and these are fastened into the foot base in such manner as to be absolutely air tight. This operation is performed by a special process. The top is made of malleable iron and is said to be practically unbreakable. The Bridgeport product is provided with a heavy coil spring on the piston rod, this preventing any violent upward movement from damaging the top.



★

The Economy Wire Brush, produced and marketed by the Williams Foundry & Machine Company, Akron, O., maker of automobile tire repair equipment, is designed to be utilized with a buffing stand, but it may be operated on an ordinary emery grinder. Where there is much work to be done, it is claimed that the brush will save considerable time in preparing casings and tubes for cement and new material. The device is constructed of steel wires in suitable lengths and it is claimed that the material will not break. It is made with different diameters as well as width of faces.

★

The Cello Battery Case is produced and marketed by the A. S. Campbell Company, 284 Commercial street, Boston, and is specially designed for automobile or marine service, as the hermetic case protects the dry cells from all moisture. The walls of the holder are .5 inch thick and the interior of the container is sealed with a water proof compound. The lower section is fitted with a bronze rim equipped with a substantial rubber gasket, which is compressed when the cover is fitted, inasmuch as this also has a gasket which presses against the rubber. The cells are held securely by a block on which is mounted a spring. Two binding posts or terminals are fitted to the exterior of the holder. The case is adaptable to any make of dry cells and is constructed to hold six batteries. It is neat and compact and the exterior well finished.

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The Victor Grease Gun, marketed by the Judd & Leland Manufacturing Company, Clifton Springs, N. Y., will appeal to motorists as the device holds two pounds of lubricant which is not injected into the differential or other part by the usual method, but by the utilization of a tire pump. The spout end of the gun is removable, and having a three-inch aperture is filled easily. The pump is then attached and a few strokes produces sufficient compressed air to force the lubricant out of the gun when the stop cock, with which the instrument is fitted, is turned to an open point. The gun is equipped with a reducer adaptable to the spout for service when lubricating universal joints, etc.

★

The Sword Piston Ring Remover, made by the Sword Manufacturing Company, Inc., New London, Conn., is designed to make easy the removal and replacement of piston rings, it being claimed that these members may be handled without danger of breaking. It will appeal to the owner who repairs his own car as the rings may be held securely when replacing a cylinder without danger of pinching the fingers. The device resembles a pair of pliers and its ends are so constructed that they will fit any type of ring. In practise the ends of the tool are fitted to the ring and when the jaws are expanded the ring may be removed easily. The replacement is also a simple matter.

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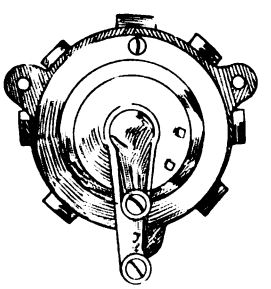
The Crary Self-Starter, made by the T. C. F. Manufacturing Company, Detroit, differs from those of ordinary form, inasmuch as the acetylene may be admitted to both the cylinders and the intake manifold. The flow of the gas and the proportions thereof are controlled by a special distributor and the needle valve member is included in the dash device. The latter is equipped with two levers, these serving to operate the needle valve and distributor. The smaller member is removable, locking the device. It is pointed out that the gas may be shut off from the dash as well as the amount regulated to secure a proper mixture.



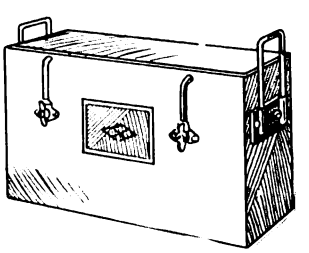
Victor Grease Gun



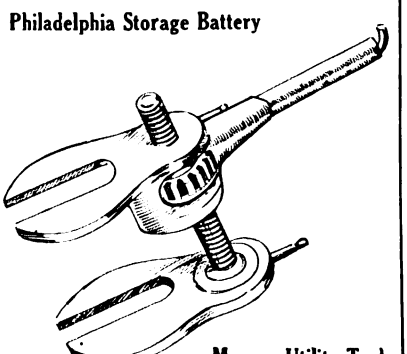
Sword Piston Ring Holder



Crary Self-Starter



Philadelphia Storage Battery



Morgan Utility Tool

★

The Philadelphia Storage Battery is a new product of the Philadelphia Storage Battery Company, Ontario and C streets, Philadelphia, Penn., and was designed especially for motor car service and for utilization both for ignition and lighting. A feature of the battery is the use of thin plates, an arrangement decreasing the weight of the cells, and it is claimed by the maker that the amperage capacity is augmented. They are made in three types, the ampere-hour capacity being 54, 72 and 90, respectively, and the voltage six, which is standard. These batteries are very compact for a given capacity, the smallest member being approximately eight inches high, six wide and eight long. The largest battery is of the same dimensions except length which is 13 inches. They are fitted with neat handles, facilitating the replacement and removal of the member and the terminals are easy of access and non-corrosive.

★

The Morgan Utility Tool is manufactured by B. Morgan, Newport, R. I., who has placed upon the market a number of practical accessories. It is a useful device inasmuch as it may be utilized for a number of purposes in the repair shop and garage, or upon the automobile. It comprises two slotted jaws, one of which is securely fastened to a threaded bolt while the other member is actuated by a ratchet. This arrangement permits of contracting or compressing the jaws when removing or replacing valve springs or stretching these members. Another use to which the tool may be put is that of holding patches on an inner tube, and it may also be attached to the running board and employed as a vise. In the repair shop it serves as a drill, jig and many other useful purposes.

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The Auto Wash Brush, marketed by the I. J. Smith Manufacturing Company, 4241 Park avenue, New York City, is designed more especially for owners who take care of their own cars, although it is constructed for garage service as well. The brush is made of a high grade soft hair through which the water passes, keeping it clean, as well as insuring a constant flow of fluid upon the part being washed. It is fitted with a special coupling to which the hose is attached and the connection also forms the handle. Extra brushes may be purchased.

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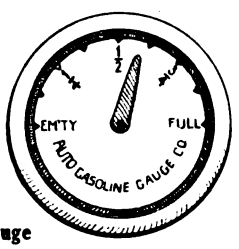
The E. & J. Condensation Cup is a device produced by the Edmund & Jones Manufacturing Company, Detroit, for attachment with the generator or gas tank, and by it all moisture is collected before it has an opportunity of reaching the acetylene burners. It is compact and easily installed, and is provided with two intake connections and a like number of outlets. It is placed below the generator or tank and any fluid that may collect is drained easily by the opening of a petcock with which the cup is provided. It is constructed of high grade material and is inexpensive.

★

The Auto Gasoline Gauge is being placed upon the market by the Specialty Sales Company, Racine, Wis., and is designed for attaching to the fuel tank to denote the amount of gasoline in the container. It is very compact and it is claimed that it may be installed in 15 minutes by the utilization of the special tool which accompanies each device. It comprises a metal tube which extends from the top to the bottom of the fuel tank, a float and a gauge. The casing has a spiral slot extending from top to bottom, half way around its circumference. This slot engages with arms on the float which slide freely on a straight staff. The latter is pivoted at either end of the casing, and at the upper end is an indicating hand which records the movement of the float below. The casing also serves to prevent the slopping of the fluid and disturbing the operation of the float. When the gauge is installed in the tank the dial lies in a horizontal position close to the surface and it is said that a perfectly steady reading is given by the indicator. The dial is calibrated, denoting empty, full and intermediate positions.

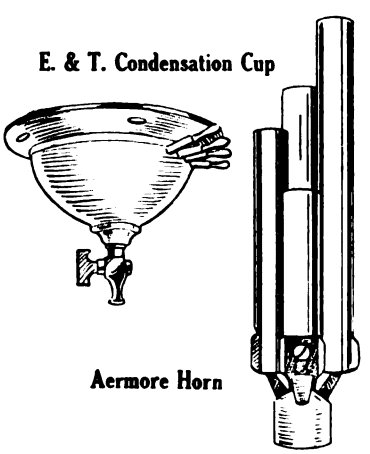


Smith Auto Wash Brush

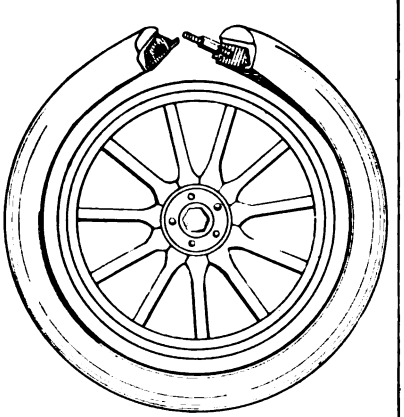


Auto Fuel Gauge

E. & T. Condensation Cup



Aermore Horn



American Emergency Tire

★

The Aermore Exhaust Horn is manufactured by the Aermore Manufacturing Company, Chicago, and it is claimed that its construction is such that it will not become clogged with soot and that it will clean itself automatically. It comprises four brass tubes having apertures and constructed on the principle of an organ. It is operated by the exhaust of the motor and may be attached to any convenient point of the exhaust pipe. A special tail-end valve is supplied if desired. The signal is operated by pedal and it is claimed that the horn produces the four major notes of the scale simultaneously and that the volume of sound is controlled easily.

★

The American Emergency Tire, marketed by the American Automobile Specialty Company, 510 Ashland boulevard, Chicago, is as its name implies, an emergency shoe for replacing a blown-out or badly damaged pneumatic tire while on the road. It consists of a length or strip of solid rubber tire material perfectly conformed to the shape and size of the channel of any given wheel. It is reinforced internally, with high carbon steel wires and these are welded at their ends to two steel plates which form parts of a turnbuckle. The tire is made tight and secure in the channel, between the rims of the wheel, through the action of the right and left hand threads of a double screw engaging in each end plate The lateral strain is on the rims of the wheel. The turnbuckle is hidden from view and its arrangement permits of the two ends of

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the tire being joined closely and without a projection.

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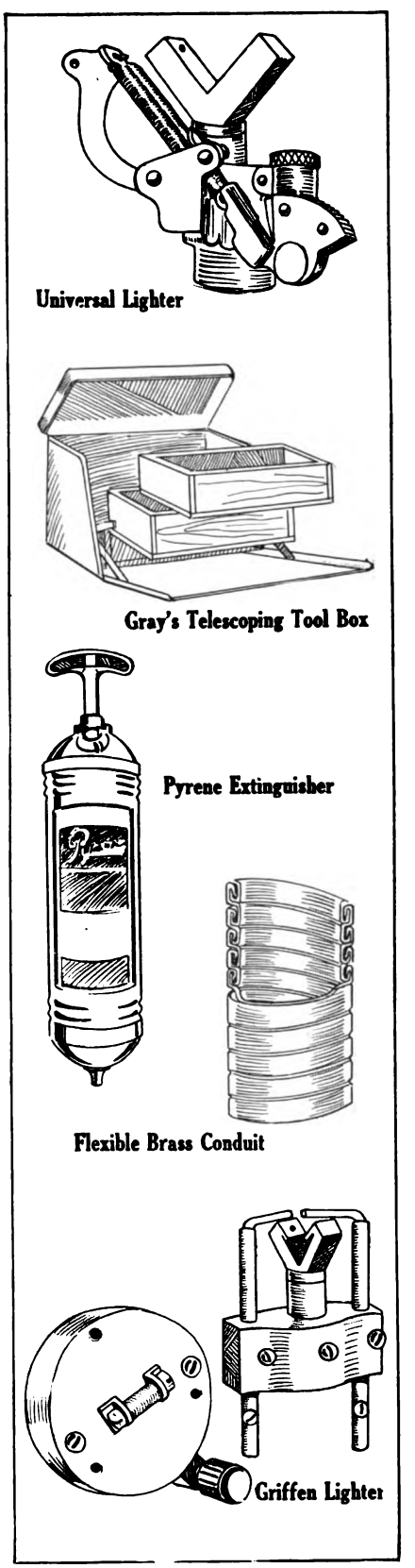
The Universal Lighter differs from those of usual construction, as by it the acetylene headlights may be lighted by a simple movement of the finger. It does not require any wiring or batteries, the spark being generated by a friction file passing over a sparking alloy, the movement throwing a shower of sparks directly into the path of the flame. It is claimed that the sparking alloy will endure over six months and it is enclosed in a small thumb nut with spring tension to keep it automatically in proper adjustment until worn out. The sparking attachment is sold separately, and costs but a few cents by the dozen. The lighter is clamped around the base of the burner and is so constructed that it will fit any type of burner. It is marketed by the Waite Auto Supply Company, Providence, R. I.

★

The Gray Telescoping Tool Box, manufactured and marketed by the Gray Specialty Company, 148 Avon avenue, Newark, N. J., is a practical device for the automobile as its construction is such that any tool may be secured easily without disarranging the other members. This is of value on the road as considerable time is saved, and another advantage is that the tools are always in sight. The front and top of the box are hinged and the drawers swing outward, permitting easy access to the contents. The container is constructed of heavy gauge steel, and is 16 inches long, 10.5 high and eight wide. The compartments are of wood, preventing rattling of the tools. The device is equipped with a substantial brass trunk lock and the exterior is highly finished.

★

The Pyrene Fire Extinguisher is a compact device designed for attachment to the automobile, being 14 inches long and but three in diameter, and weighing only five pounds. The contents are impervious to heat or cold and it is claimed will not freeze at 60 degrees below zero, Fahrenheit. The liquid is not maintained under pressure, is proof against explosion, and will not deteriorate with age. Containing neither acids, alkalis or salts it will not injure any material with which it is brought in contact. The Pyrene Manufacturing Company, New York City, has designed a holder for attachment to the dash. The device itself is finished in enamel, brass or nickel.



Universal Lighter

Gray's Telescoping Tool Box

Pyrene Extinguisher

Flexible Brass Conduit

Griffen Lighter

★

A Flexible Brass Conduit for covering the exposed wiring on motor cars or protecting gas tubing, etc., is manufactured by the American Metal Hose Company, Waterbury, Conn. It is made either of brass or steel and the metal strips are interlocked by a special process. The tubing may be bent to a considerable angle without affecting the joints. It is made plain or lined with asbestos, in different finishes, and is produced in various sizes to meet the requirements of the purchaser.

★

The Griffen Lighter is the invention of Stephen J. Griffen, 306 Linwood avenue, Bridgeport, Conn., who devised it for application to his single-cylinder car. It comprises a switch having a spark gap and a bracket for attachment to the acetylene burner. The burner device has two points in proximity to the path of the flame. When the switch lever is moved, the direction of the secondary current is changed so that it makes the circuit of the spark gaps at the burners, returning to the spark gap on the switch, and thence to the plugs as usual. The current to the plugs is interrupted but for the fraction of a second and the maker claims it does not interfere with the operation of the motor, also that the lighter is adaptable to any type of internal combustion engine.

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A British car which holds much of interest for American motorists is the Daimler, made by the Daimler Motor Company, Ltd., Coventry, England. This is due in a measure to the fact that this concern was one of the first foreign makers which gave encouragement to Charles Y. Knight, inventor of the Knight sliding sleeve engine. All Daimler models are now fitted with this motor, and the company states that it has found it necessary to increase production facilities in order to take care of the rapidly growing demand.

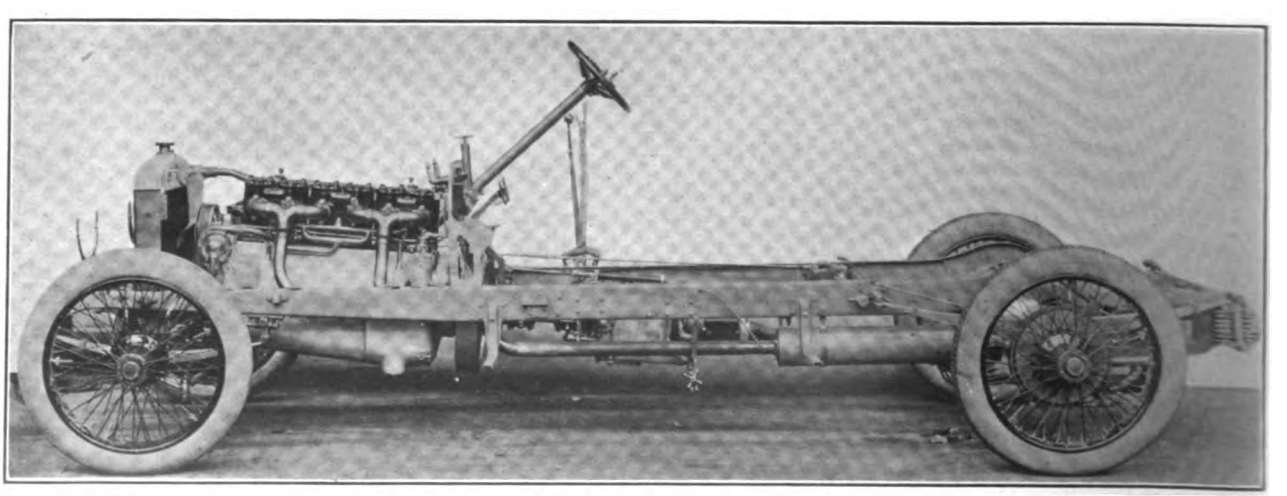
Two models are presented for the current season, these being identical in their main details, with the exception that the one shown herewith is fitted with a six-cylinder motor, while the other employs a four-cylinder unit. The design of the chassis and bodies is held to be sound in every respect, and it is stated that a judicious employment of special materials has resulted in fairly light weight, yet with sufficient strength and rigidity for all ordinary purposes.

The engine has the cylinders cast in pairs, the bore being 3.14 inches and the stroke 4.02 inches, giving a rating of 30 horsepower, according to the maker. Detachable heads are fitted, the water jackets in these being supplied from the cylinder jackets by an internal connection which dispenses with the necessity for external piping. With this new arrangement, it is claimed that all possibility of water leaking into the cylinders has been eliminated.

A water pump of the centrifugal type is provided to keep the water in circulation. This pump and the dual magneto are driven from a cross shaft placed transversely at the front of the engine, and actuated by spiral gears from the eccentric shaft. A silent chain is used to transmit the motion from the end of the crankshaft to the eccentric shaft. No change has been made in the design of the sleeves and actuating gear, this portion of the Daimler-Knight engine having proved itself to be quite satisfactory and free from trouble.

Each pair of cylinders is connected by an inlet pipe branch to the carburetor, which is of an improved type, designed especially with a view to economy of operation. On the opposite side of the engine a separate exhaust port for each cylinder communicates with the large muffler which lies along the rear portions of the frame. At all speeds the operation of the exhaust is held to be quite inaudible.

In the matter of lubrication, the design of the engine has been modified so that the pump, troughs and all parts of the system are connected to the top por-

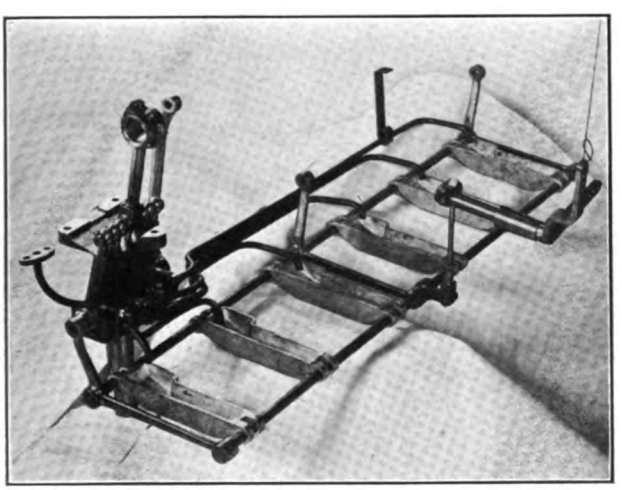


Six-Cylinder English Daimler Chassis, Fitted with Knight Sliding Sleeve Motor, Worm Drive and Several Exclusive Features.

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tion of the crankcase, the bottom half acting only as an oil reservoir. It will be remembered that the Daimler oiling system employs a large plunger pump to draw the lubricant, which has been filtered previously, out of the base and force it along separate leads to a series of troughs placed beneath each connecting rod. As the crankshaft revolves, the scoops on the bottom of these rods splash the oil to every bearing. An additional refinement is provided by hinging the troughs and connecting the actuating lever to the throttle control, so that the level of the oil is raised whenever the throttle is opened. In this manner the supply of oil to the motor is varied automatically with the work it is expected to perform. In practise, this system is said to have worked out decidedly satisfactorily, it being found necessary to renew the supply by pouring in a gallon of oil only every 600 to 800 miles, according to the size of the motor. The customary sight gauge is located on the dash.

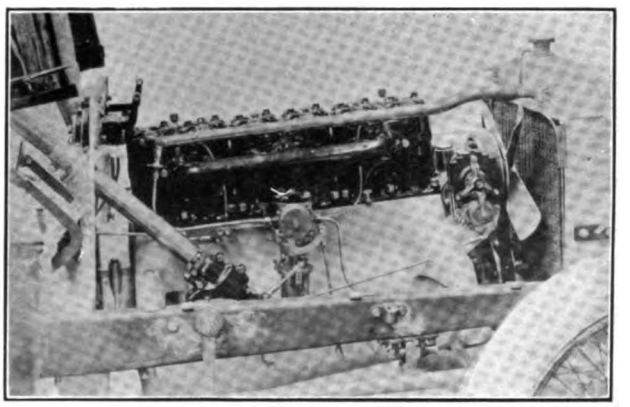
On these new engines the patented Daimler "vibration damper" is fitted to prevent the occurrence of the periodic tremor to which all fast running crankshafts are liable. This device is said to have demonstrated its value in this work, and the Daimler engines are claimed to be vibrationless at all speeds. Another special device is an air pump of improved design and with vertically placed valve, by means of which fuel is forced from the rear tank to the carburetor.



Special Oiling System Employed on Daimler Cars.

The clutch is a leather faced cone member, fitted with a new form of balanced flexible coupling to the gearbox. Four forward speeds and reverse are provided. A special sliding universal joint is placed behind the gearbox so that the rear flexible joint has no sliding motion. This rearrangement is held to give much smoother running on rough roads.

Final drive is by worm gears of special construction, the worm being placed below the axle. To reduce the amount of work imposed upon the universal joints, the engine and gearbox are slightly inclined, so that the drive from the crankshaft to the worm shaft is in a straight line under normal load.

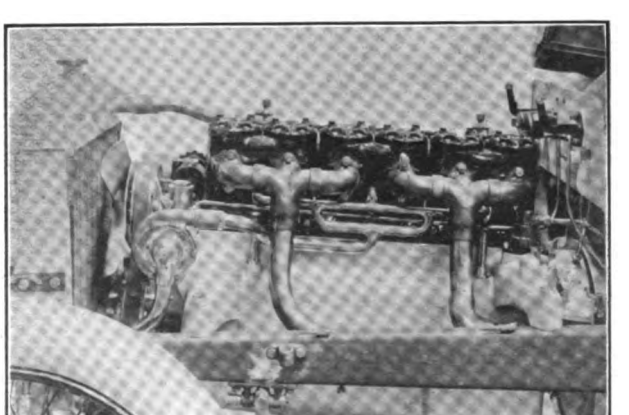


Right Side of Daimler-Knight Six-Cylinder Motor.

Two sets of brakes are fitted, both being of the external band type. The foot actuated member is located on the rear wheels and the hand brake on a drum at the rear of the gearbox. Semi-elliptic springs are employed, both front and rear. Swivel shackles at the back ends of the front springs relieve the frame of side stresses, and auxiliary spiral springs are fitted at the rear. Detachable wire wheels are supplied as standard.

A complete range of open and closed bodies is provided for each type of chassis, the open bodies comprising two-seaters, flush sided and torpedo styles, while the enclosed cars include the coupe and two special forms of low built landaulet and limousine. The landaulet is shown herewith, and it will be noted that the seating arrangement provides for four persons in the interior, with one beside the driver. The upholstery, the various fittings and the workmanship and finish are of the highest quality.

Another detail of importance is the method employed for attaching the Daimler bodies to the chassis. It is the usual coach building practise to affix the body rigidly to the chassis frame, with the result, according to the Daimler company, that when the frame becomes distorted by continual use over rough roads, the body becomes strained and creaks and rattles are set up.



Left Side of Daimler-Knight Six-Cylinder Motor.

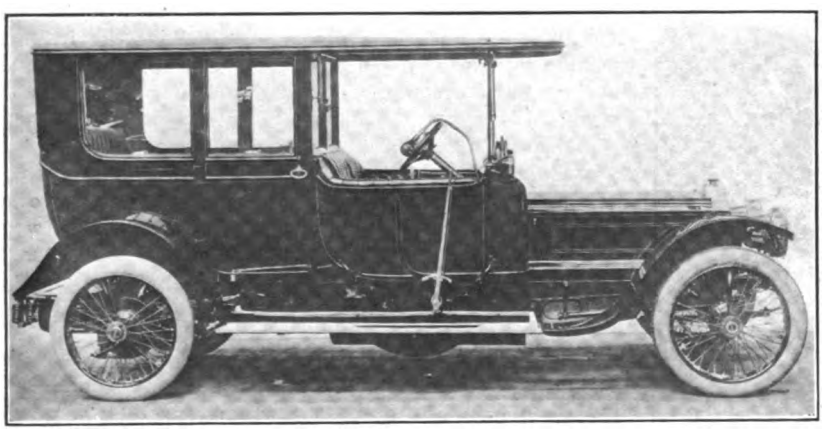
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With the Daimler, the body is hinged at the rear and at the front it is bolted down on rubber buffers.

The dashboard is a part of the chassis. The front of the body fits into place over the dash, but without having any fixed connection with it. Felt lining is, as a matter of fact, packed in between the adjacent parts, but this does not prevent relative motion. Therefore, it is claimed, that if the frame becomes deflected by the passage of the road wheels over obstacles, the body is not affected at all, and as a result all troubles in the way of rattling or of doors becoming tight are obviated.

———★———

A campaign for good roads, which is producing results, is being conducted in Ireland. The Roads Improvement Section of the Automobile Association and Motor Union in the country controls 21 committees in various counties, the 21st being inaugurated recently at Mallow. At a recent meeting in the latter place the subject of good and bad roads was discussed, the Irish manager of the association delivered



Earlham Type Landaulet Body on Six-Cylinder Daimler-Knight Chassis.

an address and there was a ready response to the appeal for voluntary support of the movement to effect an improvement in Irish road conditions.

——— ★ ———

While wire wheels are more generally employed on foreign cars it would appear that the relative merit of these when compared with American wheels of best second growth hickory is still a matter of some doubt. Recent tests were conducted by Rudge-Whitworth, Ltd., Coventry, England, in which the wire wheels made by that concern were pitted against two of the American product, two of French manufacture and two made of steel plate to represent wooden members.

The method of conducting this test was by means of a massive pendulum, 11 feet long, the "bob" of which weighed 480 pounds. This pendulum was allowed to swing over measured arcs against the rim of the wheel mounted on a dummy spindle, which in turn was part of a massive steel bar secured to a concrete monolith. Five blows were struck and the result of each blow and total result are shown by the following tabulation:

Permanent Deflection in Inches.

Blows——1	2	3	4	5	Total
American A..... .21	.32	.84	1.41	2.20	4.98
American B..... .28	.46	.67	.89	1.17	3.47
French A..... .25	.41	.64	1.07	4.60	6.97
French B..... .27	.45	.84	4.88	...	...
Steel Plate A..... .53	1.05	1.60	2.17	2.79	8.14
Steel Plate B..... .59	1.06	1.60	2.14	2.80	8.19
Rudge-Whitworth A..... .31	.55	.82	1.18	2.56	5.42
Rudge-Whitworth B..... .36	.60	.90	1.16	1.49	4.51

It would appear that the American wood wheels were quite the equal of the wire members in this respect. However, the damage done on each blow must be taken into consideration, as follows:

American A—First, none; second, one spoke cracked; third, rim moved; fourth, rim moved, quarter of felloe split, three spokes broken; fifth, felloe smashed.

American B—First, none; second, two spokes cracked; third; flange cracked; fourth, four spokes cracked; fifth, two bolt heads cracked, rim held.

French A—First, four spokes cracked; second, none; third, five spokes cracked; fourth, seven spokes broken; fifth, smashed.

French B—First, three spokes split; second, six spokes broken; third, one spoke broken; fourth, smashed.

Steel plate A—First, none; second, none; third, none; fourth, none; fifth, hub buckles.

Steel plate B—First, none; second, buckled at hub; third, no welding defects; fourth, none; fifth, hub badly buckled.

Rudge-Whitworth A—First, none; second, none; third, none; fourth, five spokes broken, two nipples pulled through; fifth, two spokes broken, two nipples pulled through.

Rudge-Whitworth B—No damage throughout.

———★———

The international tour from Budapest to Constantinople, which has been arranged by the Royal Hungarian and Roumanian clubs, has been supported by the Bulgarian and Turkish governments. The contest, originally planned for June 14, has been postponed to June 27, owing to the Austrian Alpine tour. The trip will finish at Xalewo, a very popular seashore resort, where the competitors will be guests of the Kur management and of Prince Rechid Benaid, to whose initiative this interesting competition is due. The programme follows: June 26, weighing in at Budapest; 27, Budapest to Kolozsvar, 450 kilometers; 28, Kolozsvar to Tusnad, 325; 29, Tusnad to Bucharest, 200; 30, rest day; July 1, Bucharest to Tirnovo, 165; 2, Tirnovo to Adrianople, 330; 3, Adrianople to Constantinople, 230.

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The trade in motor cars in Java is increasing steadily. Moderate priced cars are most in demand, but practically every class, with the exception of the high priced, is saleable. The importation of motor vehicles for commercial purposes is small and does not seem to increase materially.

★

An accompanying illustration presents two Waverley electric cars, made by the Waverley Company, Indianapolis, Ind., which met recently in the Philippine Islands, under somewhat unusual circumstances. Having occasion to visit these insular possessions of the United States, an American woman shipped her Waverley phaeton to Montalban, Province of Luzon, where she anticipated enjoying two weeks of touring among the mountains of that district.

Soon after her arrival, she took a friend for a short drive and was more than surprised to meet another Waverley on one of the beautiful mountain roads near the town. Investigation revealed the fact that it was a model 60 surrey, selected by its owner because of its solid construction and its large seating capacity. This man is interested in a land and development company and uses his car for conveying prospective investors from the railroad to his various estates.



Two Waverley Electric Cars Meet under Unusual Conditions in Philippines.

★

The Brooklands Whitsun meeting in England was one of the most successful, in a long series, ever held. The weather was of the best, and a large gathering of enthusiasts watched the races, in a number of which the finishes were close and exciting. The results follow:

Whitsun private competitors' handicap, 5.75 miles—First, O. D. Pollak, S. C. A. R.; second, E. Horniman, Gregoire; third, F. W. H. Farquharson, Sunbeam; speed, 65.75 miles an hour.

Fifth 100 mph short handicap, 5.75 miles—First, H. A. Arkwright, Benz; second, Alan Mander, Mercedes; third, R. B. Whitehead, Berliet; speed, 95.75.

Fourth 70 mhp long handicap, 8.5 miles—First, H. M. Bowden, Vivinus; second, E. Horniman, Gregoire; third, G. W. Hand, Calthorpe; speed, 59.25 mph.

Fifth 100 mph long handicap, 8.5 miles—First, Gordon Watney, Mercedes; second, Farquharson, Sunbeam; third, Lambert, Austin; speed, 77.25.

The Ford car race, two miles—First, J. Coulthard-Bate; second, W. H. Reid; third, W. Mermod; speed, 54.75.

Fifth 70 mph short handicap, three miles—First, E. Horniman, Gregoire; second, J. E. Lambie, Bedford; third, O. D. Pollak, S. C. A. R.; speed, 64.5.

Whitsun handicap sprint race, two miles—First, Alan Mander, Mercedes; second, A. H. Arkwright, Benz; third, Gordon Watney, Mercedes; speed, 84.5.

The Bedford car, winner of second place in the Fifth 70 mph short handicap is the English product of the Buick Motor Company of Flint, Mich.

★

The 93rd entry in the Austrian Alpine tour, in which more than 100 cars were to contest, was a Ford, made by the Ford Motor Car Company, Detroit, Mich. The machine was to be driven by V. Stuart.

★

The first motor car trip entirely across the continent of Australia has been accomplished by Francis Birtles, who drove his 10 horsepower Brush, made by the Brush Runabout Company of Detroit, Mich., a constituent of the United States Motor Car Company, from Perth to Sidney. The distance is 2600 miles and was covered in 28 days and two hours. Efforts to cross Australia by motor car have been as numerous and as vigorous as some of the ocean-to-ocean trips in America. No less than a dozen attempts were unsuccessful and until Birtles succeeded, the journey was regarded as impossible.

TIMKEN MEN MEET.

The sales and advertising forces of the Timken Roller Bearing Company and the Timken-Detroit Axle Company met at the Detroit offices recently for their third quarterly conference. An all day business session was followed by luncheon and an evening at one of Detroit's leading theatres. Among those present were E. W. Lewis, Heman Ely, H. W. Alden, F. C. Gilbert, A. R. Demorey, C. E. Gordon, P. W. Hood, E. B. Lausier, P. W. Doyle, Harry J. Porter, R. B. Weaver, C. W. Dickerson, E. A. Walton, John Hanlon, George Beadell, F. G. McClurg, W. A. Sharon and Myron Townsend.

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INSTALLING A PIT IN GARAGE.

There is a growing tendency among the class of motorists residing in the suburbs to erect a small garage on the premises, an arrangement that makes for convenience and economy. Many residents of the city also have their garages and it is surprising to note the large number of owners who care for their own machines, many of these being quite proficient in maintaining the automobile in proper running condition.

While there is considerable repair work that may

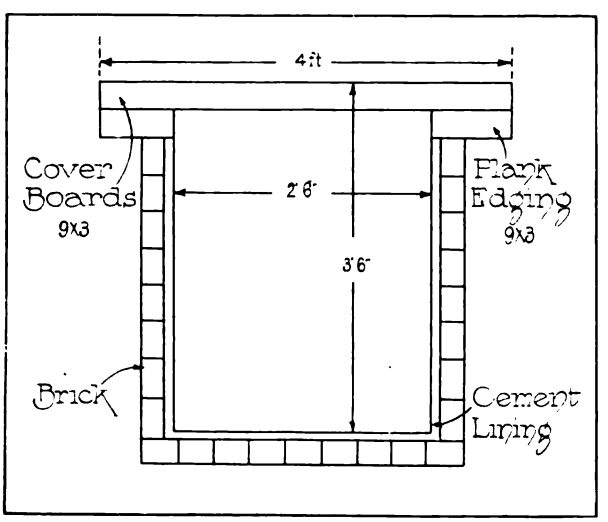


Fig. 1—Outlining Working Plan of a Brick and Cement Pit for the Private Garage.

be accomplished successfully without a pit, one of these is a valuable addition to the equipment, as by it many adjustments may be made easily without lying upon the floor. In taking up connecting rods and main bearings, the pit will be appreciated, for when properly designed the work may be performed comfortably. In disassembling the steering mechanism, and when the post must be removed, it is difficult to handle this member on some cars without a pit.

At Fig. 1 is presented a working plan for a pit, the dimensions and material being outlined, and while at first glance it may appear to be expensive, it could be constructed at a reasonable figure. The design outlined, however, has the advantage of being very durable and easily cleaned.

Although the depth may be altered to suit the height of the workman, that given in the drawing is three feet six inches, which is an average of the standard pits. A width of two feet six inches will be sufficient to permit of moving about without undue cramping while the length may be about four feet.

The retaining wall is made of ordinary brick, laid flat, and it is erected to within six inches of the floor level. The bottom of the pit is also of brick. After the mortar has set, the pit is lined with any durable cement. Planks, nine by three inches, are utilized to form the support for the cover boards which are also of the same dimensions. These boards are secured together and a ring fitted to enable the cover to be removed and replaced. The cover should be flush with the garage floor.

Another method is to make a box of heavy planking of the above dimensions and paint the outside with a creosote preparation to preserve the wood against the attack of moisture. A design of this type could be constructed easily and without expense and the interior cemented.

FITTING AN AUXILIARY LUBRICATOR.

To obtain maximum efficiency from the internal combustion motor the working parts must be lubricated properly. Too little oil results in seized bearings, burnt connecting rod bearings, scored cylinders, etc. On the other hand too much lubricant causes heavy deposits of carbon, and this material breeds trouble in the shape of poor compression, heating and knocking.

This is especially true of motors in which means are not provided for maintaining the level of the lubricant in the crankcase. If the operator of the car would observe the instructions of the maker, such systems are efficient and give no trouble, but unfortunately many motorists are careless in replenishing the supply of lubricant, and acting upon the belief that if a little oil is good for the engine a large quantity will improve it, flood the crankcase.

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For example: The model T Ford oiling system is provided with two petcocks, one of which is fitted for denoting the proper height of the oil. If upon filling the crankcase the operator observes the instructions of the maker, the motor will be properly lubricated and there will not be an excess of lubricant. Very few owners, however, observe the rule and guess at the amount of lubricant poured into the crankcase.

It is obvious that under such conditions the fitting of an auxiliary oiler will be of service, inasmuch as the device may be so regulated as to feed lubricant so that the proper level will always be maintained. Such an equipment was noted by the writer recently and the owner who attached the device has operated his machine several thousand miles without having to give the motor any other attention than that of occasionally cleaning out the crankcase and refilling to the proper height.

The device and manner of installation are outlined at Fig. 2, and the complete outfit is very inexpensive and may be fitted without any alterations to car whatsoever. As will be noted the equipment is simple, comprising an ordinary gravity feed oiler and a piece of copper tubing. The lubricator is of the type commonly employed on machinery and marine engines and consists of a large glass shell with a metal top and bottom, these parts screwing together and locking the glass securely. The lower section of the oiler has a sight feed glass through which the dripping of the oil may be noted, while the upper portion has a small handle, the moving of which actuates a needle valve, opening or closing an aperture through which the lubricant drops.

From the lower part of the oiler is fitted a reducing union to which is attached a copper tubing, this being led through the dash to the breather. It is an easy matter to secure the device to the dash and in the design noted by the writer, the lubricator was fastened by a small metal strap which was screwed to the dash.

How It Is Operated.

The oiler is equipped with a knurled nut by means of which the drip of the lubricant may be so adjusted that the liquid will flow in a stream or a few drops a minute. As the device operates by gravity, it is essential that the handle be straightened when its service is required and the supply shut off when the motor is not running. Being on the dash and in view of the driver at all times, it will be noted readily whether or not oil is being fed to the crankcase. In regulating the oiler it should be so set that enough will be fed to keep the level denoted by the maker of the machine and the amount is determined easily by a little experimentation.

The device may be procured in sizes sufficiently large to operate the car a considerable distance, and it is an easy matter to replenish the supply. Being in plain view at all times there is no guess work as to whether the member is working or if there be a supply of oil.

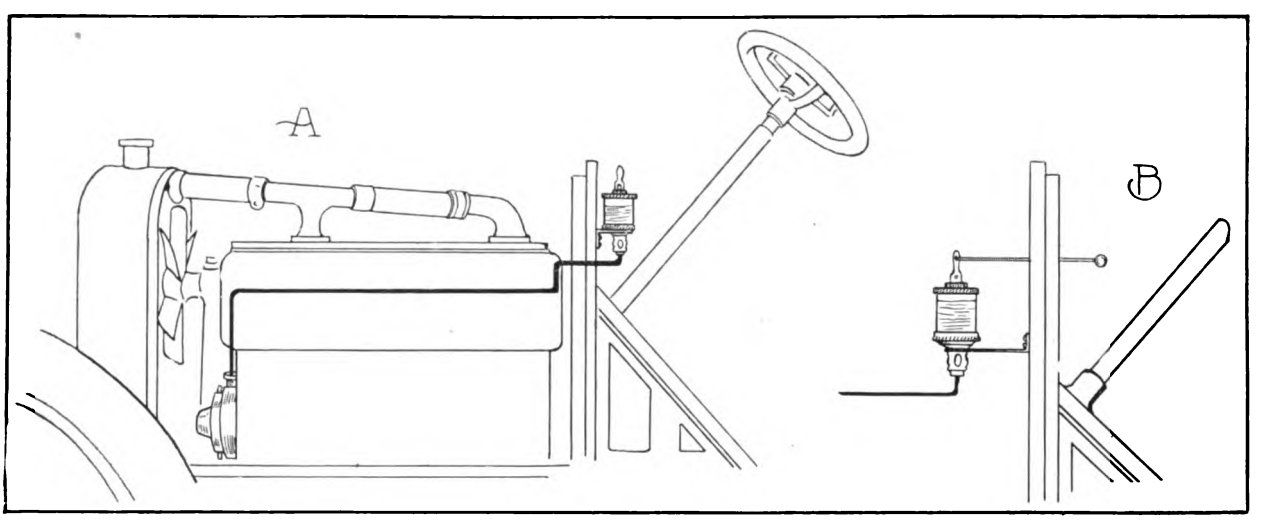


Fig. 2—Method of Feeding Lubricant to Crankcase by Gravity: A, Denoting Location of Device on Dash and Connections to Breather; B, Suggestion for Mounting Inside of Hood.

At B is suggested a method of mounting the device inside the dash and fitting a small lever having a ringed handle. The rod should be secured to the handle of the oiler by a ball and socket joint or pivotally mounted to allow its operation. The method of supporting the lubricator is also outlined. It could be mounted in proximity to the breather and a short pipe employed to convey the oil, this depending upon convenience. The latter method would require lifting the hood or the fitting of the lever attachment, a design which would require a long rod.

The oiler could also be utilized to convey lubricant to a bearing where provision is not made for oil; in fact, it could be applied to any part where friction develops.

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MAINTAINING FLOW OF FUEL.

One of the essential factors for proper carburetion is a steady flow of the fuel to the vaporizer. When this member is starved of gasoline the efficiency of the motor is impaired, a condition that is apt to lead the operator to suspect that the ignition is faulty in its operation. With pressure feed, grades may be surmounted easily if the system be air tight and the pump operating properly, but when the fuel is led to the carburetor by gravity, it is important that the tank be at a sufficient height to supply the vaporizer with fuel at all times.

The popularity of the roadster has led many owners to convert touring cars into this type, and in cutting down the height of the seat to obtain a racy appearance, the location of the fuel container is changed to the rear of the machine. Round or oval tanks are generally fitted and if the wheelbase of the motor car

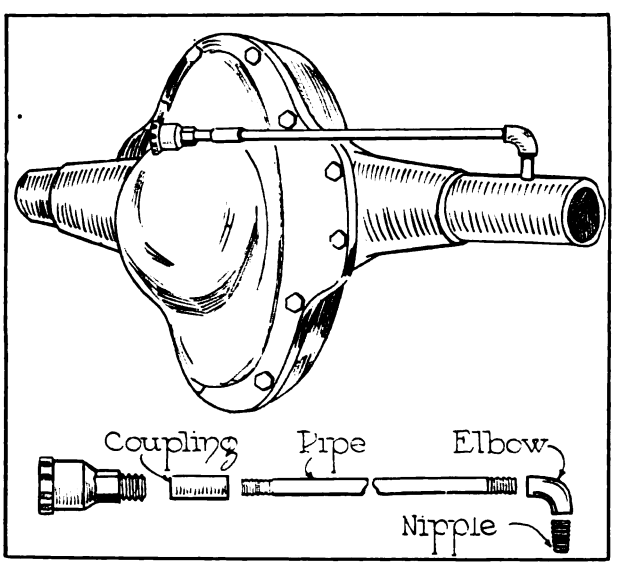


Fig. 3—A Grease Cup Kink for Making Easy the Lubrication of Inaccessible Parts, Showing How the Device Is Installed, the Material Utilized and How Assembled.

be long, it necessitates mounting the tank at an unsightly height to obtain a proper flow of fuel when ascending hills.

An installation which permits of the fuel container being mounted at a reasonable elevation above the vaporizer is made easily and is depicted at Fig. 4. It will be noted that when the car is on the level, as shown at A, the gasoline will keep the carburetor well furnished with fuel. But in climbing a steep grade the supply will be cut off because the vaporizer will be higher than the tank, as illustrated at B.

Fitting Auxiliary Tank.

A simple method of overcoming this difficulty is presented by a reader of The Autocar and the plan of fitting is shown at A. It consists of attaching an auxiliary tank, about nine inches long and four in diameter, under the bonnet in a convenient position near the carburetor. It is important that the bottom of this vessel be at least on the level with the top of the float chamber.

The connections are made easily and without any extensive alterations. Instead of main line being connected to the carburetor it is attached to the top of the additional tank and from the bottom of the latter is led another pipe which is fitted to the carburetor, the second tubing replacing the regular connection. The shut-off valve should be located in the line connecting the auxiliary tank and the carburetor, or in any other accessible place, this depending upon the design of the car.

As will be seen by the sketch, if the large tank be a few inches above that of the smaller member when the automobile is on the level, the auxiliary member will be filled while operating on level roads or down hill. Therefore, on a rising gradient and under conditions when the carburetor would be starved of a supply from the large vessel, the small tank will furnish the vaporizer with enough fuel to climb a grade several miles long. When level ground is reached again, the auxiliary member will be filled automatically.

It is advisable to provide a petcock in the small tank to prevent an air-lock when it is first filled, also to have an air vent in the regular tank. This system could be adopted with advantage on many cars having a gravity tank under the front seat, but the top of the extra tank should be at least level with the bottom of the larger member, while the former must be above the float chamber when the machine is standing on the level.

A TIRE REPLACEMENT SUGGESTION.

The experienced motorist does not relish the task of fitting a new shoe, especially if the tire be one of large dimensions. The rubber is stiff and it sometimes requires considerable exertion to fit the cover to the rim. Forcing it on with tire irons is poor practise especially in cold weather. A simple method is to warm the rubber which will make it flexible and easy to handle.

This is an easy matter if the new shoe is to be utilized in the garage as the bead and the cover walls may be sponged with hot water, taking care that none of the fluid comes in contact with the fabric. If a new tire has to be fitted on the road, remove it from the cover or wrapping and place it in the sun for a while. It will be found that it will become soft and pliable and the work of fitting will be made considerably more easy.

EVILS OF OVERLOADING TIRES.

Despite the fact that the manufacturers of tires have and are conducting a campaign of publicity to teach the motorist to care for his shoes properly, it is a question if over 10 per cent. of the owners

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have any idea of the weight the tires were designed to carry.

Experiments conducted by the United States Tire Company, New York City, have proved conclusively that the life of overburdened tires is considerably shorter than it is where the designated carrying capacity is not exceeded. It is obvious, therefore, that the direct effect of overloading is to increase tire expense. The pertinent fact about overloading is that it breaks down the side walls of the casing, laying the foundation for a blow-out which is bound eventually to occur. By this time the casing is so badly damaged that it is beyond repair.

In order that motorists may know exactly how much of a load they have a right to expect their tires to carry, the company recommends the following table of weights in relation to tire sizes:

	Rear Weight a wheel	Front Weight a wheel
28 x 2.5	225 lbs.	275 lbs.
28 x 3	350 "	425 "
30 x 3	375 "	450 "
32 x 3	375 "	450 "
28 x 3.5	425 "	500 "
30 x 3.5	450 "	550 "
31 x 3.5	475 "	575 "
32 x 3.5	500 "	600 "
33 x 3.5	525 "	625 "
34 x 3.5	550 "	650 "
36 x 3.5	600 "	700 "
30 x 4	625 "	750 "
31 x 4	635 "	775 "
32 x 4	650 "	800 "
33 x 4	675 "	850 "
34 x 4	700 "	875 "
35 x 4	735 "	885 "
36 x 4	750 "	900 "
40 x 4	850 "	1000 "
42 x 4	900 "	1050 "
32 x 4.5	750 "	950 "
34 x 4.5	900 "	1125 "
35 x 4.5	935 "	1175 "
36 x 4.5	975 "	1225 "
37 x 4.5	1010 "	1260 "
38 x 4.5	1050 "	1300 "
42 x 4.5	1200 "	1450 "
34 x 5	950 "	1200 "
35 x 5	1000 "	1250 "
36 x 5	1050 "	1300 "
37 x 5	1100 "	1350 "
39 x 5	1200 "	1450 "
43 x 5	1400 "	1550 "
37 x 5.5	1150 "	1400 "
38 x 5.5	1200 "	1450 "

WHY TIMER SHOULD BE CLEANED.

Where the car is fitted with a timer and coil and these comprise the ignition system with a battery or mechanical generator supplying the current, the commutator should be given attention in order to obtain efficiency from the motor. On some cars the device is not very accessible and some owners are apt to neglect the part.

Where it is not an easy matter to remove the cover of the timer, it may be cleaned by filling an oil can with gasoline and squirting the fluid into the member. It should be thoroughly flushed out to remove particles of dirt or metal that may have accumulated. After this operation the timer should be well lubricated with a light oil.

A GREASE CUP KINK.

Grease cups are now being fitted to parts which formerly were neglected in the way of lubrication except for an occasional oiling with the ordinary can. Some types of cars have grease cups in places difficult of access and when these members require screwing down the operator is obliged to reach under the chassis and assume uncomfortable positions, to say nothing of the danger of soiling the wearing apparel. At Fig. 3 is illustrated an easily made device, which is inexpensive, the material consisting of a piece of ordinary pipe, an elbow, coupling and a nipple in addition to the grease cup. The method of installation is shown in upper view of drawing.

To install the device the cup is removed and the distance measured from the part to be lubricated to

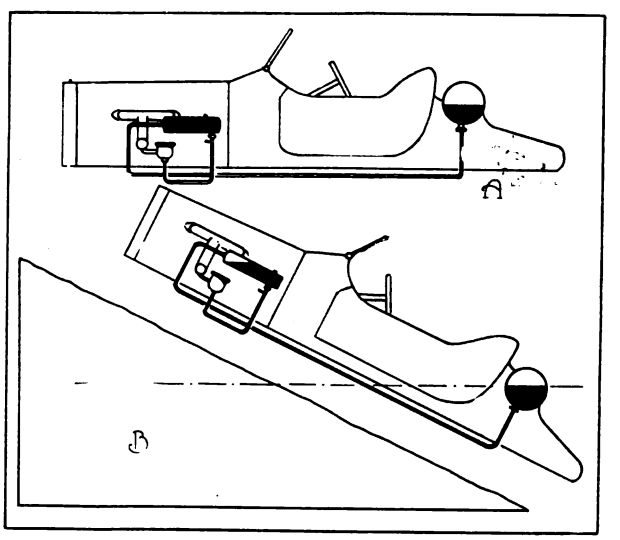


Fig. 4—Depicting Installation of Auxiliary Fuel Tank: A, Showing How Extra Container Is Filled by Gravity When Car Is on Level Ground; B, Illustrating Its Utility When Ascending Grades.

a convenient point of operation. A nipple is then screwed into the opening and the elbow attached. The stationary part of the grease cup is next fitted to the union and the latter screwed on the pipe. The material may be procured of any plumber or at a supply house. The pieces should be put together and the grease cup should be attached to make sure it will fit.

PITTSBURG GETS MOTOR APPARATUS.

Pittsburg recently awarded contracts for six motor fire trucks at $5250 each, three of the machines to be furnished by the Knox Automobile Company, Springfield, Mass., and six by the American-LaFrance Fire Engine Company, Elmira, N. Y. These firms are not the lowest bidders, but the other bids were disregarded by the city because the makers were not considered responsible in the sense in which the officials held the word.

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SUCCESSFUL REMY SALESMAN.

The accompanying illustration is that of A. J. Rogers, who was recently placed in charge of the Remy magneto branch at 170 Golden Gate avenue, San Francisco. His territory will include the entire Pacific Coast, and his success with the sale of Remy products in other capacities, is sufficient guarantee that the business of the concern in that district will show a marked increase at once.

Mr. Rogers is well known through the Middle West and South, having been connected with the sales department of the Remy Electric Company, Anderson, Ind., for some time. Inasmuch as the home office is continually seeking men for the large number of factory branches and service stations it is establishing throughout the country, it follows that his work has been watched with interest by his superiors.



A. J. Rogers, Branch Manager, Remy Electric Company.

The San-Francisco branch is one of the most important in the country. The sale of Remy magne- and other ignition and lighting equipment in this district has been increasing very rapidly of late and it was deemed best to select a man for branch manager, who had given ample demonstration of his ability. That Mr. Rogers measured fully up to this standard is a source of much gratification to his many friends, both in and out of the industry.

AUTOMOBILES AT DALLAS CONVENTION.

The convention of the Associated Advertising Clubs of America, which was held at Dallas, Tex., recently, had as delegates many automobile advertising men, and as a matter of course, motor cars were used extensively. One of the remarkable events of the meeting, and one which attracted considerable attention, was the parade of the nearly 20,000 advertising men who were present. Instead of walking as the members of an ordinary convention would, they were carried in automobiles, and 3000 of them were used, headed by an official Cole press car and five other cars of the same make bearing the officers.

TESTS OF "ESSEN KAY."

The S. & K. Tire System Company, 2021 Michigan avenue, Chicago, maker of a new tire filler or air substitute which is called "Essen Kay," has reported some interesting tests of the subtance. It is an organic compound, the chief constituent being an oil and is vulcanized into a substance closely resembling rubber. In the tests, it was subjected to acids, of which only aqua regia had any effect. Alkali did not change it, nor did heat or cold. A portion was placed in an oven containing a crucible of lead, and heat applied until the lead melted, at a temperature of 625 degrees, Fahrenheit, without the compound being affected. It was frozen in a cake of ice, and boiled for several hours, coming through all these trials without losing any of its qualities.

THE INDUSTRY ABROAD.

During his recent visit abroad, Charles A. Trask, factory manager of the newly organized Henderson Motor Car Company, Indianapolis, Ind, maker of the Henderson car, studied the methods employed by the manufacturers of the Daimler, Wolesley, Napier, Renault, Clement-Bayard, Pipe, Metallurgique, Benz, Opel, and other foreign cars of note. Concerning the industry abroad, Mr. Trask says:

"Wire and other forms of metal wheels are becoming more generally used on the European products every day. This is partly due to the difference in atmospheric conditions, but from an engineering standpoint, the metal, and particularly the wire wheel, is being looked upon as a decided improvement. It is true that the quality of hickory obtainable in this country is better than the oak employed for building wood wheels in Europe. Still, I believe that the popularity of the metal wheel will increase swiftly in America also.

"Tense interest and attention is given to careful assembly by European manufacturers. The Renault people are building about 150 cars a week. Clement-Bayard, Daimler and Wolesley are releasing 50 cars each week, to accomplish which the two last named firms are employing 3500 men each.

"I found no European factory that made a practise of fitting bodies to all of its chassis. Many of them shipped as much as two-thirds of their product minus body and equipment, the coachwork being done in most cases entirely independent of the motor car factory.

"After perceiving the extremely high tensile strength of the materials they put into the makeup of high class European cars, in almost every case of more strength than our American products, I have concluded that we are slightly lax along these lines. I intend to make it my purpose in buying materials henceforth, to hammer home the idea that we must aim towards a higher grade of excellence and lasting qualities, if we are to keep up with the quality of motor car product built by our brothers across the water."

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CORRESPONDENCE WITH THE READER

The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Locating Noisy Tappets.

(1391)—One of the valve tappets of my machine is noisy and the clatter seems to be in one of the first two cylinders, but I cannot tell which. What is the easiest and quickest method of locating the faulty member?

A SUBSCRIBER.

Des Moines, Ia., June 12.

The tappet making the noise referred to may be located easily by closing the space between the tappet and the valve stem when the motor is running. At Fig. 1 A is illustrated the method of holding a thin strip of metal between the moving parts. The device is shown at B and it will be noted that the end is flattened to a tapering point. The tool is placed between the parts of the suspected tappet as outlined, preventing its operation. If it be the cause of the noise the motor will run quietly. Each tappet may be tested similarly.

Welding Steering Knuckle.

(1392)—Through an accident the steering knuckle of my car was broken. The agent advises me to replace the damaged part with a new one. Cannot the pieces be welded by the oxy-acetylene process, and would the part be strong and safe to use? H. N. M.

Portsmouth, N. H., June 17.

According to the manager of a large welding company the knuckle could be welded successfully and the writer is informed that as the place united is built up or reinforced, it will not break, also that the company has welded many knuckles and that none have broken. If the part is welded it could be tested for weakness by placing it in a vise and applying a bending strain. A new part would, perhaps, be more satisfactory as it is not possible to determine what stresses the old member was subjected to in the accident.

Gauging Lift of Valves.

(1393)—I have read that to secure the best results from the motor the valves should all have the same lift and that one lifting sooner or later than the others affects the running of the engine. How can the lift be measured so that each tappet may be set to a hair?

OWNER.

Brattleboro, Vt., June 18.

The lift of the valve is important, for if the opening be restricted the passage of the mixture and egress of the burnt gases will be impeded. This comes under the head of valve timing and it is essential that the valves open and close according to the timing of the motor, the number of degrees varying with the design.

The amount of lift may be noted by the application of the device outlined at Fig. 2, which is employed for setting valves and making adjustments in a repair shop. It may be made from sheet metal or any suitable pieces of old material. The indicating hand may be secured from an old clock or made from brass, the latter being preferable as it can be bent to drop over

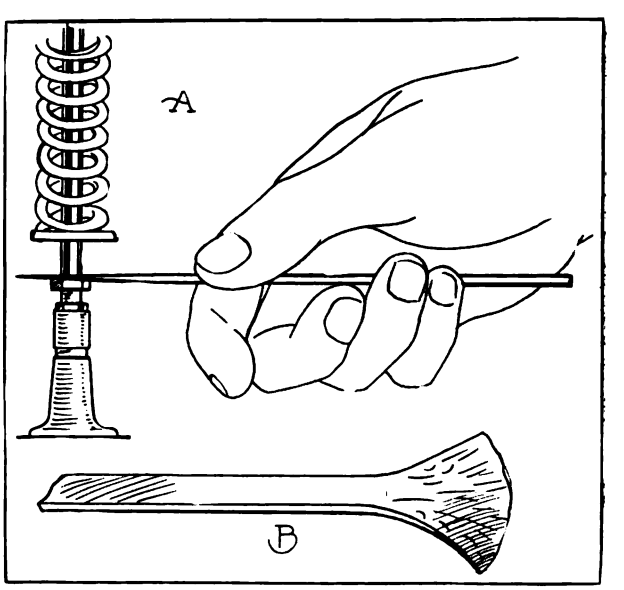


Fig. 1—Locating Noisy Valve Tappets: A, Method of Utilizing Tapered Strip of Metal Shown at B to Close Space Between Valve Stem and Tappet.

the cylinder walls surrounding the valve. A spring is fitted as illustrated to hold the needle member in normal position.

The device is placed upon the cylinder with the arm member in contact with the valve when the latter is closed. The position of the index finger is noted and the motor cranked slowly until the valve reaches the top of its stroke when by the graduated marks on the dial the lift may be noted easily. A piece of paper could be substituted for the marks and the opening and closing positions of the valve noted. Each valve may be tested in a similar manner and the actuating mechanism adjusted.

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Mysterious Missing of Motor.

(1394)—I have a 1911 model T Ford which has developed a mysterious missing in the cylinders. At low speeds and when the clutch is not in, the engine will fire on all four cylinders, but when running on the high but three cylinders work. Have cleaned carburetor and adjusted coils, but the result is the same. It cannot be the valves for these were ground recently. This condition developed after the valves were ground. Have been told that the valves and springs sometimes cause this; that the intakes and exhausts are different. Can you advise me what is the trouble? FORD OWNER.

Providence, R. I., June 20.

The probable cause of the trouble is that the valves do not seat properly due to the tension of the springs. In replacing the springs it is likely that the intake and exhaust members were mixed. These are distinguished easily by the tension, the exhaust being considerably harder to compress. The writer has known of such intermittent skips in the motor which were due to the valve springs. They may be repaired by stretching. The valve stems should also be examined to note if they move freely in their guides, and if carbonized or dirty, they are likely

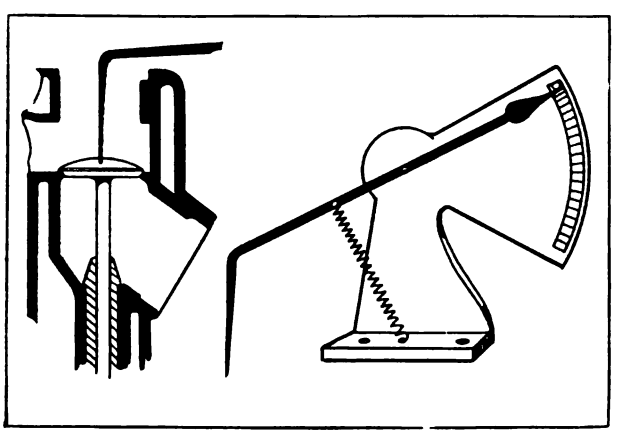


Fig. 2—Easily Made Device for Recording the Lift of Valves and Their Timing.

to stick at low speeds. In replacing these the stems should be well lubricated and care taken that the retaining collar does not bind.

Fixed or Variable Ignition.

(1395)—Am contemplating the installation of a magneto on my 1907 Oldsmobile and desire to employ a true high-tension instrument. I know where I can purchase a Bosch fixed ignition magneto at a reasonable price. A driver of experience informs me that a fixed magneto is all right for city work, but not for speeding. Which type would you advise? READER.

Woonsocket, R. I., June 16.

The fixed ignition magneto is utilized with success, but the writer believes that a variable instrument would give better results, where speed is desired. The instrument could be reconstructed so as to provide variable ignition and the work would be inexpensive. The Bosch Magneto Company, 225 West 46th street, New York City, could advise as to the cost.

Replacing Worn Cam.

(1396)—I have an old model motorcycle and the cam is worn so badly that I can get but little power from the motor as the valves do not lift high enough. I find that a new part cannot be obtained as the company is not in business. Am fairly good on ordinary machine work and wish to replace the worn part myself. What is the best and easiest method of doing the work?

MOTORCYCLIST.

Bath, Me., June 13.

Replacing a worn cam is a job requiring careful work, the best of material and an experienced repairman. As a rule in small air-cooled motors the cam is formed integral with the wheel, and both are hardened and ground. The method about to be described can be employed to advantage where a very worn cam has to be replaced or a higher lift is desired.

Assuming that the cam will require a .0625 or .03125-inch lift, the best method is as follows: Take the wheel with its cam and slowly heat it to a dull red, preferably in a charcoal fire. The slower it is heated the better. Allow it to cool in the ashes, after which it will be found soft enough to turn. Next, mount the wheel in a lathe, utilizing a three-jaw chuck. A strip of brass should be employed around the chuck to prevent its jaws injuring the teeth of the wheel. The cam is then turned or ground off until only the circular part remains, forming a true circle with the bore or hole through the wheel, or with the outside of the latter. In some instances it will be found an advantage to mount the wheel on a slightly tapered mandrel by driving it up on it and running the mandrel between the lathe centres. As soon as the cam is reduced to a circular form, it should be finished nicely with a cut of a fine finishing tool and with a very slight taper.

Next, take a piece of very tough bar steel, which, when quenched in water, will give a fairly hard surface. This should be bored when soft, and parted off the size of the bore to be such as to fit on the turned down end of the camwheel, but not to drive up completely on tapered part. It should be able to enter on the taper, and not go any distance along it. It is then taken off the chuck and mounted on a mandrel and run between the lathe centres. Each end should have a shoulder of about .015625 inch wide, representing the diameter of the turned down portion of the cam, and a top diameter equal to the diameter of the original height of the top of the old cam, supposing that the latter were a complete circle.

The shape of the cam is next filed carefully, leaving the shoulders circular, these being a guide for forming the circular part, and the metal for the shape of the cam. This can be set down easily from the old cam by tracing it on a piece of paper, marking around it on one side of the new cam blank. This will furnish a guide for the new part. After this is done, and the cam filed in a circular direction, it can again be mounted on the mandrel and the shoulders at each end turned off.

Having arranged the width of the cam to correspond with the length of the tapered portion left on the camwheel, that part of it where the cam comes should have a hole drilled about .1875 inch in diam-

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eter, a similar hole being drilled in the camwheel and fitted with a fine thread screw. The outside end of the hole in the cam should be countersunk, and a screw should be provided that will pass through the camwheel and the hole in the cam easily.

The next operation is to shrink the cam on the extended tapered portion of the camwheel and the tapered part should be hardened by heating to a dull red and plunging it through a depth of about three inches of oil into cold water, the oil lying on the top of the layer of water in a deep vessel. About .1875 inch of the soft steel should be screwed to fit the hole in the camwheel, the projecting end being about .25 inch longer than the width of the cam. The latter is next heated to a red, and while in this condition is pressed over the tapered extension of the camwheel, the upstanding steel rod locating it in position. It can be easily pressed home between the jaws of a vise. This fitting should be done quickly and before the red heat is lost. It should then be plunged through the oil into the water, the same as with the camwheel. It will be found to be shrunk on tightly, provided the taper was slight.

A hardened .1875-inch screw is made to fit the hole in the cam and is next screwed through it into the wheel. It is advisable to tin the screw and opening, as by driving the screw in when the solder is soft, a secure job is assured. If the work is carried out properly, there will be no danger of the cam working loose. In most cases it will be necessary to make the cam of a larger diameter, even though its width is not increased in order to provide enough metal between the camwheel and cam to prevent its bursting or stretching. It is obvious that the length of the valve plungers will have to be modified after the work.

Taking Up Connecting Rods.

(1397)—How tightly should connecting rods be taken up on an old motor? It has babbitt bearings and these have become loose. Is there any danger of getting the bearings too tight? How can you tell when they are too snug or not tight enough? Will the motor have to be pulled down to do this work? The crankcase is in two parts and the lower is removable.

INTERESTED READER.

Montpelier, Vt., June 17.

Repairmen differ as to the snugness of bearings where babbitt metal is utilized. The writer believes in taking them up fairly tight and the work is performed by loosening the locking nut of the connecting rod bolt and removing the latter. If a number of small shims are fitted to the bolt one or more are taken out, the bolt replaced and set up tight and the rod tried for snugness. This is done by placing a rugged screw driver or any similar tool between the connecting rod and the throw of the crankshaft employing the tool as a lever to snap the connecting rod to and fro on the crankpin. If it moves freely, but not too easily, it may be assumed that the bearing is about right.

The bearings could be set up so tight as to cause trouble, but if the above directions are followed there should be no danger of burning the metal when the motor is started. This work may be performed by removing the lower half of the crankcase. Each connecting rod should be tested and adjusted. The connecting rod bolt should be set up snugly, the nut locked securely and a cotter pin employed. Before doing this work the crankpin and babbitt metal should be well oiled.

After replacing the crankcase it should be well filled with lubricant and during the first 50 miles or so the oilers should be adjusted to feed a little more oil than usual. The motor should be started up and run for a while, and then stopped and the operation repeated. This will work out the stiffness, and it will be found after the engine has been running for about 30 minutes that it will crank easily.

Starting Crank Broken.

(1398)—Supposing the starting handle breaks and it happens when you are miles from nowhere, as they say. How could the motor be started? CURIOUS.

Northampton, Mass., June 21.

There are several methods in a case of this kind. The simplest and easiest is to jack up one of the rear wheels, engage the high speed and let in the clutch. Throw on the switch and open the throttle as usual. Next, grasp the jacked-up wheel and turn in the same direction as the car would travel if it were running. It will be found that the crankshaft of the motor will be revolved as if it were cranked by the usual method.

Another way is to start the machine down a grade and after it is rolling fairly well, engage a speed and let in the clutch. If the flywheel is accessible it can be revolved by hand until the motor starts. The cylinders could be primed with gasoline and the spark switched on, but this method is not as reliable as the others mentioned. Of course, if the car was equipped with a self-starter any of these methods would not be necessary.

Larger Sized Tires.

(1399)—Am contemplating placing four-inch shoes on the rear of my model T Ford. Will the increase in size affect the motor; that is, will I be able to secure as much power as with the regular sized tires?

JOURNAL READER.

Bridgeport, Conn., June 19.

The fitting of a larger sized shoe on the rear wheels will consequently increase the diameter of the driving wheel, but this would be so slight that it is doubtful if the difference in the operation of the motor would be noticed. A little more power will be utilized, but the economy in tire upkeep as well as more comfortable riding qualities would more than offset any loss of energy.

Leo Ross recently returned to his home in Weehawken, N. J., from his third tour of Europe and the British Isles. Mr. Ross drove a Columbia-Knight car, purchased from the United States Motor Company of New York City. He covered 3200 miles, crossing numerous mountain passes and subjecting his machine to many severe tests, which it withstood in an exceptional manner.

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THE ANNUAL TOURING NUMBER.

The next issue of The Automobile Journal will be the sixth annual Touring Number. This announcement will be received with undoubted interest by a large number of motorists who have come to rely upon the authoritative information contained in this magazine. The increasing demand for information of this character has impelled the production of a much larger number than ever before, and the material will be such as to meet the requirements of modern touring conditions.

In keeping with this view, the sixth annual Touring Number will contain complete itineraries for at least three transcontinental tours, with suggestions for connecting these at various points across the country. The splendid touring country of New England and the East will be routed as completely as in years past. In addition, attention has been given to that increasing body of motorists who desire to enjoy the pleasures of touring in foreign lands. Canada, Great Britain and Continental Europe will be covered in the same thorough manner as the United States.

Other features will include a complete digest of the laws in every state in the Union, the necessary arrangements for preparing the car for the season's touring, suggestions as to what is needed in the way of accessories and conveniences, what to wear, shipping the car abroad, and all other touring information necessary to a thorough enjoyment of the vacation period. It need not be added that the regular departments and features will be included as well. Special attention also has been paid to the matter of illustrations.

In every respect this will be the most complete guide to automobile touring ever published. The routes are so arranged that the entire country is covered, giving ample information to enable the tourist to leave any section and reach any other section over what is regarded as the most favorable touring itinerary.

It will be retained as a book of reference throughout the year. This is particularly true of the sixth annual Touring Number, because of the fact that every portion of the country is included. This means that it will prove as valuable for winter touring, as for the routes heretofore regarded as accessible only in the summer.

RECIPROCITY IN NEW JERSEY.

The present liberal motoring law in New Jersey has been in force long enough to give the people of that state some idea of how it is going to work out, albeit, the actual touring season has not opened as yet. The chief objection of the opponents of reciprocity in that commonwealth lay in the supposition that the registration of automobiles would see a large reduction under the new plan. The report of the automobile department for the first five months of 1912 shows exactly the opposite to be true.

The total registration for this period was 39,799, as compared with 25,878 in 1911. It also has been found that many non-resident owners are taking out annual licenses, instead of depending upon the 10 days' touring privilege. Even had the state not felt it necessary to increase the registration fee, the treasury would have been in much better condition under the new arrangement.

In view of the length of time needed to convince the people of New Jersey that reciprocity was a desirable institution, the condition outlined above is particularly pleasing to motorists. Some time, all the states will recognize that universal motoring laws are equally as advantageous, and automobile touring in America will receive an impetus which will result in financial benefit to all concerned.

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MASSACHUSETTS AND MOTORISTS.

The report of the Massachusetts highway commission for the first five months of 1912 shows that by the most conservative estimate the motorists in that state will contribute at least half a million dollars in registration fees toward the construction and maintenance of highways. In addition to this, may be mentioned the fines collected from motorists by the courts of the commonwealth, which amounted to $26,744.50 in 1911. Inasmuch as the summer season cannot be said to have opened yet and as many motorists from outside the state secure licenses during their vacation in Massachusetts, it is possible that the above figures will be augmented somewhat.

In view of this situation, it hardly can be held that the automobile owners of that state have no interest in any legislation contemplated. The legislature of 1912 has been prorogued without taking definite action upon two of the important bills presented. Reference is had to the proposition to increase the registration fees and that of limiting the weight of motor trucks utilizing the highways. Undoubtedly, this means that these measures will figure prominently in the campaign next fall. Automobilists are prone to forget such matters at election time, but the organized motorists of Massachusetts should take pains to remember these bills when the legislative tickets are made up.

DANGEROUS HIGHWAY TRAFFIC.

Organized motorists have done much good work in the matter of correcting existing evils, but they have found so much to do that it is surprising what success has been achieved. Attention is now being directed toward the dangerous grade crossings, whether used for steam trains or electric cars. These are not only death traps for the motorist, but for the public at large, and when this situation is fully realized all classes of individuals will unite in demanding their extinction.

Grade crossings represent archaic methods. A greater percentage of them are unprotected, even with gates or signal. Even where gate protection is provided, this is removed at night, when most needed. The antequated signs imparting the admonition to "Stop, Look and Listen," are inadequate, and often these are hidden from view around a curve or behind trees and shrubbery.

Some few states have made feeble attempts to enact laws abolishing the grade crossing, but in most cases little effort has been made to enforce them. Until such time as they are entirely eliminated, flagmen should be on duty, at least from 6 in the morning until midnight, and in addition some loud sounding signal should be installed.

Progress must necessarily be slow until public opinion is sufficiently aroused, but the time is certainly coming when the users of the highway will be fully protected from dangers of this nature. It is not reasonable to suspect that the railroads will take the initiative, and it behooves motorists to take the required steps to bring about the desired change.

CONCERNING THE OPEN MUFFLER.

Within the past few months there has been a wide demand for the elimination of the use of the muffler cut-out, and in some instances motorists have been decidedly surprised to learn that legislation on the subject has been enacted. This applies particularly in Rhode Island, where several operators have had the matter brought very forcibly to their attention.

Recent tests, conducted by engineers fully capable of determining results, indicate that there is little need for the cut-out on the modern automobile. Its use certainly could be restricted to the open country without entailing any hardship upon the motorist. Since this is true, it would seem to be the better part of discretion to accede the point.

Motorists are bound to feel the need of public opinion in securing many of the reforms that are regarded as necessary to the proper enjoyment of automobiling. It will be through attention to the minor things that this will be acquired. A good place to begin is in the matter of the muffler cut-out, and it ought not to be necessary for the public to have recourse to the enactment of special legislation upon the subject.

GROWTH IN EXPORTS.

The remarkable growth in automobile exports from the United States during the past three years, in which the increase has been something like 300 per cent., is bound to be a source of much pride to the American public. Not only does it indicate that the condition of the industry is such that it can reach out for additional markets and care for them satisfactorily, but the comparative figures show that the United States now occupies a position second alone to France in the matter of exportations in this field.

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MOTORING NEWS OF NATIONAL IMPORT

National Association of Automobile Manufacturers Plans Pretentious Show Circuit for 1913---Engineers' Meeting in Detroit---Census Figures for Michigan---Increased Activity Marks Industry's Growth.

The National Association of Automobile Manufacturers at a recent meeting in New York City arranged a 12-city circuit for shows during the coming year, the determination for such a plan being announced immediately after a session of the executive committee, and show managers in 12 of the largest cities of the country will assist in promulgating the new idea. Chester I. Campbell, manager of the Boston show, was chairman of the committee appointed to arrange the national dates, as follows:

Cleveland, Jan. 4-11; New York, Jan. 11-18; Philadelphia, Jan. 20-25; Detroit, Jan. 27-Feb. 1; Chicago, Feb. 1-8; Minneapolis, Feb. 10-15; Kansas City, Feb. 17-22; St. Louis, Feb. 24-March 1; Pittsburg, March 3-8; Boston, March 8-15; Buffalo, March 17-22; Indianapolis, March 24-29.

The plan was not adopted until after a lengthy discussion, those present at the meeting finally deciding unanimously that it would result advantageously to both manufacturer and show promoter.

The subject of special trains for the conveyance of exhibits and employees, co-operative advertising and uniform rules also was considered, and a committee was appointed to confer with the Motor and Accessory Manufacturers in an endeavor to procure its co-operation and sanction of the circuit.

It is possible that the summer of 1913 will see a commercial vehicle exhibition and demonstration conducted by the N. A. A. M., which may or may not take the place of the winter shows as now held, this being a subject for which the opinion of the trade will be canvassed. The matter has been referred to the show and commercial vehicle committees.

Other business transacted included the admission to membership of the Auburn Automobile Company, Auburn, Ind., represented by J. I. Farley and the Ideal Motor Car Company, Indianapolis, Ind., represented by E. G. Sourbier. H. R. Bradford was elected to succeed R. A. Palmer as representative of the Cartercar Company, Pontiac, Mich., and H. W. Taylor to succeed B. A. Becker of the Elmore Manufacturing Company, Clyde, O. The membership formerly held by W. J. Groves, representing the Mack Bros. Motor Car Company, was transferred to C. P. Coleman, representing the International Motor Company, New York City, of which the Mack concern is now a constituent.

Show managers present were: Louis Block, Philadelphia Automobile Trade Association; T. I. Cochran, Pittsburg Automobile Show Association; A. E. Doherty, Automobile Show Association of Pittsburg; F. W. Paynes, St. Louis Automobile Dealers' Association; H. E. Pence, Minneapolis Automobile Show Association; W. F. V. Neumann, Detroit Automobile Dealers' Association; F. H. Calet, F. C. Wood, Cleveland Automobile Show Company; Chester I. Campbell, Boston Automobile Dealers' Association; H. L. Archey, Indianapolis Automobile Trade Association; A. L. Pope and S. A. Miles of the N. A. A. M. show committee.

SIMMS PLANT REOPENED.

Edwards Motor Car Company Men to Produce Magnetos, Cars and Trucks.

Capital connected with the Assets Realization Company of New York and Chicago has secured the $1,000,000-plant of the Simms Magneto Company, Bloomfield, N. J., and it is understood that a working agreement has been made with C. G. Stoddard and H. J. Edwards, of the newly organized Edwards Motor Car Company, to open the factory and resume the production of Simms magnetos. This plan will not affect the motor car concern, plans of which include the announcement of the new Edwards-Knight within the near future.

Arrangements also are said to have been completed for the purchase of the Longest Bros. truck plant in Louisville, Ky., which is to be operated by the Edwards Motor Car Company. The plans in connection with this deal are understood to include the production of the Longest truck as a Knight engined model for 1913. The Edwards car is to be produced in this factory.

MARMON COMPANY EXPANDS.

Additional Factory Facilities Being Provided to Take Care of Increased Demand.

In order that it may be able to increase its output to meet the demand created for Marmon cars, the Nordyke & Marmon Company, Indianapolis, Ind., has made arrangements for substantial additions to its plant. A new office building is to be erected, this being a two-story brick structure, 43 by 155 feet. The general and executive offices will be located on the first floor, and the enlarged drafting rooms on the second. Two stories, 52 by 243 feet, also will be added to one of the factory buildings.

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WOLVERINE TOURISTS.

Detroit Motorists Elaborately Entertained by Remy Electric Company at Its Factory.

A noteworthy motor car tour was that taken recently by the Wolverine Automobile Club of Detroit, to Indianapolis, Ind., and return, a distance of 703 miles. Fifty-one cars, each carrying the colors of the club, represented the following makers: Hudson Motor Car Company, Detroit; Maxwell-Briscoe Motor Company, Tarrytown, N. Y.; Lion Motor Car Company, Adrian, Mich.; Olds Motor Works, Lansing, Mich.; Alden Sampson Manufacturing Company, Detroit; Chalmers Motor Company, Detroit; Oakland Motor Car Company, Pontiac, Mich.; Buick Motor Company, Flint, Mich.; Hupp Motor Car Company, Detroit; Warren Motor Car Company, Detroit; Nordyke & Marmon Company, Indianapolis, Ind.; Peerless Motor Company, Cleveland, O.; Winton Motor Carriage Company, Cleveland; Abbott Motor Company, Detroit; K-R-I-T Motor Car Company, Detroit; Packard Motor Car Company, Detroit; Studebaker Corporation, Detroit, and Pratt-Carter-Sigsbee Company, Indianapolis.

One of the most pleasing features of the trip was the entertainment of the entire party of tourists at Anderson, Ind., by the officials of the Remy Electric Company. Just outside the city, the travellers were met by General Manager H. W. Griffith of the Remy company and the Remy band, which acted as an escort to the borders of the city, where the cavalcade was joined by a body of mounted policemen, a delegation from the city government, headed by Mayor Foster, representatives of the press of Anderson and eastern cities, and Secretary W. S. Gilbreath of the Indianapolis Hoosier Motor Club.



Wolverine Tourists Being Entertained by the Remy Electric Company at Factory in Anderson, Ind.

The tourists were escorted to a tent, raised on the lawns of the Remy company, where a luncheon was served. Among those gathered about the tables were Henry Ford of the Ford Motor Company, Detroit, his son, Edsal; Frank Kulick, his racing driver, and some of his factory lieutenants; Harry Matthews, president of the Jackson Automobile Company, Jackson, Mich.; C. D. Cutting, engineer of the Clarke-Carter Company, Jackson, and Chief Engineer Berger of the Oakland Motor Car Company.

After the luncheon and post-prandial exercises participated in by several automobile men known throughout the country, there was an inspection of the Remy plant under the guidance of General Manager H. W. Griffith, E. F. Willett, Detroit branch manager; W. F. Hamilton of the executive staff; H. E. Krause, factory manager; W. O. Kennington, assistant chief engineer; I. J. Reuter, chief engineer and F. E. Moskovics, sales manager.

ENGINEERS IN DETROIT.

Interesting Programme of Papers, Discussions and Entertainment for June Meeting.

The mid-summer meeting of the Society of Automobile Engineers will be held in Detroit, June 27 to 29. The following programme has been arranged:

Papers—"The Effect of the Relation of Stroke and Bore in Automobile Engines," John Wilkinson; "Motor Sizes and Drive Ratios for Commercial Vehicles," E. P. Batzell; "Cost of Work with Gasoline Motor Trucks," Louis Ruprecht; "Stability of Automobile Propeller Shafts," J. M. Thomas; "The Standardization Work of the S. A. E.," Henry Souther, chairman of the standards committee; "An Exhaustive Motor Test," Herbert Chase (introduction by F. R. Sutton); "Tests of Aluminum Alloys," H. W. Gillett; "Worm Gears," Frank Burgess; "Helical Gears," Frank Burgess; "Standardization of Drawings," George W. Dunham; "Test of Knight Motor," R. C. Carpenter; "Leaf Springs," Leavitt Lane.

Reports of standards committee divisions—Broaches, C. W. Spicer, chairman; carburetors, G. G. Behn; data sheet, C. P. Poole; frame sections, J. G. Perrin; iron and steel, Henry Souther; miscellaneous, A. L. Riker; sheet metals (aluminum), T. V. Buckwalter; springs, Harold L. Pope; truck standards, W. P. Kennedy.

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The Detroit committee of arrangements includes: H. E. Coffin, Hudson Motor Car Company; H. W. Alden, Timken-Detroit Axle Company; Russell Huff, Packard Motor Car Company; E. T. Birdsall and Mason P. Rumney, Detroit Steel Products Company; Tracy Lyon, General Motors Company; F. H. Floyd and E. E. Sweet, Cadillac Motor Car Company; H. R. Corse, Lumen Bearing Company; C. W. Dunham, Chalmers Motor Company; F. H. Berger, Oakland Motor Car Company; J. G. Vincent, Hudson Motor Car Company.

NEW TIRE PLANT.

United States Rubber Company's Capital Increased to Provide Additional Facilities.

Following the announcement by the United States Rubber Company, New York City, of an increase in capital stock from $75,000,000 to $120,000,000, comes information from the United States Tire Company, that plans are under way for the erection of another plant, which is expected to have the largest output of any factory of its kind in the world. The two projects—that of increased capitalization and that of another factory—go hand in hand, the latter, in a way, being dependent upon the former.

The United States Tire Company is now operating four immense tire plants, these being located at Hartford, Conn., Detroit, Mich., Providence, R. I., and Indianapolis, Ind. The daily output runs into the thousands, yet such has been the demand that additional production facilities are deemed necessary.

J. M. Gilbert, general manager of the United States Tire Company, says the proposed new factory will increase the company's output about 5000 tires daily. At present, by working eight-hour shifts in all the plants and utilizing all available equipment, the company is barely able to care for its trade. The new factory, besides being the largest of its kind in the world, will be equipped with the most modern machinery known to the industry. Information concerning its location is to be made public soon.

NOTED BRITISH MOTORIST.

Lord Montagu Visits America to Become Better Acquainted with Conditions on This Side.

Lord Montagu of Beaulieu, Eng., probably one of the best known motorists in that country, is on a tour of the United States, where he is paying particular attention to road and motoring conditions. Besides being editor of "The Car," he holds a seat in the House of Lords, where he represents the motorists' interests, is vice president of the Royal Automobile Club of Great Britain, handles all engineering and motoring news for the London Times, and is a special correspondent for the Daily Mail. He will remain in this country until July, his itinerary including visits to Washington, St. Louis, Indianapolis, Chicago, Cleveland, Detroit, Buffalo, Syracuse, and other cities where automobile factories will be inspected, and in Montreal and Quebec.

Considerable time was spent in New York in a study of the state roads, while one of the features there was a ride over the Long Island motor speedway as the guest of W. K. Vanderbilt, Jr. Lord Montagu expressed himself as highly pleased with the new roads and especially with the construction of the motor parkway, which he believes takes care of the dust problem. He says that the motorists of the United States have every reason to feel gratified with the automobiling and highway conditions, and he predicts a great advance within the next year or two. He adds it will be only a question of time before the highway authorities will effectively solve the road building situation by making them of suitable depth so as to provide permanency, and by making the surfaces durable for a longer period and practically dustless.

BAY STATE REGISTRATION.

Decided Increase in Number of Cars Licensed During First Five Months of Year.

Figures recently compiled by the Massachusetts highway commission show that before the year is ended fully 50,000 cars will be registered, from which the state will receive a revenue in excess of $600,000. Already the registrations are within a few hundred of the total last year, and the money derived from fees is less than $4000 under the grand total for 1911. Summer registrations have not started so that it is estimated that last year's total will be surpassed before the end of the month.

E. J. O'Hara, who has charge of the automobile department, has registered 38,169 cars, so far this year, which is an increase of over 27 per cent. over last year, when the number was 29,955. For the whole of 1911 the total registration was 38,907. The commission has taken in so far this year $473,579.50, against receipts of $374,534.75 for the corresponding period last year and $477,417.95 for the entire year of 1911.

As all the money, with the exception of about $63,000 that is used for the expenses of the automobile department of the highway commission, goes to the maintenance of state highways, and the improvement of other through routes, it is plain that this year the motorists will pay a sum in excess of $500,000 for actual use on the roads of the state. In addition to the fees there are fines, amounting last year to $26,744.50, which also go into the road maintenance fund.

At this time and in this connection a review of the registration figures for the past eight years and for the first five months of 1912 might be of interest:

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Year	Cars	Receipts
1903	3,241	$17,684.00
1904	3,772	19,162.00
1905	4,889	24,490.50
1906	6,572	33,085.50
1907	16,739	92,096.50
1908	18,066	121,488.50
1909	23,971	169,973.54
1910	31,360	374,789.94
1911	38,907	477,417.95
1912 (to June 7)	38,169	473,579.50

SEEK LION FACTORY.

Adrian Capitalists Would Retain Motor Car Concern Which Lost Heavily by Recent Fire.

Soon after the disastrous fire, which destroyed the factory of the Lion Motor Car Company, maker of Lion cars, in Adrian, Mich., June 2, the officials of the company received a tempting offer from the Chamber of Commerce in Detroit. It would appear, however, that there is some doubt about the acceptance of the proposition, since several business men in Adrian have decided to raise $100,000 in additional capital in an effort to induce the concern to remain in that city.

ANOTHER NEW CAR.

Dodge Bros. of Detroit Reported as Experimenting with Machines on Michigan Roads.

It is understood that Dodge Bros., Detroit, formerly engaged in the manufacture of motors and gears utilized in Ford cars, is about ready to announce the production of pleasure and commercial vehicles, experimental machines having been tested out on the roads of that city and vicinity for a number of weeks. Frederick J. Haynes, until recently factory manager of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., is said to have been engaged in a similar capacity with the new enterprize. Detailed plans will be awaited with interest.

MICHIGAN CENSUS RETURNS.

Figures Set Forth Remarkable Growth in the Very Heart of the Automobile Industry.

The rapid growth of the automobile industry in the State of Michigan from 1904 to 1909 is shown in a recent report of E. Dana Durand, director of the 13th census. The increase in value was much greater relatively than that in number. Compared with 33 establishments in 1904 there were 113 in 1909, while the average value a machine in 1909 was $1086 as against $718 in 1904.

The entire value of automobiles produced in 1904 was $6,552,804, and in 1909, $70,359,749. The value of all other products reported, which, for the most part, represents the value of automobile bodies and parts turned out by establishments engaged primarily in that branch of manufacture, increased even more rapidly than that of the complete machines. This item was $1,443,730 in 1904 as compared with $26,291,702 in 1909.

The increase in number of cars produced during the five-year period, their value and other points of interest concerning the growth of the industry, is set forth in the following table:

	1904		1909	
	No.	Value	No.	Value
Buggies, runabouts and touring cars	9023	$6,481,164	62,319	$64,940,793
Limousines and cabs	*	.....	1,560	3,825,066
Service vehicles	*	.....	146	273,108
Delivery Wagons	51	35,250	401	319,071
Trucks and all others	51	36,390	374	1,001,711
Other products, including bodies, parts and repair work	...	1,443,730	....	26,291,702
Totals	9125	$7,996,534	64,800	$96,651,451
Gasoline cars	9114	6,537,404	64,262	69,130,223
Electric cars	11	15,400	538	1,229,526

*Not reported.

The growth of the industry is shown in another manner as follows:

State of Michigan.

	1904	1909
Number of establishments	33	113
Persons engaged	2,953	28,098
Proprietors	17	29
Salaried employees	201	2,625
Wage earners	2,735	25,444
Primary horsepower	1,800	25,938
Capital invested	$4,347,000	$52,926,000
Salaries paid	236,000	2,570,000
Wages paid	1,268,000	15,491,000
Cost of materials	3,443,000	53,882,000
Value of products	7,997,000	96,651,000
Value added by manufacture	4,554,000	42,769,000

City of Detroit.

	1904	1909
Number of establishments	19	68
Persons engaged	2,191	17,437
Proprietors	12	*
Salaried employees	145	1,762
Wage earners	2,034	15,675
Primary horsepower	*	14,666
Capital invested	$3,447,000	$28,928,000
Salaries paid	168,000	1,781,000
Wages paid	959,000	9,621,000
Cost of materials	2,631,000	31,363,000
Value of products	6,240,000	59,536,000
Value added by manufacture	3,609,000	28,173,000

*Figures not given.

GOODYEAR ADDS TO CAPITAL.

Akron Tire Concern Follows the Lead of Other Manufacturers in Its Field.

Within the past month several well known tire concerns have increased their capital stock and otherwise provided for additional production. Among the latest to make an announcement of this nature is the Goodyear Tire & Rubber Company, Akron, O., which has increased its capital from $6,000,000 to $15,000,000. Part of the money will be utilized in making improvements and extensions of the factory facilities.

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THE G. C. KEROSENE VAPORIZER.

The fuel problem is being given more serious attention abroad than in this country and many engineers and individuals are devoting considerable time and money in efforts to produce a suitable and efficient vaporizing device for operating internal combustion engines with kerosene, and other heavy fuels. The advantages resulting from the use of these is, perhaps, more appreciated in countries where the price of gasoline is almost prohibitive, and this applies especially

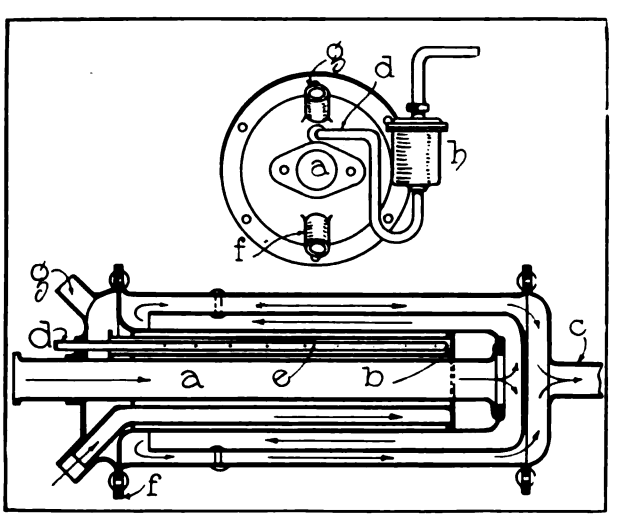


Fig. 1—G. C. Vaporizer, a Simple Device for the Utilization of Kerosene and Heavy Fuels with Internal Combustion Motors.

to the tropics. Kerosene may be considered a household necessity, and naturally is more readily obtainable, to say nothing of its lesser cost.

The British and Colonial G. C. Syndicate of London, England, has adopted a vaporizer known as the G. C., and it is stated that the device is being operated with success on a number of motor cars, including both pleasure and commercial vehicles. It is the invention of Mr. Constantinesco, a Roumanian engineer, who has had extensive experience with the various oil fields in his native land and possesses an intimate knowledge of the nature of mineral oils.

The vaporizer is depicted at Fig. 1 and is simple in construction as will be noted by the sectional and end elevation drawings. This particular model is built in combination with the muffler and it is stated that it may be utilized in place of the latter. The hot exhaust gases are discharged through a central pipe a, gilled on the outside and having strips of brass secured to it longitudinally. These are not shown in the illustration, however. The object of this arrangement is to retain the heat, also to keep the vaporizing chamber b at an even temperature. After passing through the chamber b the gases travel back along the outside of the latter and find egress at the outlet c.

The fuel to be vaporized enters at d, and is conveyed through a long perforated pipe e inserted in the vaporizing chamber, the temperature of which is stated to be maintained at between 500 and 600 degrees, Fahrenheit, when the motor is running. A small opening f at the end of the vaporizing chamber is provided for the purpose of admitting a stated amount of atmosphere, which is heated and mixed with the vaporized fuel, forming an explosive mixture which is drawn into the cylinders of the motor through g.

An auxiliary air valve is also fitted on the intake pipe and employed to obtain the proper mixture. The flow of fuel to the vaporizer is automatically controlled by the speed of the motor through the medium of a simple device consisting of a vessel h, similar to an ordinary float chamber, fitted with a glass gauge for the purpose of noting the level of the fuel. Inside this member is a jet, consisting of a piece of .25-inch copper tube slotted down each side by a saw cut .0625 inch wide. An adjustable valve controls the supply from the tank to this regulator, the amount of fuel being sufficient to meet the demands of the motor when at its maximum speed. The valve is adjusted easily and may be set with the engine operating.

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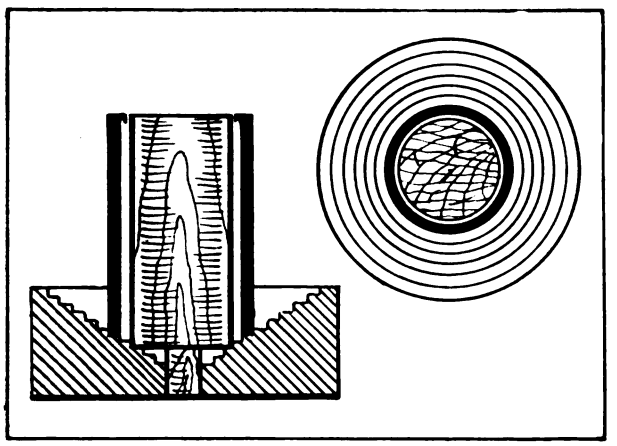


Fig. 2—A Universal Jig for Pouring White Metal.

As generally is the case with heavy fuel vaporizers, the device must be heated to a certain temperature before the motor will pick up on the kerosene. This is accomplished by operating with gasoline, then changing to the heavier fuel.

Experiments conducted with the G. C. vaporizer are said to have demonstrated the fact that the motor would operate equally well upon either fuel. A noticeable feature in connection with the utilization of the crude oil was the continuous discharge of residual tar from the drain pipe attached to the vaporizer. It is also claimed that the fuel consumption compares very favorably with that of the Diesel engine, and that greater mileage and a more flexible motor are obtained.

UNIVERSAL JIG FOR BUSHINGS.

A device for service when bushings are to be lined with white metal is outlined at Fig. 2 and the sketch is almost self-explanatory. The internally stepped base is made of cast iron, each step being .1875 inch or .25 inch smaller in diameter than its neighbor. Several wooden cores of various sizes are constructed to fit tightly into the centre hole. It is obvious that any bush resting upon a step suitable in size will be central with the wood core. The stepped core and bush should be well heated by a blow torch and the part to be lined well tinned before the metal is poured. The wood core should be quite smooth, and should taper very slightly toward the top and it also should be well smeared with black lead before pouring.

NEW VICTOR AIR COMPRESSOR.

The up-to-date garage no longer relies upon the hand pump, but is equipped with a compressed air system, an arrangement permitting of the storage of air for the inflation of tires, and cleaning the upholstery of the motor car, as well as the chassis. The Victor Electric Company, Chicago, has brought out a new compressor which is designed to be belt driven from a line shaft.

It is a double-cylinder unit, having a 2.5-inch bore and two-inch stroke. The pistons are fitted carefully and means have been provided for keeping these well lubricated. The valves are especially designed and are constructed to withstand the great strain to which they are subjected in operating at high speeds.

The compressor, which is shown at Fig. 3, can be operated safely up to 360 revolutions a minute at which rate it gives a capacity of four cubic feet or 30 gallons of free air a minute. A pressure of 125 pounds may be maintained easily and a higher ratio if desired. The pulley is located between the cylinders and it is claimed that the device operates with the least possible noise, that all parts are interchangeable, and that it is economical in operation.

HISEY ELECTRIC BREAST DRILL.

Portable electric hand or breast drills are a valuable addition to the shop equipment as by them work may be drilled either in the vise or on the car. At Fig. 4 is presented one of several types manufactured by the Hisey-Wolf Machine Company, Cincinnati, O. It is made in three types and the motor is operated by a direct current of 110 or 220 volts. It is equipped with two side handles, one detachable and one combination end, and a breast handle. Their speed under load varies according to the design, being from 400 to 900 revolutions a minute. The chuck is offset, allowing drilling in close corners.

The motor is completely enclosed, air-cooled, the openings being in the housing and protected by a brass screening, thereby preventing any cuttings from getting into the motor, no matter in which position the drill is operated. The gears are cut from solid steel, hardened, run in grease, and are separately encased. The brush holders and wire connections are also en-

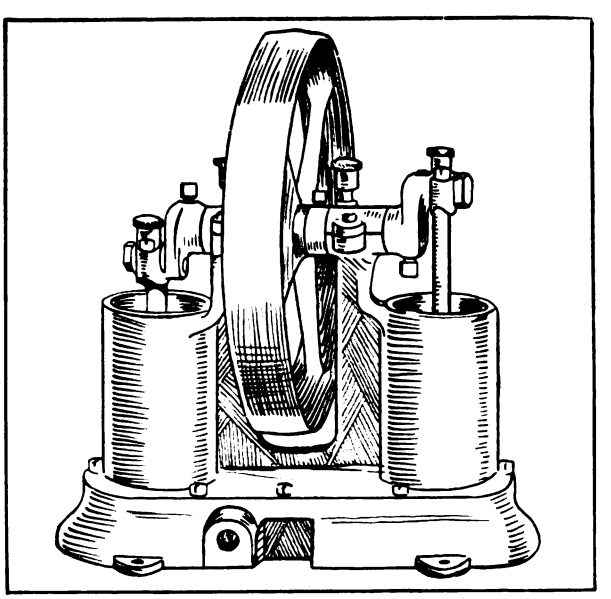


Fig. 3—New Double-Cylinder Compressor Brought Out by the Victor Electric Company.

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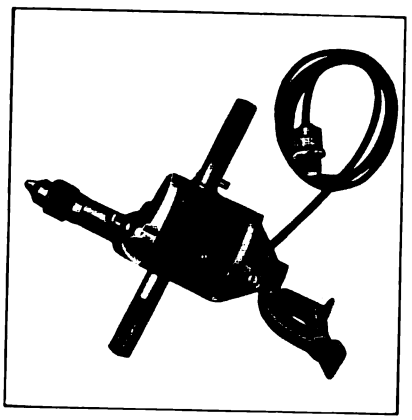


Fig. 4—Hisey Portable Electric Drill.

closed, preventing short circuiting. The drill and armature spindles are provided with ball thrust bearings.

The operation of the drill is controlled by a patented, enclosed automatic switch which controls current by means of a brass trigger operated through the permanent handle. It is claimed that this construction prevents the operator burning his fingers or short circuiting the motor, and that the drill is under control at all times. The handles are made of hollow steel tubing, screwed into the housing. Each attachment plug has a fusible cap, protecting the motor from an overload. The drop cord is connected on the outside of the motor housing with an insulated cover, preventing any possible damage by lead wires and inside connections should it be accidentally torn loose.

OXI-CARBI WELDING OUTFIT.

Oxy-acetylene welding outfits are important factors in the repair of automobiles, as the process permits the welding of broken and cracked parts which were formerly discarded. Although there are concerns which make a special business of welding, some repair shops are installing the apparatus, saving much time as well as deriving profit.

The Oxi-Carbi Company, New Haven, Conn., manufactures both portable and stationary welding outfits and these are designed for any number of blowpipes. The equipment outlined at Fig. 6 is known as the No. 2 and this with the No. 4 is more generally installed by the company.

The acetylene generators are of the carbide feed type and are said to be so designed as to make it impossible for those not familiar with their use to tamper with them and bring about accidents. In charging, the elevating screw shown on the bracket on the front of the hopper is raised to its highest point. This movement raises the feed lever and closes the valve that feeds the carbide. The upper section of the tank forms the expansion chamber and the lower the generating compartment.

Raising the two right hand cock levers shuts off the expansion chamber. Raising the right hand lever gives vent to the generating chamber, and the water filling cock can then be opened, as well as the sludge valve. Turning the agitator handle at the right of the tank loosens the sludge or lime that has settled in the tank. The top of the tank is provided with a removable plug for replenishing the supply of carbide.

When the tank is filled with water to the overflow in the filling funnel, the cock is closed first, then the vent cock and last the gas cocks. The interference rods prevent operating differently, and as the vent pipe connects with the safety pipe which is run to the open air no gas will enter the room with this generator. The object of the expansion chamber is to reduce the air space when recharging, as with this shut off the only air admitted to the generator is in the generating chamber as the sludge is emptied. This air is exhausted as it is recharged, leaving but a small amount, and it is claimed by the maker that this arrangement prevents dangerous mixtures.

With all cocks closed, the elevator screw may be lowered, which allows the valve to open and the carbide to feed through. As soon as pressure of gas is sufficient the lever will raise and close the valve. Utilization of the gas causes the valve to operate and no further attention is needed until the supply of carbide becomes exhausted.

The outfit illustrated has 25 pounds capacity. The oxygen generators are of the pressure type and are operated by filling a tray with potassium chlorate mixed with manganese dioxide, and placing in the retort. The cover is then bolted on and the gas burners beneath are lighted. The heat causes the chemicals to give off a gas in the form of oxygen, this passing through purifiers into a storage tank at pressures

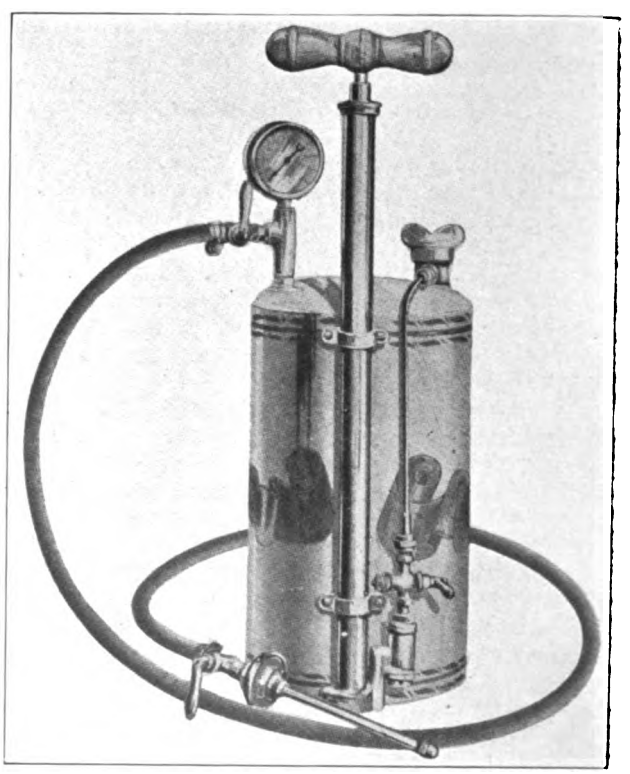


Fig. 5—Auto Engine Cleaner Which Utilizes Gasoline or Kerosene Mixed by Compression.

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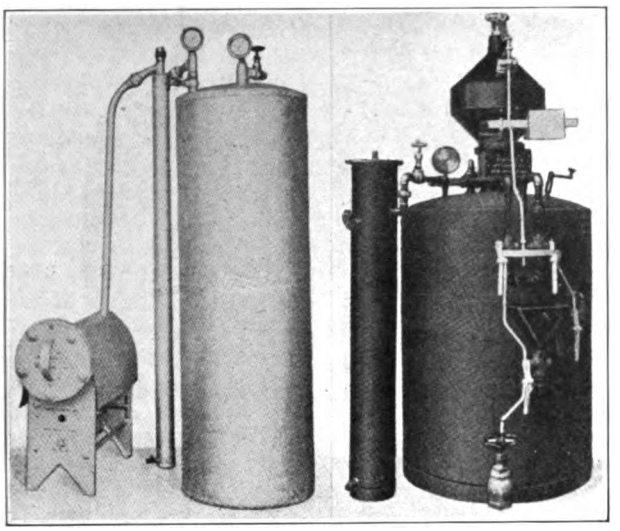


Fig. 6—Oxy-Acetylene Welding and Cutting Outfit Produced by the Oxy-Carbi Company.

suitable for welding and cutting. The tank requires from two to 20 pounds according to the size of tip employed, while for cutting, 30 to 75 pounds is utilized. It is stated that one tray full will produce approximately 28 cubic feet. The retorts may be recharged immediately if required.

The blowpipes utilized with the outfit are of the improved type and capable of performing a wide range of work, the No. 1 equipment having five tips, these being for sheet metal up to .25 inch thick and cast iron up to two inches. The welding tip may be removed easily and the cutting member substituted. The latter increases the pressure on the oxygen at the reducing valve and it is claimed that it will cut a two-inch round bar of steel in 90 seconds. In welding, all of the usual metals may be united, such as steel, aluminum and bronze of the different alloys; cast iron, malleable iron, wrought iron, etc.

AUTO ENGINE CLEANER.

In the overhaul of the motor car considerable time, as well as gasoline is utilized in removing the accumulations of grease and dirt that collect upon the various components. It is troublesome to remove all grease as many places are difficult of access with the ordinary brush.

The up-to-date repair shop employs air mixed with gasoline which is compressed to a high pressure, and when employed in this form removes dirt easily and quickly. The Cleveland Faucet Company, Cleveland, O., is marketing the Auto Engine Cleaner, shown at Fig. 5, which is designed for the repair shop, garage and private owner.

The complete outfit consists of a three-gallon, seamless, galvanized steel tank, to which a special hand pump is attached, also a gauge and a safety valve. Provision is made for the introduction of gasoline, kerosene or any other cleansing fluid. An air inlet cock is provided, also 10 feet of flexible tubing.

In practise, the tank is filled two-thirds full with gasoline and the outlet cock closed, after which the pressure is pumped up to 80 or 100 pounds. The air inlet cock is next closed, after which the other two members are opened and the apparatus is ready for service. The spraying nozzle is of sufficient length to reach easily any part of the motor or other components of the automobile.

OLMSTEAD POWER HACKSAW.

Any tool or device which will save time and labor in the repair shop is money well invested. In well appointed shops the hand hacksaw is employed only for fine work such as the cutting off of pins of small diameter, etc. Where heavy material is to be cut, considerable time is required with the hand tool and often some of the metal is wasted, to say nothing of numerous broken blades in the operation.

Power hacksaws are inexpensive and once the work is secured and energy applied, the device requires no further attention until the saw completes its work. During this time the workman can perform other tasks, and an advantage of the power device is that it cuts evenly and accurately.

L. H. Olmstead, Hasbrouck Heights, N. J., manufactures a variety of power hacksaws, these being adapted for light and heavy work. That depicted at Fig. 7 will take work up to 1.25 inches, either round or square, and it may be secured to the bench or table and driven from the main shaft of the power equipment. It is provided with a clutch for starting and stopping and is fitted with a swivel device to permit sawing at any angle. The driving pulley is six inches in diameter and should be driven at 175 revolutions a minute. The net weight of the machine is 16 pounds.

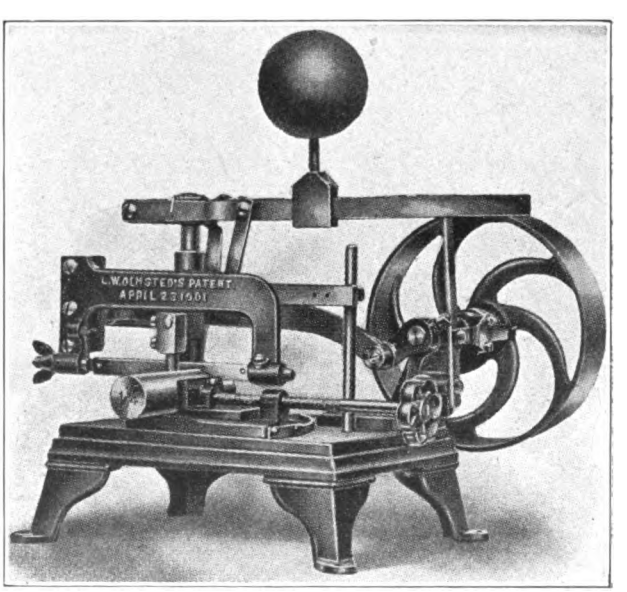


Fig. 7—Olmstead Power Hacksaw Designed for Work up to Two Inches, Either Round or Square.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



LONGEST COMPARTMENT BODY.

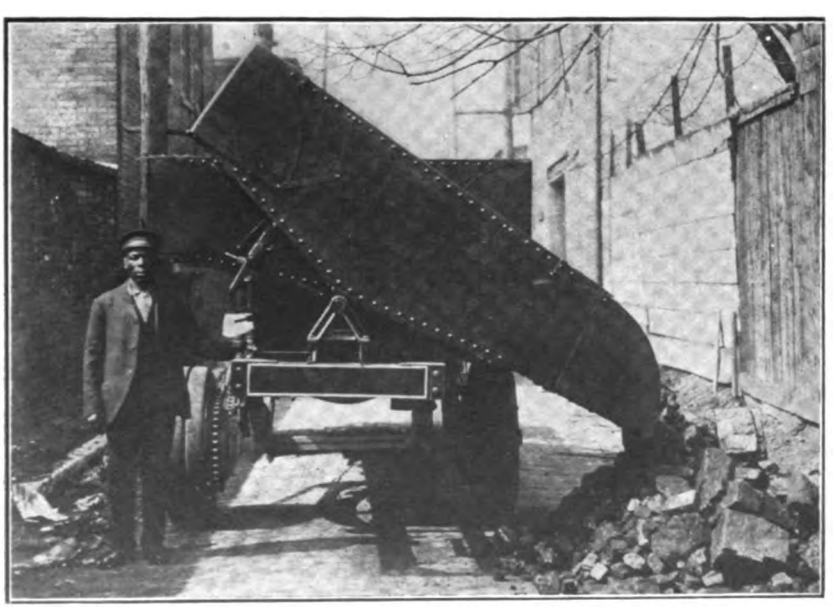
The problem of dumping bodies is one which has proved of decided interest, both to the manufacturer and user of motor trucks. It is generally agreed that the utmost economy may be realized from a mechanical transport only when it is utilized to its maximum efficiency. Many coal concerns, for instance, are anxious to make use of the commercial vehicle, but hesitate to make the change from horse drawn equipment unless thoroughly convinced that the nature of their business is such as to warrant keeping the truck fully occupied.

In an effort to solve this problem for such business men, the Longest Bros. Company of Louisville, Ky., maker of the Longest truck, has brought out the patented individual compartment side dumping body, which is illustrated herewith. The particular advantage of this design, which is fitted to a four-ton chassis, lies in the fact that the truck may be loaded with as many as four different orders and delivery may be made with the same degree of economy as if the business were confined to the hauling of four-ton loads.

Each of the compartments is arranged to hold one ton, and each is provided with means for dumping individually, as may be noted from the cut at the bottom of this page. It may be added that the load may be dumped at either side of the vehicle.

Let it be assumed, for instance, that the load is to be delivered in a narrow alley. No turning or backing is necessary; no manoeuvring to get into position. It is immaterial even which end of the alley is entered. The load is dumped just where it is wanted, and the driver is free to take the next order to its destination without delay. Suppose, however, that the alley is obstructed and that the driver cannot get through. As the material is dumped clear of the path over which the wheels must travel, the driver may back out much more quickly and easily than would be possible with a team.

The same thing applies to dumping on the sidewalk. In fact, no situation can be cited in which the load cannot be dumped as desired, unless, possibly, that in which the hole is located directly underneath the wagon, in which event, the Longest dumping body could be utilized as advantageously as any other type, except that especially designed for dumping through the bottom. This feature is of particular merit in itself.



Rear Compartment of Longest Body Dumping its Load, Indicating Simplicity of Operation.

From examination of the accompanying illustration, it will be seen that each compartment is hinged upon a central rod which is securely braced to the frame. At either side is a pivotally mounted support, a rod extending from the central hinged portion to the centre of this support. This latter rod has a threaded end which passes through the support and carries a nut.

The method of operation is as follows: The nut is screwed

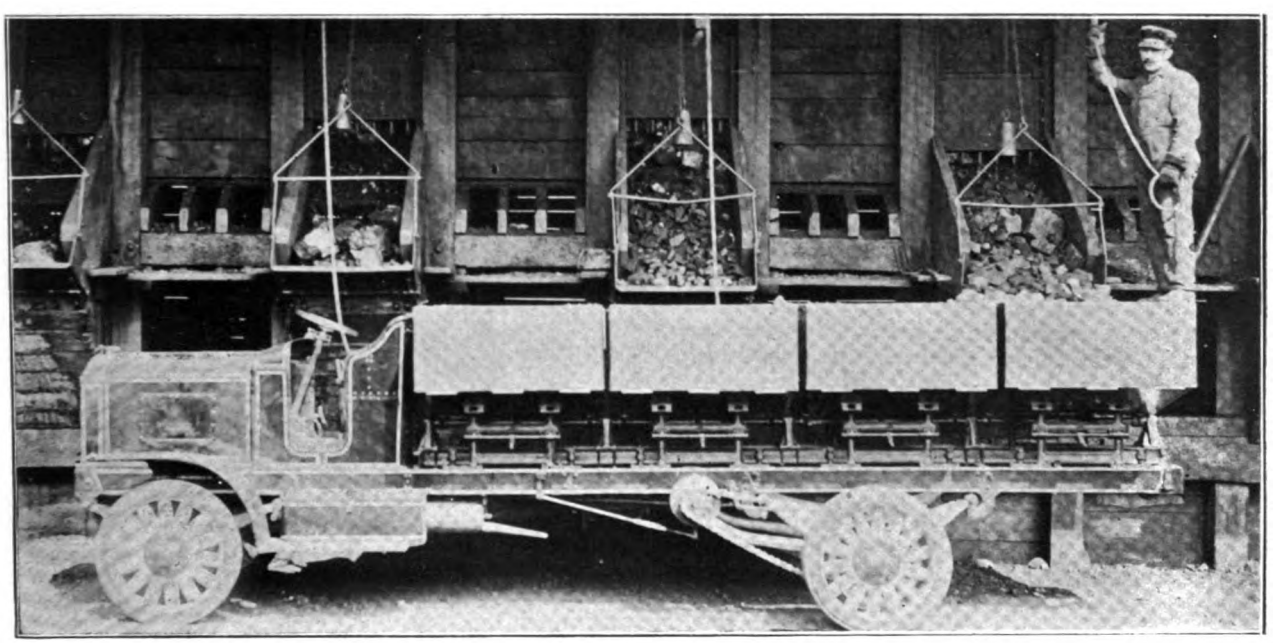
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back until it released a clamp which holds the side support in position. This support is hinged, one end folding up against the bottom of the compartment, while the other normally rests in sockets on the frame. As the clamp is released the hinged portion is folded easily, and the upper end is held in place by a catch on the bottom of the container.

After this has been done, all that is necessary is to drop the chute door on this side of the dumper, which, as will be noted, is of metal, securely riveted. When it is in a normal position the floor of the compartment slopes from either side toward the centre, but as a catch is released on the opposite side, the support having been removed, the weight of the load tends to tip the compartment and the entire contents are emptied automatically.

The explanation takes decidedly more time in the telling than is required for actually accomplishing the work. As soon as the load is dumped, the body swings back into place, and it is only necessary to restore the supports to their original position, screw up the locking nut, and the truck is ready for the next delivery.

It is maintained by the maker that the use of this dumping body does not necessarily imply that a skilled workman must be employed. There is nothing about the construction that is intricate or not easily understood. It is a plain, simple piece of mechanism, with all parts substantially built, and not liable to breakage, even with extremely rough handling.



Longest Four-Ton Truck, Fitted with Patented Unit Compartment Side-Dumping Body, Receiving Its Load of Various Kinds of Coal.

MORGAN DUMPING DEVICE.

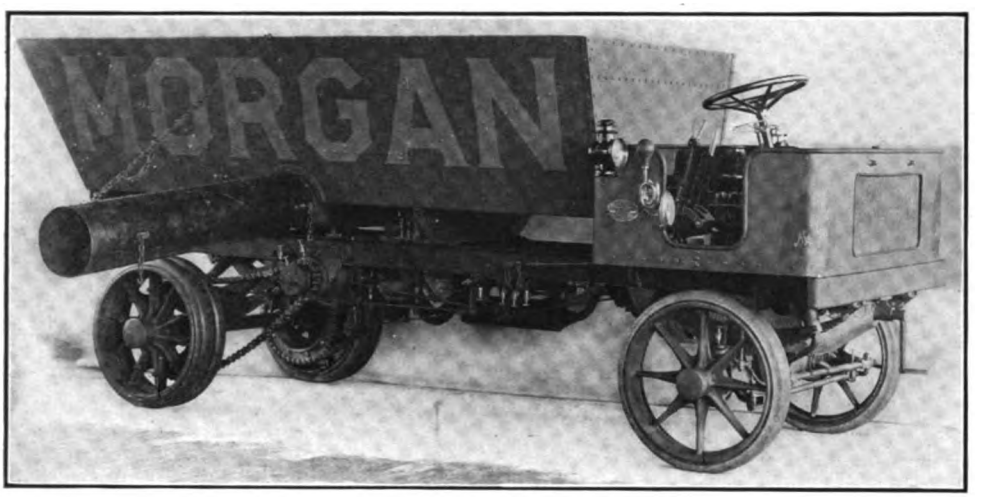
Another dumping design which has occasioned some little interest is the screw discharge body produced by the Morgan Motor Truck Company, Worcester, Mass. The construction is of steel, the sides sloping toward the centre, where an Archimedian screw is located crosswise of the body. Power to operate this is supplied by the motor, through a change gear mechanism, in which an extra gear and shaft lead to a chain wheel mounted on the side of the chassis.

A much larger wheel is mounted on the end of the conveyor shaft opposite to which is attached a removable chute. This wheel is fastened by a key, which, when withdrawn, permits the chain and wheels to rotate idly while the truck is being driven. When the load is drawn into position, the operator slips the key into place and the motor rotates the screw, which discharges the contents of the body without the latter being tilted or moved about in any manner.

This body is fitted to the new five-ton Morgan chassis, which has several features of merit. Prominent among these is the matter of load distribution, care having been exercised to cause all of the space from the front of the radiator to the rear cross members to serve a useful purpose. The motor is located in front, in the cab with the driver, who is placed at the right.

A vertical four-cylinder, four-cycle, water-cooled unit is employed, this having a bore and stroke of five inches and being rated at 40 horsepower. The cylinders are cast en bloc, with water jackets integral. Both the intake and exhaust valves are located in the removable cylinder heads, the latter being so designed that by loosening a few nuts they may be entirely withdrawn for inspection or grinding the valves. The intake and exhaust manifolds also are integral, and

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Morgan Screw Discharge Body, Depicting Detachable Chute through Which Contents Are Emptied.

each end of the latter is provided with removable plugs through which any carbon may be released easily.

In the matter of cooling, the Morgan motor is noteworthy in design, as not only is provision made for maintaining the proper temperature under all conditions, but for cleaning as well. The exhaust side is fitted with a detachable plate, as is also the inlet side, and an opening in the latter allows water from the pump to be forced through a well designed manifold to the radiator. A large sized centrifugal pump, gear driven, takes the cooled water from the radiator, which is of high grade cellular type and of ample proportions.

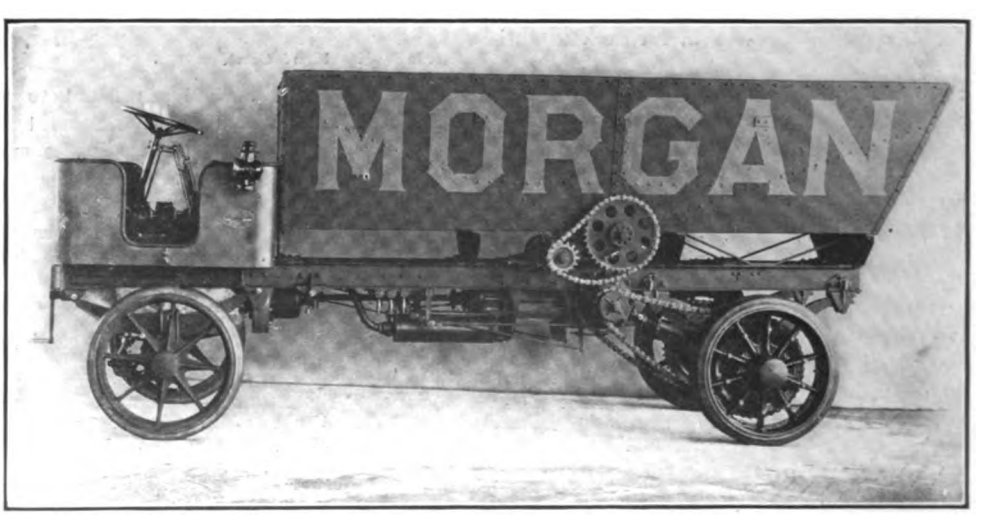
Two separate and distinct ignition systems are employed, each having its own plugs. A four-unit vibrating coil, timer and battery furnish the ignition for the plugs on the left of the motor, while a high-tension magneto performs the same functions for those on the right. Either system may be operated independently. The lubrication system also is dual. A gear driven pump forces oil through an aperture in the crankshaft to each bearing and all connecting rod bearings, and this lubricant is circulated constantly. Interposed between the crankcase and the oil reservoir is a pressed steel pan carrying the lubricant for the splash system. The crankcase is constructed in three sections, and the lowest portion is equipped with two petcocks for noting the supply of lubricant and for draining off the old oil.

The Morgan clutch is of the multiple disc type with alternate plates of steel and copper, these operating in a bath of oil. A feature of the device is a leather universal attachment fitted between the flywheel of the motor and the clutch. This disc being of very flexible leather relieves the clutch of all shocks.

The transmission is of the selective type, providing three speeds forward and reverse, and the change speed gears are always in mesh. Clashing of gears is held to be impossible, as the transmission has a set of dogs on the face of each of the speed change gears, which are losely journaled on the driven shaft, and two corresponding double sliding clutches mounted on the squared portions of this shaft, by which any one of the change speed members may be locked to the shaft.

The jackshaft and transmission are a unit, and the former is mounted in a spherical housing, which in turn is supported by a substantial bracket secured to the main frame. This housing protects the jackshaft when the machine is traversing uneven roads, as it carries a spherical joint. Final drive is by double chain.

Springs are semi-elliptic, front and rear. Two sets of brakes are provided, the service members being external contracting on the jackshaft, and the emergency, internal expanding on the rear wheels. Solid metal wheels of the locomotive type are employed.



Morgan Screw Discharge Body, Showing Chain and Sprockets Actuating Archimedian Screw.

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Tires are of solid rubber, 36 by six inches, single, in front, and 36 by five, dual, rear.

Another special feature is the use of patented universal couplings and joints, in which rubber blocks in sections are carried in a housing. The design is such that when energy is applied these members absorb all shocks, such as too sudden application of the clutch, improper changing of speeds and inequalities of road. These shock absorbers are fitted to the jackshaft, and one of the same design is utilized on the drive shaft.

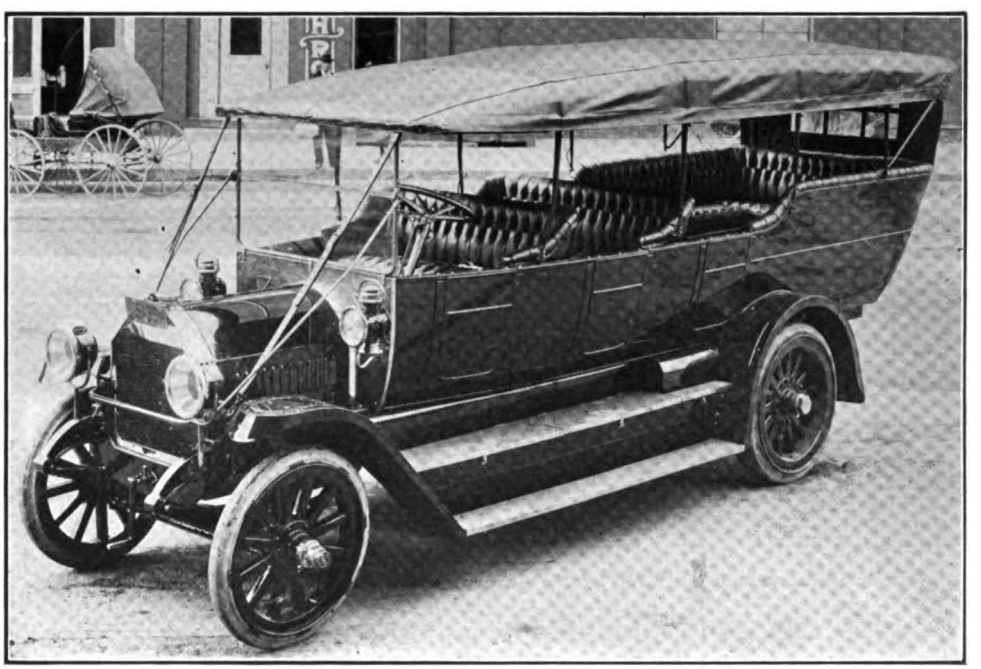
G. M. C. SIGHT-SEEING CAR.

The General Motors Truck Company, Detroit, has brought out an interesting sight-seeing body, shown in the accompanying illustration. It is a full fore and side door model, and is claimed to be a distinct advance over designs which have been utilized in the past. As will be noted, the construction follows pleasure vehicle practise, and has the appearance of an elongated touring car.

The chassis is a standard two-ton G. M. C. with a wheelbase of 142 inches. The seats are well arranged, the two front members being placed so that the occupants face forward while the back seat is semi-circular in form. Accommodations are provided for 16 persons

The first of these vehicles was shipped to the Rainier national park, near Seattle, Wash., and is to be utilized in conducting parties through the park to the line of eternal snow on Mount Tacoma, over what is considered one of the prettiest scenic automobile drives in America. Incidentally, this will prove a severe test for the car.

It is anticipated that the design will meet with the approval of tourists everywhere, and that a general demand will be created for this machine wherever it is desired to cater to public touring parties. The refined appearance of the car is such as to warrant the supposition.



New G. M. C. Sight-Seeing 'Bus, Built Along Pleasure Car Lines and Holding 16 Passengers.

NEWS OF THE TRUCK FIELD.

The Packard Motor Car Company, Detroit, is announcing a five-ton model, which resembles the three-ton design manufactured by this concern, with the exception that it has a 40 horsepower motor, with bore of five inches and stroke of 5.5, and is of stronger construction throughout. The wheelbase is 14 feet and options of 12 to 16 feet in body space back of the driver's seat are offered.

The main offices of the General Motors Truck Company, which have been located in Detroit, will be at the factory in Pontiac, Mich., in the future. The lighter duty gasoline and the electric G. M. C. vehicles are made at this plant, the factory organization of which will remain as before. The branch office in Detroit will be removed into the new service station and garage at 12th and Fort streets.

The Universal Motor Truck Company has broken ground at 26th street and South Park avenue, Detroit, for the erection of a new service building, 112 by 150 feet, which is to be one of the most completely equipped in America. Similar stations will be located in New York City and Boston.

The Bucklen Auto-Truck Company of Elkhart, Ind., has purchased the factory of the Elkhart Wrench Company, in which it will produce Bucklen vehicles in the near future.

The International Motor Company, maker of the Saurer, Mack and Hewitt trucks, is building extensive additions to the Saurer plant at Plainfield, N. J. It is expected that the capacity of the plant will be doubled.

The Argo Electric Vehicle Company, Saginaw, Mich., is constructing a four-story addition to its factory, which, when completed, will triple the output of the company. The new structure is 150 by 150 feet,

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and is to be ready for occupancy about July 15.

REORGANIZATION OF GRAMM COMPANY.

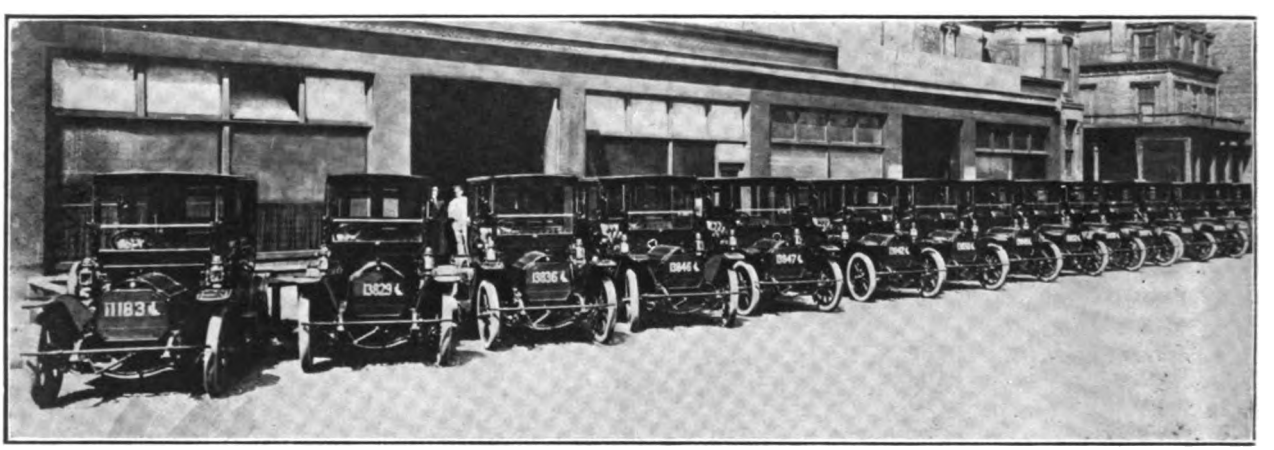
The final reorganization of the directorate of the Gramm Motor Truck Company was completed at a meeting of the board at Lima, O., May 23. G. W. Bennett, vice president of the Willys-Overland Company, was elected vice president to fill the vacancy caused by the resignation of B. A. Gramm. The full list of officers follows: President and general manager, John N. Willys; vice president, G. W. Bennett; secretary, James E. Kepperly; treasurer, Walter Stewart; assistant general and factory manager, Harvey L. Hooke.

The output of the factory is said to be almost double what it was before Mr. Willys purchased control. The factory force has been systematized, and plans for 1913 are constructive and extensive. Carl A. Neracher, the Willys-Overland Company's consulting engineer, is to have general oversight over the construction of the product. The sales will be made through the commercial car department of the Willys-Overland Company with headquarters in Toledo.

GROWTH IN AUTOMOBILE EXPORTS.

That 20,000 automobiles will be the export record of the United States for the fiscal year which ends with the present month, is the assertion of the bureau of statistics, basing its judgment on official figures for the past 10 months. Their value, including parts and accessories, will approximate $27,000,000. The figures on which this claim is made show that nearly 17,000 automobiles were exported to foreign countries in the 10 months ending with April, valued at $16,500,000; parts thereof, $3,250,000; tires, sent separately from machines under the head of exports of rubber manufactures, over $2,000,000, and automobile engines, $670,000, making a total for the 10 months of practically $22,000,000. These figures do not include the 900 machines sent to the non-contiguous territory, valued at about $1,500,000.

Although France formerly led the world in the exportation of automobiles, the United States now surpasses that and all other countries in rapidity of growth of production and exportation. As an example of this growth it is noted that the American exports increased from $5,000,000 in the calendar year 1908, to nearly $20,000,000 in 1911; while in the same period those of France increased from $24,600,000 to $31,700,000; United Kingdom, from $7,600,000 to $15,000,000; Germany, from $3,000,000 to $11,000,000, and Italy, from $5,500,000 to $6,100,000. Thus in the brief three-year period there was an absolute gain of 300 per cent. in exports from the United States; over 100 per cent. in the United Kingdom; 266 per cent. in Germany, and slightly more than 10 per cent in Italy.



Fleet of Garford Taxicabs, Made by the Garford Company, Elyria, O., in Service with the Frank Parmalee Company, Chicago.

GARFORD TAXICABS SUCCESSFUL.

An accompanying illustration presents a part of the fleet of Garford taxicabs, made by the Garford Company, Elyria, O., in service with the Frank Parmalee Company of Chicago. These cars have given excellent satisfaction as is evidenced by the fact that the company has placed orders for 60 vehicles of the same type during the past year.

The Parmalee concern was induced to give the Garfords a trial under decidedly unusual circumstances. It was noted that competitors in the city were purchasing second hand Garford touring cars, on which they were fitting taxicab bodies. These reconstructed vehicles were watched carefully, and as they seemed to be working well, it was decided to employ specially constructed taxicabs of the same make.

A lover of horses all his life, President Joseph Gibbons of the Road Drivers' Association of New York, the largest organization of its kind in the country, has taken up motoring and in the future will divide his time between his stable of fast horses and a five-passenger Maxwell, built by the Maxwell-Briscoe Motor Company of Tarrytown, N. Y.

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For the first time in the history of American aviation, at least, a surgeon answered a call for his services by the aerial route, June 10, when Dr. P. L. Alden of Hammondsport, N. Y., finished his trip to the home of E. A. Petrie of Urbana in a Curtiss hydraeroplane, driven by Hugh Robinson. The young son of Mr. Petrie fell down a stone stairway and fractured his skull, and Dr. Alden was summoned by telephone. On the way, his automobile broke down, and the doctor hailed Robinson, who was testing one of the Curtiss machines, explained the necessity for quick work and was carried the remainder of the distance, about 10 miles, which was covered in exactly six minutes.

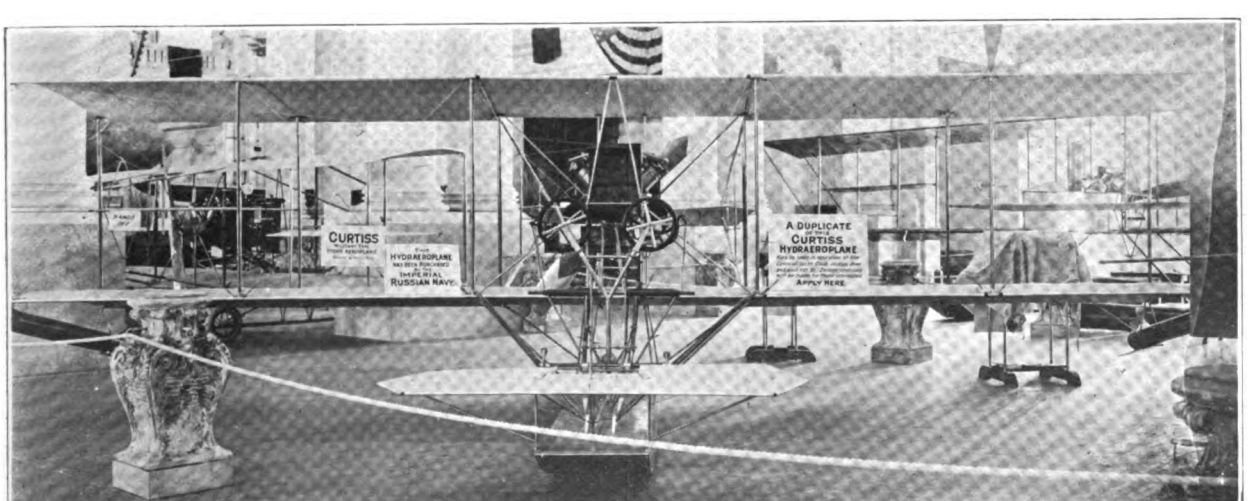
Although one of the world's foremost constructors of aeroplanes, and an inventor of aeroplane attachments of merit, W. Starling Burgess did not secure his pilot's license from the Aero Club of America until this month. Burgess had flown numerous machines, but did not consider it of sufficient importance to try for the license previously.

Plans are progressing most favorably for the great American circuit race, to be conducted by the Aero Club of Illinois and associated clubs during the international meet in Chicago in September. It is announced that arrangements have been made to accommodate 60 foreign and American aviators during this meet, and it is anticipated that most of these will take part in the circuit event. The tentative route is as follows:

Chicago to Cedar Rapids, Ia., 200 miles; Cedar Rapids to Des Moines, Ia., 120; Des Moines to Omaha, Neb., 100; Omaha to Lincoln, Neb., 60; Lincoln to Kansas City, Mo., 160; Kansas City to Jefferson City, Mo., 125; Jefferson City to St. Louis, Mo., 100; St. Louis to Charleston, Ill., 125; Charleston to Indianapolis, Ind., 100; Indianapolis to Cincinnati, O., 100; Cincinnati to Columbus, O., 90; Columbus to Akron and Cleveland, O., 130; Cleveland to Toledo, O., 100; Toledo to Detroit, Mich., 60; Detroit to Chicago, 220.

This gives a total of 1810 miles, which is nearly 700 miles longer than the European circuit of 1911. A grand prize of $25,000 and second and third prizes of substantial amounts, are expected to attract a number of foreign machines and men, who might not be induced to come to America were the race for the International cup the sole incentive.

An accompanying illustration presents the Curtiss hydraeroplane recently sold to the Russian government, this being a duplicate of a number which have been shipped abroad by the Curtiss Aeroplane Company, Hammondsport, N. Y. Louis Paulhan of France,



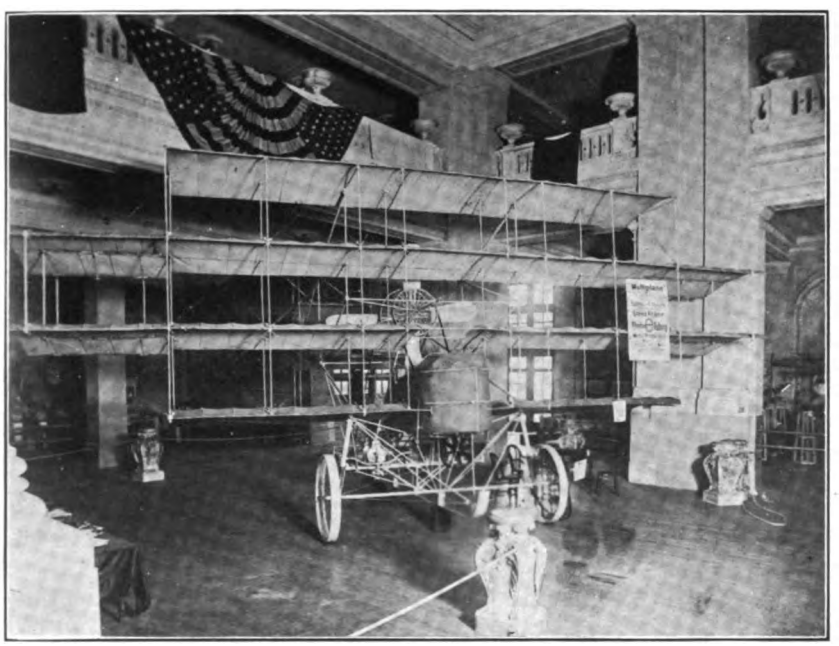
Curtiss Hydraeroplane, Sold to the Imperial Russian Government, on Display at the Recent Exhibition in New York City.

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who has the Continental agency, has been decidedly active in introducing the American product. Among the experienced aviators he has secured to assist him is Eugene Bara, who has been flying Henri Farman biplanes for some time.

Both Paulhan and Bara will be entered in the competition of the Swiss Aero Club on Lake Geneva in August, when the contest for the hydraeroplane championship of Europe will be held. It is expected that this meet will take place Aug. 31, Sept. 1 and 2.

Although it is nearly two years since Edwin Gould announced a prize of $15,000 for the most perfect and practical heavier-than-air flying machine, designed and demonstrated in this country, and equipped with two or more complete power plants (separate motors and propellers) so connected that any power plant may be operated independently, or that they may be used together, it is announced that the contest to determine the winner will be held over one of the flying fields in the vicinity of New York City, July 4. Entries closed June 1, and the Scientific American, which has charge of the arrangements, has announced the list as follows:



Jacobs-Emerson Multiplane, a Novel Creation Constructed and Flown in Atchison, Kan.

Alleas Aeroplane Company, Boston, biplane; Howard Gill, Boston, biplane; H. Curtis, Manchester, Mass., Burgess biplane; Boland Aeroplane & Motor Company, Rahway, N. J., biplane; Edward J. Elsas, Kansas City, Mo., biplane; H. W. Mattoni, 217 West 120th street, New York City, multiplane; Macleod Multiplane Company, Richmond, Staten Island, N. Y., multiplane; Charles H. Burleigh, South Brunswick, Me., multiplane; George W. Beatty, Mineola, N. Y., biplane; Grover Cleveland Loening, on behalf of the Queen Aeroplane Company, Fort George, New York City, monoplane; John P. Conkling, 125 East 23rd street, New York City, biplane.

The third annual Boston aviation meet will be held at Atlantic flying field, Squantum, Mass., June 29-July 7, under the management of W. A. P. Willard. Already some 15 aviators, including Lincoln Beachey, Hugh Robinson, Frank Coffyn, William Hoff, Charles F. Walsh, Charles Witmer, Beckwith Havens and George W. Beatty have entered for the meet.

Among the machines displayed at the recent show in New York City, none attracted more attention than the Jacobs-Emerson multiplane, made by Multiplane, Ltd., Atchison, Kan. This craft is constructed under patents issued to H. W. Jacobs and R. Emerson, both of whom are well known engineers in railroad transportation. It is said to have been flown with splendid success near Atchison.

The machine is of the headless type, having four main planes in front and four tail planes in the rear, with an elevator immediately behind. The propellers, of which there are two mounted on the same axis, are placed midway between the main planes and are driven by leather covered, flat steel belts from two eight-cylinder, 80 horsepower, air-cooled motors of the V type.

Owing to its large surface the assembly is designed for weight carrying, and for that reason is provided with a large cabin having a double row of seats, capable of holding five persons comfortably. Particular emphasis is laid upon the fact that the craft is to be regarded as non-capsizing and self-righting in action. To demonstrate this feature, a quarter-size model was loaded to its proportionate capacity and carried aloft by a balloon. It was dropped edgewise from an altitude of approximately one-third of a mile and glided gently to earth with practically no shock or damage.

The landing chassis consists of one long centre skid, having two large 48-inch wheels in front and a single swivelling wheel in the rear. Contrary to the usual practise these wheels are not fitted with pneumatic tires, but instead have a broad, flat strip steel rim. Landing shocks are taken care of by spring and pneumatic plungers.

The control consists of a wheel mounted on a vertical column, which operates to the ailerons by a rotating motion. Fore and aft movement actuates the elevator. The vertical rudder is moved by twisting the whole column, wheel and all, around its axis.

The construction throughout is of a special type of steel tubing, known as Theta, this being in sec-

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tional form, held together by a very strong and rapidly assembled steel joint. The spread is 37 feet, the length 29 feet eight inches and height 17 feet.

The problem of flying without power is far from being solved. The official contest for the $2000 prize offered in France was to have been held in Paris, June 2. Several entrants were on hand at the appointed time, but none of them was able to leave the ground. In order to capture the prize it was necessary to make a flight of at least 33 feet.

After flying in a Burgess hydraeroplane Rear Admiral Bradley A. Fiske of the United States Navy is convinced that the eight battleships of the North Atlantic squadron should be equipped with 12 aeroplanes each. He declares that the machines would be of great service in time of war, not only as scouts but as a means of destroying the unprotected shipping of the enemy and thus crippling its foreign trade.

Flying a Curtiss hydraeroplane, Glen L. Martin secured a new world's altitude record for this type of craft over Balboa Island, near Los Angeles, Cal., early in the month. He reached a height of 4400, exceeding the previous mark held by Hugh A. Robinson in a machine of the same make by 800 feet.

Eleven aviators competed in the aeroplane race bebetween Berlin and Vienna, June 9, in which Helmut Hirth, a former automobile racing driver, was the victor. He covered the 330 miles in 6:35:00.

The new Burgess-Curtis army biplane, constructed from specifications furnished by the United States Army, was given its first official trials at Marblehead, Mass., June 8. The machine is equipped with a 70 horsepower Renault engine and with this made a speed of 50 miles an hour. In the tests, the biplane was fitted with hydraeroplane attachment.

The new Thomas biplane, made by Thomas Bros., of Kanoma, N. Y., was given its initial tests near that town early in the month. The machine was fitted with a Kirkham four-cylinder motor of 40 horsepower, and made three flights at an altitude of 500 feet. Charles Niles was at the wheel.

Seven aviators competed in the flying Derby conducted by Claude Grahame-White over an 81-mile circuit around London, England, June 8. T. O. M. Sopwith finished first, his time being 1:22:00. G. Hamel was second, and W. Morrhouse third.

The Aero Club of America is planning a hydraeroplane race from New York to Boston, which is expected to be held some time during the early part of July. The contestants will leave New York City, flying over Long Island sound and around Cape Cod. The full details have not been made public, but it is understood that a total of $10,000 will be offered in prizes.

In the French circuit, covering 683 miles, which started and ended in Angiers, June 17, only one of the seven contestants finished. This was Rolland Garros, who flew the distance in 7:56:00, thereby winning a prize of $10,000.

At the meeting of the Wright Company in New York City, June 18, Orville Wright was elected president to take the place of his late brother, Wilbur Wright. The other officers of the company are: Vice president, Andrew Freeman; secretary and treasurer, Alpheus F. Barnes; directors, the officers and August Belmont, Cornelius Vanderbilt, Russell A. Alger, Theodore P. Shonts, Morton F. Plant, Edward J. Berwind, Pliny W. Williamson and Henry S. Hooker.

In response to a letter from Congressman William G. Sharp, W. Starling Burgess has compiled an estimated cost of equipment and maintenance of a Burgess hydraeroplane, such as might be available for use in aerial mail carrying. These figures are taken from the Aero Club of America's Bulletin, as follows:

First cost of complete hydraeroplane	$5500	
Housing with suitable launching device	1000	
		$6,500
Flying 15,000 miles at two cents a mile	$ 300	
Aviator at $100 a month	1200	
Mechanic at $50 a month	600	
Mechanic's board and incidentals	250	
Engine depreciation, yearly	750	
Aeroplane construction depreciation	800	
Repairs and other expenses	500	
		4,400
Total		$10,900

The new scout dirigible Conte of the French army created a new altitude record for this type of air craft near Paris, June 18, reaching a height of 9025 feet. The previous mark was held by the French army dirigible Clement-Bayard III at 9514, this having been made May 20.

The bureau of manufactures, Department of Commerce and Labor, Washington, D. C., announces that a foreign government will make some extensive purchases of aeroplanes and hydraeroplanes within the near future. The plans contemplate securing at least 30 machines, as a beginning and it is stated that American makes probably would be preferred on the basis of merit. Particular attention should be paid to the matter of carrying power. An appropriation of $515,000 has been made, and eventually the government in question will buy at least 100 machines.

By way of perpetuating the memory of the late Wilbur Wright, who made some of his first flights over French soil near that city, the municipal council of Mans, France, has voted to name one of its streets after the famous aviator.

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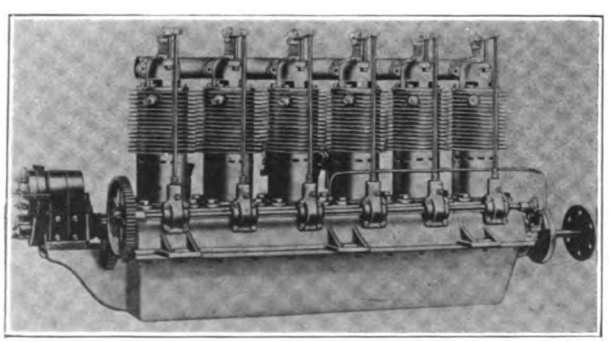
Progress of Aerial Navigation.

Mechanical Details and Features of Construction.

NEW AMERICAN AERIAL MOTORS.

The importance of the power plant in determining the safety of the aeroplane is only just beginning to be appreciated by the American public. Students of aviation abroad have been paying rather more attention to this problem, however, as is evidenced by the fact that the revolving Gnome, the Renault, the Anzani, and perhaps some few other engines, are almost as well known in America as the machines to which these are fitted.

There has been a feeling that the design of the aeroplane, whether it be a monoplane, biplane or other type, was of prime importance in the matter of



Six-Cylinder Gray Eagle Aeroplane Engine.

safety. It is by no means certain that this is not true, but one result of recent accidents has been to raise the question as to what extent the reliability of the power plant may be held responsible. Failure of the engine at an inopportune moment may have the effect of counteracting other safeguards incorporated in the construction of the machine itself.

It follows that considerable more attention will be paid to this feature in the future, and for this reason it will prove of interest to consider some of the motors which have made their appearance in the American market recently. No attempt is made herein to illustrate or describe all of the new engines which have been offered for aviation purposes, it being believed that the subject is of sufficient importance to merit a more thorough consideration than would be possible under such an arrangement.

SIX-CYLINDER GRAY EAGLE.

R. O. Rubel, Jr., & Co., of Louisville, Ky., is producing the six-cylinder, four-cycle, 50 horsepower Gray Eagle motor, which has been designed as a moderate priced aviation power plant. The engine has been tested out under all conditions, the company having invited amateur and professional aviators to visit its flying school, there to make such use of the motors as they may desire, free of charge, the object being to bring the product to the attention of the public and to give it practical working tests.

One of two very prominent features are claimed for this engine. Perhaps the most important is the matter of cooling. It is described as an air-cooled unit, although it is pointed out that the lubricating system is so devised as to aid materially in this work. The oil is pumped from the reservoir into the crankcase at the rate of three gallons a minute, and the construction of the concentric valve system is such that both valves form a sliding sleeve, the intake working within the exhaust, which is located directly in the cylinder head. These valves are slightly larger in area than those of water-cooled motors of the same cylinder displacement. This whole construction is with the idea of obtaining efficient cooling.

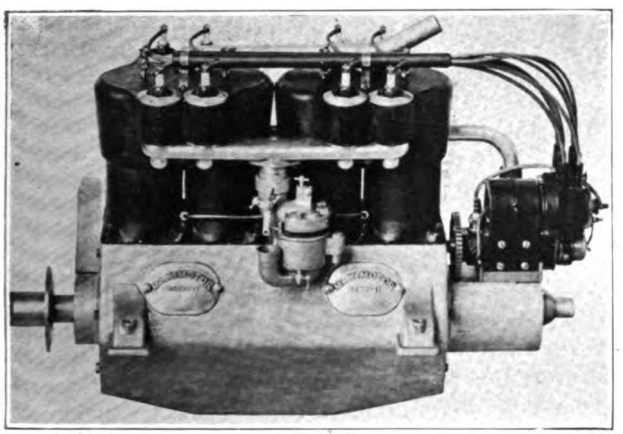
Each cylinder of the Gray Eagle motor is machined from an ingot of semi-steel which weighs 55 pounds in the rough, and when finished it weighs less than 10.5 pounds. The crankshaft is cut from a solid bar of vanadium steel and is mounted on seven large high speed nickel alloy bearings.

A normal speed of 1100 revolutions a minute is claimed by the maker, at which rate a standing thrust of 350 pounds is obtained with a seven-foot diameter propeller of five-foot pitch. The bore and stroke of the cylinders are four by 4.5 inches, and the weight complete, equipped with Bosch magneto, Rayfield carburetor, oiler, plugs and wires, is 260 pounds.

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FOUR-CYLINDER MAXIMOTOR.

The Maximotor Makers, Detroit, has announced a four-cylinder, four-cycle, water-cooled Maximotor,



Inlet Side of 40-50 Horsepower Maximotor.

with bore of 4.5 inches and stroke of five and rated at 50 horsepower. A six-cylinder motor of the same design, rated at 75 horsepower, also is offered. The weight of the former, with radiator, is 238 pounds, and of the latter 340.

The motor has seen extensive use in this country and abroad, having been employed on Wright, Curtiss, Nieuport, Bleriot, Henri Farman and other aeroplanes, and on dirigibles in Japan. Particular attention has been paid to the matter of securing none but the best materials, and every effort has been made to produce an aviation motor which shall be recognized by the airmen of the world. The details of the four and six-cylinder units are the same in the main, and only the former will be described herein.

The cylinders are of the T head type, cast in pairs, with water jackets, valves, valve chambers and guides integral. The material is a semi-steel of very high tensile strength, thoroughly tested chemically and tried out under hydraulic pressure before machining, and again before installation in the engine. A pyramidical form, leaving no line for breakage, is given to the cylinder flange through which bolts are passed to the crankcase. Six .375-inch chrome nickel steel studs hold the cylinders down, with the assistance of hardened nuts and lock washers, and a paper gasket renders them oil tight.

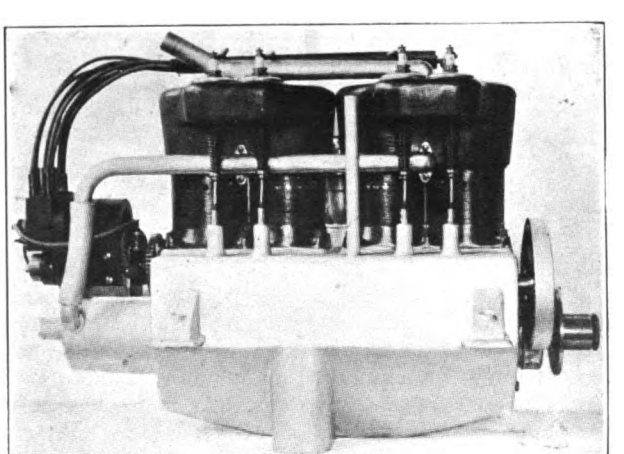
The pistons are of the strong, convex section type, made of a special semi-steel of very fine grain, and are accurately machined inside and out, so that there is no possibility of unequal expansion and loss of power. The wristpin is hollow, and of hardened and ground steel. It is held in place by a large cotter pin. The three eccentric rings on each piston are ground, double-turned and pinned to insure good compression. At the bottom of the piston is a groove, which catches the oil sprayed upon it by the force feed jet and carried up and down to lubricate the cylinder walls.

The crankcase is cast in one piece, with valve lift guides integral, of an easily welded aluminum composition. The centre bearing housing divides the case into two parts. Ribbed reinforcements are added at all points subject to strain. The supporting brackets are of a new type, on the bridge principle, and are so rigid that but four are required. Ample hand holes are provided.

The end plates or crankcase discs act as housings for the crankshaft end ball bearings. The front disc also serves as a housing for the crankshaft timing gear. The rear disc has three additional functions (five in all)—as housing for the magneto driving gear, support for the magneto, and also for the water pump. Each disc is held in place by five bolts, .375 inch, of nickel steel, locked with washer and nut.

The camshaft is made light of special steel tubing. The hardened and ground cams are fastened by taper pins, which are held in place by cotter pins. It is claimed that this arrangement allows of timing by hand with decided accuracy. Maximotor cams are of a rounded section that is very easy on the valve lifts and valves. The camshaft gear is of bronze. The valve tappets are of the mushroom type and are hardened and ground. The ordinary rollers are said to have been found unnecessary.

Lubrication is by the forced feed system. The crankcase with its tapering bottom acts as an ideal oil reservoir, and keeps the lubricant in the centre no matter how the engine may be tipped in flight. At the middle of the crankcase floor, in a little recess, lies the gear driven oil pump, continually working in oil and therefore requiring no priming to start. The pump is actuated by a steel rod reaching up to the camshaft. By loosening the screws on the small base plate to which the pump is attached, it and the rod and gear may be removed.



Exhaust Side of Four-Cylinder Maximotor.

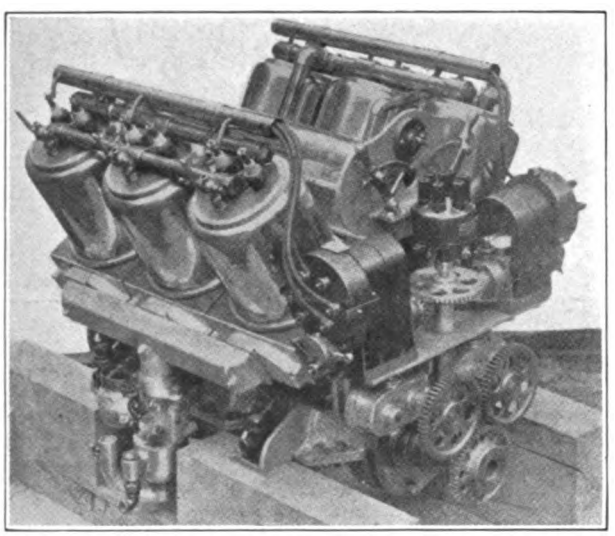
All oil is pumped through pipe to an oil jacket around the gas intake manifold, where it is cooled. It then continues under pressure to points between each pair of cylinders, where in the form of a strong

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jet it strikes the connecting rods, pistons and crankshaft. These parts, revolving at a speed of 20 revolutions a second, catch the oil and send it about in a fine spray that bathes all moving parts.

The oil jacket about the intake is held to be valuable in warming the intake and preventing the carburetor from "freezing" in high altitudes, as well as keeping the lubricant at a temperature which does not allow it to become thin enough to lose its lubricating qualities. The oil jacket is of glass and serves as a sight gauge, so that the aviator can tell at a glance the condition of both the oiling system and the carburetor.

The centrifugal water pump is made of aluminum and is fastened to the rear disc by five steel bolts. It is driven directly from the crankshaft by a special steel dog. The radiator is of a peculiar, patented, square tube type with water running around three sides of every square. In one of these radiators 20



Three-Quarter View of Six-Cylinder R. V. Motor.

inches high the water travels down through cooling passages 60 inches, or five feet.

TWO-CYCLE, SIX-CYLINDER R. V.

The Raymond Engineering Company, Boston, Mass., presents the six-cylinder, two-cycle, water-cooled R. V. motor of the V type, with bore and stroke of five inches, and rated at 75 horsepower. This is made in three models, the sole difference being the materials employed, which affect the weight. The engine is designed for automobile, motor boat and aeroplane service, and as model A is the lightest, weighing 375 pounds complete with dual equipment, it will be described.

While it is admitted that with an engine of the two-cycle type, every second stroke serves a useful purpose, as against every fourth stroke in the four-cycle, certain drawbacks to its use have been recognized by designers. The Raymond Engineering Company claims to have overcome three of the most important of these, i. e., insufficient pressure in the crankcase to force the mixture with required rapidity into the cylinder head; difficulty in preventing the fresh mixture and the burned gases from mixing in the cylinder head with consequent loss of some fresh mixture and retention of some of the burned gases, this condition bringing about a weak mixture, and the expulsion of the burned gases without back pressure.

In the R. V. motor the fresh gases enter from two opposite sides of the cylinder. The bypasses by which they enter are shaped to deflect them horizontally. They are deflected upward at the centre of the piston head; rise in the form of a column; meet an inverted cone in the cylinder head, which causes them to sweep the head of the cylinder; return downward along the cylinder wall, driving the exhaust gases before them; the piston being timed to rise and to close all ports just as the fresh charge reaches the top of the exhaust ports. It is argued that every action of the fresh mixture is directed as if the cylinder were filled with an infinite number of small tubes bent to carry these gases through the exact paths desired. The large exhaust ports allow quick escape of burned gases.

The cylinders are cast singly, the material being semi-steel. Each has two spark plugs, not with the idea of having one in reserve, but for firing simultaneously. These are located where they are thoroughly cleaned by the rushing, sweeping action of the fresh charge, and are not pocketed. When they fire, they do so in the midst of a column of fresh mixture.

The pistons are also of semi-steel, and while each must have its own connecting rod, the placing of the cylinders has been such that but one crankpin is employed for each pair of connecting rods. This not only reduces the length of the crankshaft by one-half, but permits of a smaller diameter on account of this. The shaft is of special nickel steel and is hollow, while the connecting rods are of the same material. The crankcase is of aluminum alloy.

As each crankcase feeds the mixture to two cylinders, the intake system from the carburetor is required to handle but three ports. Owing to the peculiar and distinctive action of the two pistons working closely together, but not exactly together, it is claimed that it is impossible to make the engine run backward accidentally. The cooling system has been designed with great care to give a maximum of cooling water where most needed and not to carry the weight of pockets of dead water where not required. The circulation is by two rotary or gear pumps.

In the accompanying illustration, it will be noted that the cylinders are so mounted that the two Schebler carburetors are located in the centre on either side of the assembly. The two Bosch magnetos are at the front end, and the actuating mechanism is clearly visible. The entire motor is light, strong, simple and compact. In addition to the features mentioned, it is pointed out that there are no valves, valve springs, tappets, cams, camshafts or camshaft gears. Every part is easily accessible.

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NATIONAL CONTEST AND RACING NEWS.

Detailed Plans Concerning Vanderbilt and Grand Prize Events---Revised Results in Recent 500-Mile Contest---Old Orchard Beach Programme---Proposed Meets in Several Cities---Annual Electric Vehicle Run.

Formal application for sanctions for the Vanderbilt Cup and Grand Prize events has been made by the Milwaukee Automobile Dealers' Association, and there now appears to be no reason why the contest board of the American Automobile Association will not take definite action in the near future. With the application comes the announcement that the Vanderbilt Cup and Pabst Trophy races will be held Sept. 17, and the Grand Prize and Wisconsin Trophy events, Sept. 21. Of course these dates are tentative.

The proposed entry blanks have been forwarded to New York, and give the following details: Vanderbilt cup—Distance, 287.925 miles, or 33 laps of an 8.725-mile course; entrance fee, $500 for one car, $800 for two and $1000 for three; limited to cars of 301-600 cubic inches piston displacement. Pabst trophy—Distance, 218.125 miles, or 25 laps; limited to cars of 231-300 inches. Grand Prize — Distance, 401.350 miles, or 46 laps; entrance fees, $1000 for one, $1500 for two and $1700 for three; no limitations. Wisconsin trophy—Distance, 157.05 miles, or 18 laps; limited to cars of 161-230 inches.

The prizes are as follows: Vanderbilt, $3000, $2000, $1000 and $500; Pabst, $1000, $500, $250 and $125; Grand Prize, $3000, $2000, $1000 and $500; Wisconsin, $1000, $500, $250 and $125.

REVISED INDIANAPOLIS FIGURES.

The revised figures concerning the 500-mile race on the Indianapolis speedway, Memorial Day, do not affect the final standing of the contestants, although there is a slight variation in the time made by some of them. While Ralph De Palma and his Mercedes claim to have exceeded certain records during the race, Joseph Dawson and the winning National hold that no records are recognized unless the car making them finishes the contest. Inasmuch as Dawson also exceeded all previous marks for these distances it is expected by the National Motor Vehicle Company that its machine eventually will be awarded these records by the contest board of the American Automobile Association. As revised the time of the various contestants in 100-mile periods was as shown in the accompanying tabulation. It will be noted that in this revised list Mulford's Knox is credited with having finished the race, although in the original report it was announced that this contestant was flagged.

REVISED TIME OF CONTESTANTS IN 500-MILE RACE.

Car and Driver	Miles— 100	200	300	400	500
National, Dawson	1:14:24	2:30:59	3:48:50	5:04:14	6:21:06
Fiat, Tetzlaff	1:13:37	2:25:59	3:52:02	5:13:32	6:29:25
Mercer, Hughes	1:16:17	2:32:48	3:55:24	5:16:37	6:33:09
Stutz, Merz	1:17:37	2:36:53	3:56:22	5:18:14	6:34:40
Schacht, Endicott	1:20:39	2:43:40	4:03:22	5:26:29	6:46:28
Stutz, Zengel	1:20:02	2:40:35	4:05:21	5:29:04	6:48:31
White, Jenkins	1:21:25	2:42:41	4:06:36	5:27:15	6:52:38
Lozier, Horan	1:17:20	2:37:25	4:02:47	5:31:52	6:59:38
National, Wilcox	1:44:31	3:02:17	4:22:41	5:50:32	7:11:30
Knox, Mulford	1:19:15	2:46:33	5:24:48	6:59:20	8:53:50
Mercedes, De Palma	1:13:01	2:24:47	3:43:21	4:56:34	198 laps
Cutting, Burman	1:17:42	2:34:43	3:52:40	156 laps	
Simplex, Dingley	1:19:18	3:05:12	115 laps		
Lozier, Matson	1:23:00	2:54:46	107 laps		
Mercedes, Wishart	1:15:27	2:33:26	92 laps		
Stutz, Anderson	1:18:10	79 laps			
Marquette-Buick, Liesaw	1:20:35	71 laps			
Case, Disbrow	1:33:59	67 laps			
McFarlan, Marquette	1:18:25	63 laps			
Case, Hearne	1:28:01	54 laps			
Firestone-Columbus, Frayer	1:16:45	44 laps			
National, Bruce-Brown	25 laps				
Lexington, Knight	7 laps				
Opel, Ormsby	6 laps				

FOUR-STATES TOUR.

The officers of the Indiana Automobile Manufacturers' Association have approved the route for the Four-States tour which will be held July 9-24, there being only a few slight modifications from the itinerary previously published. The route book was prepared by W. D. Edenburn of the Remy Electric Company, Anderson, Ind., chairman of the publicity committee, and embodies suggestions to tourists, rules of the contest, and a list of the names of the entrants. This tour will cover 1283.9 miles through Ohio, West Virginia, and Kentucky, as well as nearly 300 miles in the Hoosier State. The route was laid out by Clarence LeMar in a Great Western machine which will also act as the pilot car during the tour. The new Henderson car, the popular priced product of

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the Henderson Motor Car Company of Indianapolis, Ind., was the first to present an application blank and will thus be entitled to the No. 1. The object of the tour is to advertise the cars built in the Hoosier State.

DETAILED RESULTS AT SALEM.

Although announcement was made in the last issue of The Automobile Journal concerning the winners in race meet at Rockingham park, Salem, N. H., June 8, time did not permit of presenting the details of the various contests. While the principal event of the day, so far as distance was concerned, was the 50-mile race won by Le Cain in a Stutz, much interest centred in the special match race won by Harry F. Grant in a Berkshire. The detailed summary follows:

Five Miles, 301-450 Inches.

Car Driver	Time
Buick, Jessup	5:37.4
Stutz, Le Cain	.....
Berkshire, Grant	.....

Five Miles, Amateurs, Match.

Thomas, Kingsley	5:51.0
Bianchi, Slater	.....
Buick, Bigelow	.....

Ten Miles, Free-for-All, Handicap.

Lexington, Esleek	13:22.4
Hudson, Willis	.....
Chadwick, Hersey	.....

Twenty Miles, Special, Match.

Berkshire, Grant	25:12.8
Jackson, Cobe	.....

Fifty Miles, 301-600 Inches.

Stutz, Le Cain	54:20.2
Berkshire, Grant	.....

TWO-DAY CHICAGO MATCH.

The first inter-club race between the Chicago Motor Club and the Illinois Athletic Club was held June 6-7, the former winning by a score of 34 to 70, in the matter of penalization. The route covered about 200 miles, extending from Chicago to La Salle, Ill., and return. One car was withdrawn on either side, the following machines finishing with perfect scores: Chicago Motor Club—Sinsabaugh, Velie; Stalnaker, Premier; Van Sicklen, Apperson; Hirschl, Pierce-Arrow; Lee, K-R-I-T; Zimmerman, Stutz; Simmons, Hupmobile; Breakstone, Midland; Gaidzik, White; Choate, KisselKar; Deagon, Pierce-Arrow. Illinois Athletic Club—Lewin, Chadwick; Iverson, Apperson; Cooney, Winton; Ganshue, Bergdoll; Knab, Pierce-Arrow; Stein, Winton; Wolf, Locomobile; Wilson, Cadillac; Canton, Overland; Bersbach, Mitchell.

ENTRIES FOR TACOMA.

Although the entry list of the races in Tacoma, Wash., July 5-6, under the auspices of the Tacoma Automobile Club and Tacoma Carnival Association, do not close until July 1, 10 cars have been entered to date. The first of these was the Mercer, driven to third place in the recent 500-mile race by Hugh Hughes. A second car of the same make will be represented, although the driver has not been named as yet. Among the other cars and drivers are Earl Devore in a National and Earl Cooper in a Stutz.

Four events are planned for the two days. July 5 there will be three races as follows: One hundred miles, for cars of 230 inches; 150 miles, for cars of 231-300, and 200 miles, for cars of 301-450 inches. The first two will be run simultaneously over a five-mile course. July 6, the 250-mile free-for-all event will be held for the Montamarathon trophy. Prizes totalling $10,000 are offered for the four contests.

OVERLAND WINS ABROAD.

In a recent contest in Austria, an Overland car, made by the Willys-Overland Company, Toledo, O., in competition with 60 other machines of American and foreign manufacture, made the best time between Vienna and Abbazia, a distance of 528 kilometers. Besides winning first prize the Overland was awarded 53 points for condition, style of body, mechanical perfection of motor, and comfort.

QUAKER CITY MEET.

Robert Burman, driving an Ohio car, took the Remy grand brassard at the opening meet of the season on the Belmont track, Philadelphia, June 8. Later, he reduced the mile track record, driving the "Blitzen" Benz the distance in 0:54.26. The summary of the meet follows:

Ten Miles, 161-230 Inches.

Car Driver	Time
Buick, Bauer	11:34.08
Flanders, Duval	.....
Empire, Smith,	.....

Six Miles, Special.

Mercer, Thebaud	6:28.58
Kline-Kar, Menker	.....

Five Miles, 301-450 Inches.

Kline-Kar, Menker	5:09.99
Stutz, Blockson	.....
G. J. G., Thebaud	.....

Ten Miles, 451-600 Inches.

Cutting, Burman	10:15.14
American, Earle	.....

Five Miles, Special.

Lion, David	7:24.37
Otto, Ervin	.....

Twenty-Five Miles, 231-450 Inches.

Cutting, Burman	25:53.42
American, Earle	.....
Ohio, Raimey	.....

Three Miles, Free-for-All, (Remy Grand Brassard.)

Ohio, Burman	3:15.91
Mercedes, Meneghetti	.....

Five Miles, Free-for-All, Handicap.

Mercer, Thebaud	5:10.56
Buick, Bauer	.....
Kline-Kar, Menker	.....

PROGRAMME FOR OLD ORCHARD.

The Old Orchard Automobile Association, Old Orchard, Me., has arranged an attractive programme for the three-day beach meet, to be held in connection with the old home week celebration, July 4-6. En-

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tries do not close until June 29, and at the present writing the management has declined to make public any of the cars listed to appear. The programme follows:

July 4—Time trials, flying start, prize of $100; five miles, 161-230 inches, $75 and $25; 10 miles, 301-450 inches, $75 and $25; five miles, 301-450 inches, $75 and $25; 10 miles, 600 inches, $100 and $50; five miles, 301 inches, $75, $50 and $25; 100 miles, special event, three races at one time, 301-450, 451-600 and over 600 inches, $300, $150, $50 and $25.

July 5—Five miles, free-for-all, $100 and $50; 50 miles, 301 inches, $125, $75 and $25; five miles, 161-230 inches, $75 and $25; five miles, 301-450 inches, $75 and $25; 100 miles, over 301 inches, $200, $100 and $25.

July 6—Ten miles, 231-300 inches, $75 and $25; five miles, 451-600 inches, $75 and $50; 25 miles, special, two races at the same time, 161-230 and 231-300 inches, $100 and $25; 10 miles, free-for-all, $100, $50 and $25; 100 miles, special, three races at the same time, 301-450, 451-600 and over 600 inches, $300, $150, $50 and $25.

The course, which had its initial test last year, is one of the fastest in the country. In view of the fact that this year's meet is to be held in connection with a national holiday, it is anticipated that a large attendance will be present from all over New England and the East. The results in 1911 were such as to indicate that some of the best racing of the season will be seen. Several well known cars and drivers are expected to compete.

GALVESTON BEACH EVENTS.

Capt. J. W. Munn, chairman of the racing committee of the Galveston Automobile Club, Galveston, Tex., has been in the East during the past week in an attempt to secure entries for the annual beach meet in Galveston, Aug. 8-10. He also was a visitor in Indianapolis during the 500-mile race of Memorial Day, and promises to have one of the largest entry lists ever signed for the Texas beach. The Texas State Automobile Association is co-operating with the Galveston club in the enterprise.

ELECTRIC SUBURBAN RUN.

The annual electric vehicle contest of the Electric Auto Club in New York City was held June 15, 14 cars taking part. The route covered 45 miles, including Bronxville, New Rochelle and Pelham Manor. As outlined, there was to have been a secret time schedule, but for some reason this was eliminated. Among those who drove their own cars were Mrs. C. Y. Kenworthy, Miss Alice Pryor, Mrs. Alice E. Waxham, Mrs. Albert Weatherby, Mrs. Harvey Robinson, Mrs. E. E. Schwarzkopf and Mrs. W. R. Christopher. The makes represented were as follows: Anderson Electric Car Company, Detroit, three Detroit electrics; R-C-H Corporation, Detroit, two Hupp-Yeats; Rauch & Lang Carriage Company, Cleveland, O., two Rauch & Langs; Baker Electric Vehicle Company, Cleveland, O., six Bakers, and Flanders Manufacturing Company, Pontiac, Mich., one Flanders.



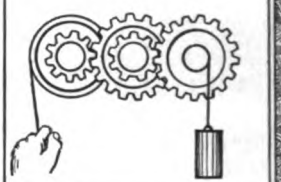
Line-Up in Central Park, New York City, at the Start of Annual Electric Vehicle Run.

WARREN WINS HILL CLIMB.

A Warren, built by the Warren Motor Car Company of Detroit, Mich., was the winner of the third annual Toll House Hill climb, near Fresno, Cal., recently, the event proving one of the most interesting of the kind ever held in central California. The Buick record of last year, 22:48, was lowered by three cars, the Warren leading, the time being 22:30. A Buick, built by the Buick Motor Car Company, Flint, Mich., was second in 22:32, and a second Buick was third in 22:36.5. The cars were compelled to cover a distance of 7.5 miles and negotiate a grade of over 40 per cent.

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RECENT MOTOR VEHICLE PATENTS



Swern Self-Starter.

Among the recent patents granted for starting devices for attachment to internal combustion motors is that of Ernest V. Swern, Denver, Col., assignor of one-fourth to John H. East of the same city. The self-starter is manually operated by pedal located in a position convenient to the driver and depressing the pedal actuates a lever which in turn imparts energy to the starter proper which is attached to the front of the motor. The mechanism comprises a sleeve mounted upon the engine shaft and having an external spiral groove, and a clutch member loosely mounted on the sleeve. The clutch has a projection within the spiral groove whereby a rotary movement of the member is converted into a simultaneous movement of the same in one direction with relation to said sleeve, and a spring between the sleeve and a stationary surface opposes its movement in the opposite direction.

Douglas Lamp.

A patent for a motor car lamp has been granted to Harry A. Douglas, Chicago, assignor to the Adams & Westlake Company of the same city. It has an upper and lower section which are united by a set of frame bars, the marginal portions of which are bent to form seat panels and panel engaging shoulders. A set of panels engage these seats and have instanding flanges slidingly engaging the upper shoulders and the margins of the top and bottom sections. Clamping bars bind the panel sections to their seats.

Thompson Anti-Skid Device.

An anti-skid device which resembles in construction the usual tire chain, has been patented by Langdon S. Thompson, Jersey City, N. J. It comprises a series of multiple reversed loop bands arranged around the shoe, connected by intermediate links. The anti-skid members are alternately reversed and the loop members are graduated in size, increasing from the retaining chain to the centre of the tire.

Forney Muffler.

With the authorities of the various cities and towns enforcing the laws against the use of cut-outs, inventors are devoting their efforts to devise a muffler which will reduce back pressure to a minimum as well as be silent in its operation. Samuel W. Forney, Pulaski, Va., has been granted a patent for a muffler which comprises an outer casing having a flanged end and a pipe mounted therein. This tube is enclosed in a second casing and is provided with perforations. Branch pipes are also fitted, these having their inner ends secured in said perforations and their outer extremities connected to the openings of the casing. The burnt gases are broken up by a conoid deflector before entering the mixing chamber.

Schweinert Tire Valve Locking Cap.

Maximilian Charles Schweinert, West Hoboken, N. J., has patented a locking cap for tire valves and the like. A nut is utilized in combination with a swiveled part, these members having a recess formed between them in which is fitted a notched disc, which is adapted to engage one of the parts. A spring is connected with the other and employed to engage with the corrugated disc. The latter rotates with the nut and has an opening any diameter of which equals that of the bore of the nut.

Belew Pneumatic Tire Protector.

Charles A. Belew, San Diego, Cal., has been granted a patent for a pneumatic tire protector which not only is claimed to protect the shoe from contact with sharp stones, etc., but it completely envelops the casing. It conforms to the tread of the tire and completely encloses it. Extensions are provided on either side of the protector and these pass under the rim of the wheel and are secured by means of bolts and locking nuts. The inventor claims that not only is the shoe protected from injury but all dirt and moisture are excluded from the casing.

Bond Fender.

Jayson K. Bond, Milwaukee, Wis., assignor of one-half to Kenneth W. Jacobs of the same city, has been granted a patent for a fender applicable to the motor car. It is secured in a manner similar to those of usual construction and is equipped with a buffer carried by a pair of plunger rods. These extend through eyed brackets and the openings of guide blocks. Coiled springs are interposed between the brackets and the buffer and stops are fitted for limiting the forward movement of the plunger rods.

OTHER PATENTS GONE TO ISSUE.

Wheel Rim, James Ellis Hale, Akron, O., assignor to the Goodyear Tire & Rubber Company, Akron, O. Dual detachable rim having split expansion rings and means for securing same.

Water Cooling System, Russell Huff, Detroit, assignor to the Packard Motor Car Company, Detroit. Comprising water jackets, radiator and a multiplicity of conduits leading from upper and lower sections of cooler to pump and water manifold of cylinders.

Lamp Attachment, George S. Sherman, Great Neck, N. Y. A vehicle lamp bracket in combination with a support

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having a ball and socket bearing and means for swinging said bracket.

Automatic Headlight, George T. Tribe and John M. Bemis, Worcester, Mass. Lamp standard rotably mounted, including hinged plate, a lever plate and a screw plate, as well as means for raising and depressing the lamp to any desired angle.

Resilient Wheel, James R. Wright, Trenton, Mo. A wheel having a hub, a rim comprising a plurality of loosely coupled sections, links arranged at right angles to and offset from centre of hub and connecting the sections, also bowed springs for connecting the adjacent ends of the sections.

Acetylene Generator, Fay H. Young, Rockford Ill. The device has two casings, the inner member being removable and having a transverse partition above its lower end, forming a water reservoir in the upper compartment. The fluid flows between the casings to the carbide which is contained in a removable holder.

Shock Absorber, Charles O. Browne, Norwood, O. Two cylindrical casings telescoping and having a piston in a compression chamber and so designed that the movement of the piston in one direction will draw out the compression cylinder against the vacuum pressure.

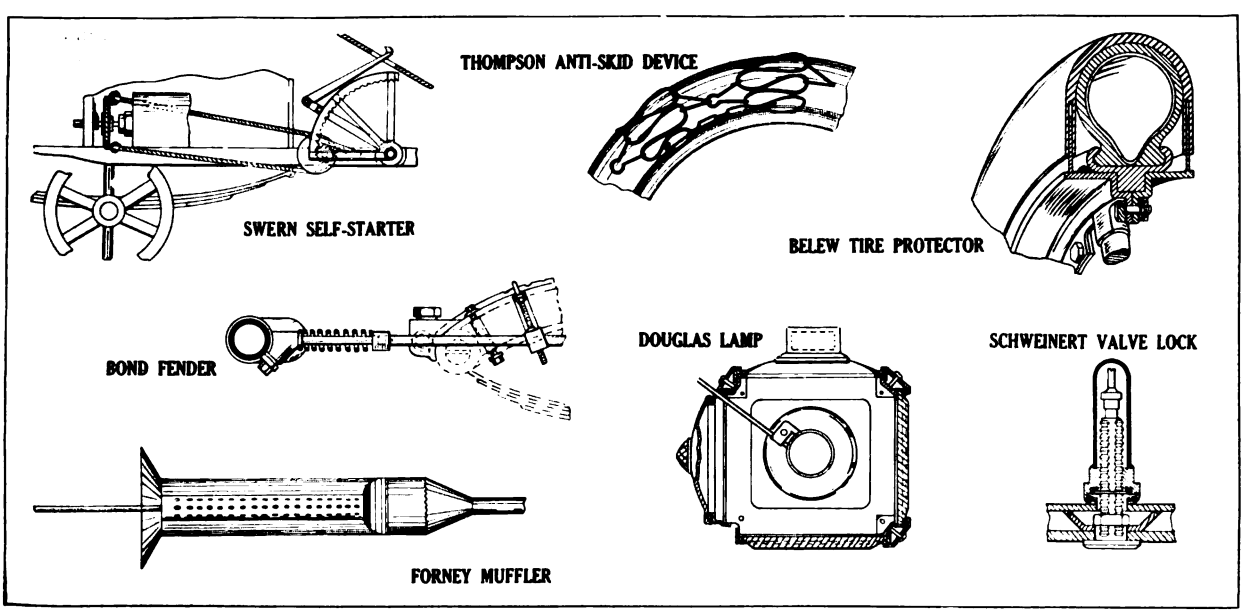
is led to the lower chamber through a tube which is also perforated at a point below the partition. The lower chamber is provided with a petcock for draining off deposits of water and dirt.

Puncture Proof Tire, McRoy De Viese, Fresno, Cal. Two rims are provided, one slidingly mounted within the other and between the members is a pneumatic or resilient tire. A solid tire is utilized on the exterior rim.

Shock Absorber, Horace B. Stanton, Boston. The device comprises a cylinder, a piston rod, a main piston on the latter and two auxiliary pistons at each end of the main piston, and means for the additional members to slide freely through the main piston.

Grip Tread and Mud Shoe, Cortez V. Pugh, St. Louis, Mo., assignor of part to Edward Brockschmidt and others. It comprises a pair of endless chains on opposite sides of the wheel, having a plurality of chain grip treads each of which is provided with a base portion conforming to the tire. These mud shoes have a blade projecting outwardly.

Automobile Heater, Frank W. Dilks, Philadelphia, and Davis Reyam and Eugene E. duPont, Wilmington, Del., said Dilks assignor to said Reyam and said duPont. A casing is utilized to form a heating chamber and is pro-



Some Recent Efforts of Inventors Relating to Devices Applicable to the Motor Car, Including an Anti-Skid Chain, Tire Valve Lock, Tire Protector, Self-Starter and Bumper.

Spark Plug, Charles C. Eldridge and Edwin J. Beebe, Marshalltown, Ia. The main body of the shell of the plug is fitted with two extensions, these being so designed that the space between them and the central electrode may be altered as desired.

Lamp Attachment, Harry A. Lewis, Chicago. A hinged hood attachment for acetylene headlights projecting forward from the upper portion of the light and adapted to intercept the upwardly radiating rays from the source of light.

Wrench, Charles T. Melhorn, Amsbry, Penn. The shank of the wrench is provided with teeth which mesh with a pawl arrangement on the movable jaw of the tool and means are provided for engaging and disengaging the member.

Guy for Tops, Helen M. Ormsby, Xenia, O. An attachment plate is secured to the frame of the car or vehicle and a similar member has a stud adapted to engage with the permanent plate.

Lamp Cover, William T. Phillips, Berkeley, Cal. Flexible covers in sections are pivotally mounted on the support of the lamp and these are so constructed that the sections meet for locking. When the use of the lamp is desired these covers fold compactly and by means of a flap are protected from foreign elements.

Fuel Filter, Joseph Remi Tourangeau, Windsor, Ontario, Can. The device comprises an upper and lower compartment separated by a perforated partition. The fuel

vided with openings for the exhaust pipe, also tubes for air, as well as a hot air outlet and means for detachably connecting same.

Gearing, Joseph Dain, Ottumwa, Ia. A transmission device comprising a pair of discs which engage with a similar member, slidably connected to the crankshaft of the motor and operated by a lever. It is designed to secure a low speed and reverse only.

Automobile Starter, Wilbert B. Speice, Payne, O. A self-starting mechanism for internal combustion motors comprising a clutching device, a spring and two wheels and means for winding said spring and for throwing into and out of engagement the wheel actuating the crankshaft of the motor.

Tire Inflating Apparatus, Mason F. Stolberg, Toledo, O. A device for pumping up a tire by utilizing a friction wheel in contact with the revolving wheel of a motor car, said friction member actuating a plunger pump which is mounted upon a frame carrying the driven member.

Non-Freezing Water Device, Howard S. Campbell, Baltimore, Md., assignor of one-third to Jacob Zill and one-third to Percy Teixaira de Mattos, of the same city. A valve is incorporated in the circulation system of a motor and is fitted with an armature. An electro magnet is in proximity to the armature which is operated by a temperature actuated element. When a predetermined temperature is reached, the device automatically opens the valve and allows the water to drain out of the system.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



The Columbus Convention.

The members of the Columbus Motorcycle Club, Columbus, O., are planning a number of surprises in the matter of entertainment for the visiting delegates at the annual convention of the Federation of American Motorcyclists in that city, July 17-21. Among other things, there is to be a barbecue at Olentangy park, one of the most interesting suburban resorts in that section. Still another feature, but one that is being guarded as a great secret, is to be announced in connection with the gathering at the new motordrome, when the delegates to the convention will be the guests of the city officials.

Four Tourmasters Named.

The tourmasters for the four national tours have been named by President Hamilton as follows: Eastern, assembling at Albany, N. Y., R. S. Morton; southeastern, assembling at Baltimore, Md., J. A. Robinson; western, starting from Chicago, Jesse A. Campbell; southwestern, headquarters in Louisville, Ky., E. G. Baker. Two of these tourmasters have announced their itineraries as below:

Southeastern—July 14, Baltimore to Cumberland, Md., 138 miles; 15, Wheeling, W. Va., 132 miles; 16, Zanesville, O., 72 miles; 17, Columbus, 55 miles.

Western—July 15, Chicago to Fort Wayne, Ind.; 16, Springfield, O.; 17, Columbus.

More Amendments.

Among the proposed constitutional amendments which will come before the convention are the following:

Substitute for sections 1 to 12 of article IV of the constitution, the following: "For convenience of government this federation shall be divided into units comprising individual states, and in addition, as many districts as from time to time may be organized in Alaska, Philippine Islands, Hawaii, Porto Rico, Cuba, Mexico or any other foreign territory. All responsibility for the growth and development of the organization in each of these units shall be borne by a commissioner to be appointed by the national president, said appointment to be approved by the board of directors."

Amend section 1 of article V of the constitution to read: "The officers of the federation shall be a president, a secretary and a treasurer, who shall be elected for a period of one year, and commissioners for each state and foreign district, to be appointed as above provided for. The governing body of the federation shall be six directors, who, together with the two living



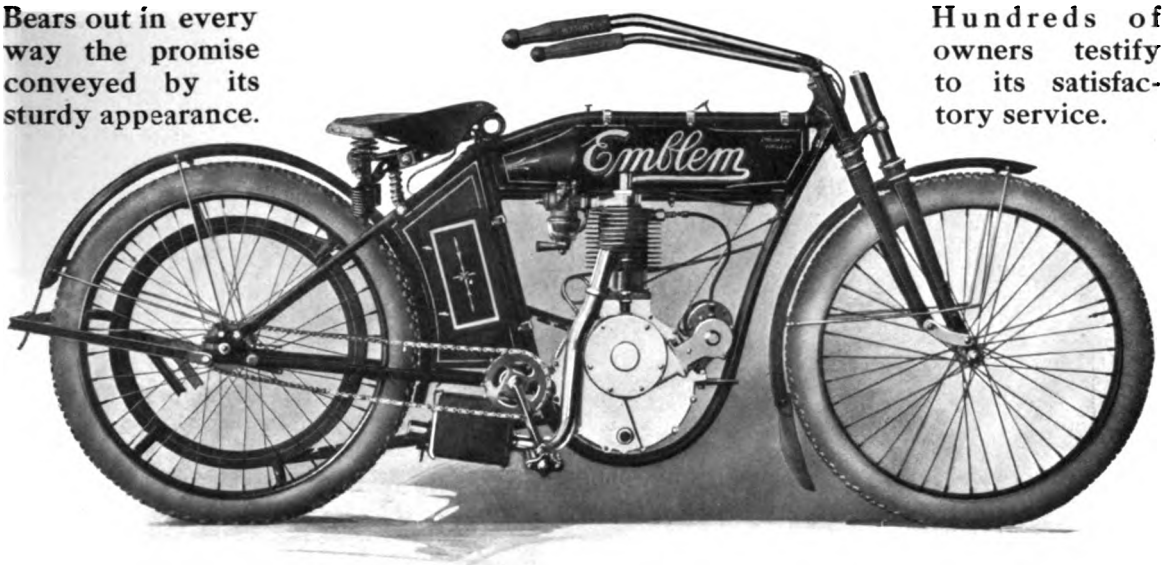
Members of the Rhode Island Motorcycle Company Lined Up for One of Their Regular Sunday Runs from Providence, R. I.

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ANGOLA ERIE COUNTY NEW YORK

preceding ex-presidents and president, shall constitute the board of directors."

Amend section 3 of the same article by striking out the words "the 11 vice presidents, one for each district."

Amend section 1 of article I of the bylaws by striking out "or the district vice presidents." Strike out section 2 of the same article.

Amend section 2 of article III to read: "The annual dues shall be paid to the national secretary," and to amend section 5 of article VIII by substituting for the word "president," the word "national secretary."

The effect of these changes will be to legislate the present district vice presidents out of existence. Still other amendments are to be offered providing for monthly reports of the state commissioners to the national secretary. It is held that the present plan of organization is too unwieldly to produce satisfactory results.

New England District Meeting.

The June meeting of the New England district, F. A. M., has been called for June 29, at the new clubhouse of the Providence Motorcycle Club, Providence, R. I. This is in the Swenson building at the corner of Broad and Blackstone streets, and the event will afford the members of the district a splendid opportunity to view one of the most up-to-date club headquarters in the country. The Providence club has planned a hill climb for the following day, and it is expected that the attendance at the meeting will be largely augmented as a result of this announcement. Of course, the chief business of the session is to nominate a candidate for vice president, although if the proposed amendments succeed at the national convention, it would appear that there will be little need for this action.

The Bosch Trophy.

The amateur motorcycle championships of the United States will be determined at the Columbus meet, in connection with the national convention. Last year, the Bosch Magneto Company, New York City, donated a handsome trophy, which was won by Frank Hart. This is a challenge award, known as the Bosch trophy, and the company now announces the point

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

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system by which it will be awarded this year.

The winner of the one-mile championship will receive four points; the second place man, three, and



Ray Seymour and Percy Powers Riding Tandem on an Indian at Los Angeles.

the third, two. In the two-mile event, the winner will secure six points; second, four, and third, two. Other points will be gained as follows: Five-mile race—First, seven; second, five; third, three. 10-mile—First, eight; second, six; third, four. One-hour—First, 12; second, seven; third, five.

It will be necessary for the winner of the trophy to have competed in all events. In this manner, the man who secures but third place in the one-mile event, for instance, still stands a good chance of winning the trophy.

Mail for Delegates.

As was the plan last year, Secretary-Treasurer G. B. Gibson of Westboro, Mass., will act as chief postmaster for the delegates to the national convention. With Mrs. Gibson, he will be located at Hotel Virginia, on the second floor near the elevator, and all delegates and tourists are invited to send their mail in his care throughout the convention. The fiscal year of the federation will close July 1, at which time the officers will begin to make up their reports.

New Affiliated Clubs.

The following new affiliations are reported by Chairman E. M. Estabrook of the F. A. M. membership committee: Cream City Motorcycle Club, Milwaukee, Wis., 271; E. A. Sochurek, secretary, 764 Windlake avenue, 21 members. Motorcycle Touring Club, Philadelphia, 274; R. K. Hewitt, 1676 North 54th street, 12. Bound Brook Motorcycle Club, Bound Brook, N. J., 275; Dominick Boronio, Main street, 21. Humboldt Motorcycle Club, Chicago, 276; J. J. Peska, 3545 West North avenue, 47. Columbia Motorcycle Club, Columbia, S. C., 278; F. S. Hebenicht, 1101 Taylor street, 15. West Texas Motorcycle Club, Stamford, Tex., 279; E. E. Duke, 23. Austin Motorcycle Club, Chicago, 280; F. G. Sherman, 5502 Iowa street, 29. North Pennsylvania Motorcycle Club, Philadelphia, 281; N. A. Wheatley, 3301 Ridge avenue, 16. Indian Motorcycle Club, Mobile, Ala., 282; Oron Overton, 519 Dauphin street, 32. Union City Motorcycle Club, Union City, 283; Chauncy Beery, Franklin street, 18. Chanute Motorcycle Club, Chanute, Kan., 284; I. D. Meeker, 19 South Wilson street, 15. East Side Motorcycle Club, East St. Louis, Ill., 285; C. H. Heinz, 30. Indian Motorcycle Club, Cincinnati, O., 11; Joseph Thuenker, 433 Main street, 12 (reinstated).

Touring with an Emblem.

The Emblem Manufacturing Company, Angola, N. Y., maker of the Emblem mount, calls attention to the fact that its product is a decided favorite among those who are seeking a reliable machine for long distance touring. An accompanying illustration shows two of these vehicles in the hands of tourists on the road near Dunkirk, N. Y.

Increased Indian Production.

The Hendee Manufacturing Company of Springfield, Mass., maker of the Indian motorcycle, announces that up to June 1, it had shipped a few more than 13,000 machines for 1912, about 90 per cent. more than during the same period last year. The figures run about 65 per cent. twins.

New Track for Newark.

Newark, N. J., is to have a motorcycle track, C. A. Dunlap, for many years connected with the racing game, being one of the principals in the movement. Work on construction has been started, and it is planned to have it finished in time for a series of races, July 4. The increased interest in this branch



Emblem Tourists on the Road Near Dunkirk, N. Y.

of sport is shown from the fact that a new track is being built in Philadelphia, one near Coney Island, and two in the Middle West, at Detroit and Cleveland.

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Manufacturers' Bi-Monthly Meeting.

At a June bi-monthly meeting of the Motorcycle Manufacturers' Association in Toledo, O., steps were taken for a motorcycle exhibition and demonstration at the Panama exposition in 1915. Secretary J. F. Cox was appointed to gather data for presentation at a future meeting. By voting to present trophies to every tourist who checks in on the last morning of the Columbus, O., run, the association showed its interest in the coming big event being arranged by the F. A. M. The manufacturers also voted to donate a trophy for the five-mile motorcycle championship, to be competed for annually at the national meets, the same to become the permanent property of the rider winning it three successive years. This event will be open to all F. A. M. amateurs.

The subject of two national shows at New York and Chicago was discussed, with a view to determining what course would be best to follow regarding independent motorcycle shows. It was decided that under certain conditions it would be best to hold shows concurrently with the automobile manufacturers.

Secretary Cox reported that practically all of the mayors of cities to whom letters had been sent advocating repressive measures against the open muffler had sent in replies promising co-operation. The Triumph Manufacturing Company was admitted to membership. The next meeting will be held in Detroit, Mich., Aug. 7. Those present were:

President A. B. Coffman, Yale; Secretary W. G. Schack, Emblem; J. W. Ash, Merkel; E. J. Knight, Thor; Arthur Davidson, Harley-Davidson; J. F. Cox, Pope; A. J. McCullom, New Era; Edward Buffum, Indian; W. F. Remppis, R-S; Don C. McCord, Flanders; W. A. Johnson, Pierce; H. T. Roberts, manufacturers' agent for motorcycle materials; S. A. Falor of the Goodyear Tire & Rubber Company and Mr. Welch of the United States Tire Company.

New Mount Coming.

Announcement has been made that the Davis Sewing Machine Company of Dayton, O., is to place a motorcycle in the market, and plans are being made for an output of 2500 machines the first year. The model is said to be completed. It is planned to equip the machines with Spacke motors, seven and nine horsepower, two speed. The output will be twins exclusively, chain drive, Troxel saddle, Schebler carburetor. The machines, to which no name has yet been given, will be marketed through dealers.

Cover Lock for Bosch Magneto.

The Bosch Magneto Company, New York City, is equipping its motorcycle magneto with a little device which will be appreciated by riders who have experienced the loss of the breaker box through the retaining spring jarring loose. On some types of mounts the belt is very close to the magneto and when the machine is operating at high speeds, it will vibrate laterally, moving the spring out of position with the result the breaker box cover is sometimes lost.

The new device is simple, consisting of a small ring. The cover, which is shown hanging free from the contact breaker box, fits snugly in the circumference of the casing in the usual manner. The cover is normally held in position by a flat spring which is shown in the illustration pushed to the left of the magneto as it would be if it were loose. The cover and casing are bored to take the ring which is large enough to allow sufficient freedom of movement so as not to interfere with the manipulation required for adjusting the contact points, etc.



Bosch Protecting Ring Device.

Wichita's Endurance Run.

A 168-mile endurance run was recently held by the Wichita Motorcycle Club of Wichita, Kan. Rules governing the run made almost perfect riding and machine work necessary, six riders, G. E. Woodwell, John Bronson, James Trimmel, Frank Honer, Wells Bennet and W. T. Cunningham receiving gold medals

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for perfect scores. There were three classes, private owners, trade riders and professionals. G. E. Woodwell was first among the private owners, John Bronson of the trade riders, and Wells Bennet led the professionals. The schedule was 20 miles an hour.

Merkel's New Addition.

An accompanying illustration shows the officials of the Miami Cycle & Manufacturing Company and invited guests performing the ceremony of breaking ground for the big new addition to the plant in which the Merkel mounts are manufactured. It is anticipated that this will be ready for occupancy in time to take care of the 1913 production. It will afford 55,000 square feet of floor space, and will be four stories in height. In explanation of the picture, it may be stated that the numbers refer to the following individuals: 1, K. R. Jacoby, president and general manager; 2, A. H. Walburg, vice president; 3, H. S. Wise, treasurer; 4, James W. Ash, secretary and manager of sales; 5, F. L. Valiant, advertising and assistant sales manager; 6, F. F. Merkel, chief engineer; 7, C. F. Miller, superintendent; 8, W. D. Andrews, Buffalo distributor, and 9, J. F. Stener, Pacific coaster brake missionary.



Breaking Ground for New Merkel Factory: 1, President Jacoby; 2, Vice President Walburg; 3, Treasurer Wise; 4, Secretary Ash; 5, Advertising Manager Valiant; 6, Chief Engineer Merkel; 7, Superintendent Miller; 8, Buffalo Distributor Andrews; 9, J. F. Stener.

Another Reward Paid.

Treasurer G. B. Gibson of the F. A. M. has just drawn his check for $25 in favor of Deputy Sheriff Chapman of Onondaga county, New York. The latter caused the arrest and conviction of Leslie Lusk for stealing the motorcycle of J. Harry Towne at Baldwinsville, N. Y., April 12. This reward was paid in accordance with the policy of the F. A. M. in such cases.

Boston and Not Providence.

Elsewhere in this issue is an announcement that the June meeting of the New England district, F. A. M., is to be held in Providence, June 29. Since this was written, the meeting was called for Boston, at the rooms of the Boston Motorcycle Club, 206 Massachusetts avenue, for the same evening. The club will hold a hill climbing contest at Arlington on June 29.

Club Notes, Here and There.

A new motorcycle club has been organized at Winona, Minn., with James Jenson, president.

A successful economy test was recently held by the Washington, D. C., Motorcycle Club on the White House ellipse.

The Chicago Motorcycle Club, in co-operation with the automobile organizations in that city, is backing a movement to obtain legislation requiring all motor vehicles to halt when approaching a street car which has stopped to permit passengers to alight or to board.

Two hundred members of the Dayton Motorcycle Club, Dayton, O., are expected to attend its annual banquet, Feb. 1, 1913.

The Maryland Motorcycle Club and the Touring Club of Maryland, together with other motorcycle clubs in Baltimore, recently held their first Sunday run to Annapolis. Fifty riders made the trip.

E. Mitchell Dodson has been elected president of the National Motorcycle Club of Washington, D. C.

The New Jersey Motorcycle Club is planning a lantern parade. President Post has named the following to make the arrangements: Peter Cunningham, Seth Eberhardt, George Riechey, John Beevers, Roy Pascal, Carl Segelbach, A. W. Brown, William Obert and Howard Hill. The club will hold a run from Newark to Asbury Park, July 4.

An excellent programme has been arranged for the races at Pablo Beach, near Jacksonville, Fla., July 4.

Swenson's Building Opened.

The formal opening of the new Swenson building, the Indian Wigwam, at Blackstone, Friendship and Broad streets, Providence, R. I., was held June 15-16. Several riders from all over the East, including a number from New York, Springfield and Boston, were present. The building is owned by B. A. Swenson, Rhode Island agent for Indian mounts, made by the Hendee Manufacturing Company, Springfield, Mass., and is one of the most modern in its appointments. The salesroom and repair shop were both thrown open for inspection, and the guests were liberally entertained by Mr. Swenson.

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PROF. HOSFORD IS MANAGER.

The many friends of Prof. Winthrop C. Hosford, M. E., chief instructor of the Boston Y. M. C. A. automobile school, will be glad to learn of his promotion to become manager of this institution. The school itself enjoys the distinction of being the first of its kind in America, and its reputation has been such as to place it in the very front rank of progressive and effective institutions of this character.



Prof. Winthrop C. Hosford, M. E.

Prof. Hosford has served for several years as chief instructor, and the constant and growing success of the school is attributed largely to the system and methods employed by him. Over 5000 men,—chauffeurs, operators and others connected with the industry in various capacities—can testify to his skill as a teacher and to his genial personality.

Born in New Britain, Conn., Prof. Hosford entered a machine shop at the age of 16. During the next four years he studied machine drawing and designing evenings. He entered the automobile field in 1898, when he became identified with the New England Motor Carriage Company. For the past 14 years he has been connected with the industry continuously in some capacity.

The promotion comes as a fitting tribute to his energy and painstaking efforts on behalf of the school. He is not only a hard worker, but studies constantly, keeping abreast of the improvements and developments of the modern automobile. In his work he is assisted by 16 instructors, all of whom are trained and experienced in their respective branches. In this manner the highest possible standard is maintained at all times.

CORRECTION OF ERROR.

In connection with an illustrated announcement of John H. Kelly's appointment as sales manager of the Republic Rubber Company, maker of Republic tires, in the issue of The Automobile Journal for May 25, the address of the concern was stated as Akron, O., instead of Youngstown, O. There are a large number of tire manufacturers located in Akron, but Youngstown also is a rubber centre of some note, and the Republic Rubber Company has done its full share toward bringing about this result.

JOINS MICHIGAN FORCES.

W. H. Cameron, for four years chief engineer with the Willys-Overland Company, Toledo, O., has accepted a similar position with the Michigan Buggy Company, Kalamazoo, Mich., maker of Michigan cars. Mr. Cameron is well known throughout the entire industry as one of the foremost engineers and designers in America, and the Michigan concern is to be complimented upon securing his services.

He may be regarded as a pioneer in the development of the automobile industry, and brought thereto a splendid practical experience in various lines of higher mechanics, an experience which placed him in a leading rank in the matter of motor car science.

In 1902 he was with the Daimler Automobile Company of Long Island City, N. Y., a concern that was at that time engaged in the production of the American Mercedes. From that position he joined the forces of the Packard Motor Car Company, about the time it was building its Detroit factory. In 1904 he went to the Olds Motor Works in Detroit, and when that plant was removed to Lansing, Mr. Cameron went to Indianapolis to take charge of the automobile work of the Nordyke & Marmon Company. Two years and a half later he became associated with the Gibson Company of Indianapolis, and joined John N. Willys in the manufacture of Overland cars in 1908.

Under Mr. Cameron's guidance the plans for enlarging the production of Michigan cars will be put into effect at once. These plans are the result of the Michigan car's remarkable success in the market during the past three years; in fact, since the first car of this make was duly announced. With the Michigan Buggy Company's large resources, its live, progressive policies and its immense factory facilities, Mr. Cameron has an unexcelled field for his future work.



W. H. Cameron, Chief Engineer, Michigan Buggy Company.

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The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Gotham Sporting Goods Company, New York City; $10,000; to deal in motorcycles, automobile supplies, etc.; incorporators, Benjamin Goodman, Henry Ephriam, Ben Stacy.

The Veitch Motor Manufacturing Company, New York City; $200,000; to manufacture motors, automobiles, motor trucks, etc.; incorporators, James S. Harris, Percival J. McIntosh, Charles H. Toy.

Northern Motor Car Company, Albany, N. Y.; $25,000; incorporators, R. Dudley Cannon, Arthur P. James, J. Somers McClellan.

Robert Stock Auto Spring Wheel Company, New York City; $300,000; incorporators, Robert Stock, Augusta M. Stock, Joseph F. Bokelman.

American Carburetion Company, New York City; $5000; to manufacture carburetors and parts thereof; incorporators, William H. Woolley, Albert G. Hubbell, James F. Bisselle.

The Walden Aeroplane Company, New York City; $10,000; incorporators, Joseph M. Gottesman, Henry W. Walden, Louis Green.

Audubon Auto Service Company New York City; $500; incorporators, Michael P. Caffe, Edmond Huerstel, Julius M. Ferguson.

Kirchner Motor Company, Poughkeepsie, N. Y.; $2500; incorporators, Otto Kirchner, Charles Kirchner, John E. Townsend.

A. B. Manufacturing Company, Poughkeepsie, N. Y.; $200,000; incorporators, Max A. Kotzen, Jacob Lichtenstein, Ralph H. Raphael.

Whiteboro Motor Car & Garage Company, Utica, N. Y.; $1000; incorporators, J. Webster Rogers, Mabelle G. Malsan, Adrian S. Malsan.

Stanley Automobile Company, Louisville, Ky.; $2000; incorporators, E. C. Walker, George H. Laib, W. B. Young.

Auto Repair Company, Savannah, Ga., $10,000; incorporators, Shelby Myrick and others.

C. D. Franke & Co., Charleston, S. C.; $250,000; incorporators, Emil H. Johnz and Julius H. Johnz.

Robinson Automobile Company, Charleston, S. C.; $20,000; incorporators, C. B. Hulet, Walter B. Wilbur, J. T. and V. F. Robinson.

Fiat Motor Car Company, Memphis, Tenn.; $20,000; incorporators, O. C. Fleumer, Nelson E. Taylor, H. O. Bell, J. W. Kirkpatrick and J. E. McCadden.

Newark Auto Truck Manufacturing Company, Newark, N. J.; $500,000; incorporators, L. W. Babbage, H. H. Poole, J. T. Walsh.

Brooks Motor Car Company, Buffalo, N. Y.; $100,000; incorporators, H. G. Rechtsteiner, G. B. North, E. O. Kerr.

Automobile Sales Corporation, Camden, N. J.; $30,000; incorporators, P. L. Neel, J. R. Shoch, H. R. Shoch.

Ohio Motor Car Distributing Company, Chicago, Ill.; $5000; to manufacture and deal in automobiles, motor vehicles, bicycles, etc.; incorporators, Joseph Slotow, Samuel C. Wood, Fred C. Churchill.

A. S. Lee Company, Providence, R. I.; $5000; incorporators, Daniel J. Healy, H. Ladd Walford and G. Otis Washburn.

V. C. Motor Truck Company, Kittery, Me.; $100,000; incorporators, Horace Mitchell, C. E. Smothers, William E. Fisk.

Smith Bros. Garage, Inc.; Melrose, Mass.; $1000; directors, Rufus W. Smith, Rufus W. Smith, Jr. L. A. Smith.

Dunn Flyer Company, Boston, Mass.; $50,000; aerial craft, etc.; directors, Stephen C. Burgoyne, C. D. Woodbury, R. Cushman.

Hubmark Rubber Company, Boston, Mass.; $25,000; to manufacture rubber goods, tires, etc.; incorporators, George H. Mayo, O. W. Smith, W. H. Mayo.

Perfection Aero-Navigation Company, Pittsburg, Penn.; $200,000; incorporators, Dyke Smith, Joseph Sinkovitz, W. L. Mooks.

Everitt Motor Car Company, Wilmington, Del.; $3,000,000; incorporators, Byron F. Everitt, Paul Smith, Harry W. Davis.

WITH THE MANUFACTURER.

The Stevens-Duryea Company, Chicopee Falls, Mass., is erecting a four-story brick and steel building 508 feet long, with frontage of 80 feet on Page boulevard, East Springfield. The quarters are to be used for the body building and painting departments.

H. N. Hovey and T. C. Starret of Detroit have secured the entire stock of the Simplex Motor Car Company, manufacturer of the Amplex car, with headquarters at Mishawaka, Ind., the 30 or more stockholders turning in their stock, rather than stand a pro rata assessment. Mishawaka people are hopeful that the action will save the concern for their town and that it will not be moved to Detroit as it was planned to do at one time. Operations will be continued on a small scale until reorganization. Present plans are to capitalize for $1,000,000.

The Federal Rubber Manufacturing Company of Milwaukee, Wis., is planning a six-story addition to its plant at Cudahy. The building will be 400 by 100 feet, and will give the company double its present capacity. The total floor space now occupied is 170,000 square feet. From a payroll of 38 men last July, when the Cudahy plant was taken over, the Federal company has increased its business, so that now it has a factory force alone of 428 men, which, with the sales force and engineering corps, brings the number nearly to 600.

Pratt, Carter, Sigsbee & Co., of Detroit, motor truck manufacturer, is reported to be arranging for larger factory quarters and will increase its equipment.

The Castle Lamp Company of Amesbury, Mass., maker of automobile lamps, denies the report that it is to remove to Richmond, Ind. H. J. Quinn, general manager of the company, says that no factory site has been purchased there or in any other place.

John A. Graham, at one time superintendent of assembling and testing at the Brightwood Motor & Manufacturing Company of Springfield, Mass., was recently appointed engineer and superintendent of the Westfield Motor Truck Company, Westfield, Mass.

The England Manufacturing Company, maker of metal stampings and automobile accessories, formerly located in Amesbury, Mass., recently removed to Detroit, taking the old factory of the King Motor Car Company at 1559 Jefferson avenue.

The General Aluminum & Brass Castings Company is the name of a new concern which will erect a huge plant at Grand boulevard and St. Aubin avenue, Detroit, to manufacture castings and other parts for the automobile trade. Frank C. Root, who was identified with the Aluminum Castings Company, and capitalists from Detroit and Cleveland, will be identified with the venture.

Matthew B. Morgan, an automobile engineer, who has been with the Chalmers Motor Company of Detroit, Mich., for the past three years, has joined the Marion Motor Car Company force at Indianapolis, Ind. Morgan's ex-

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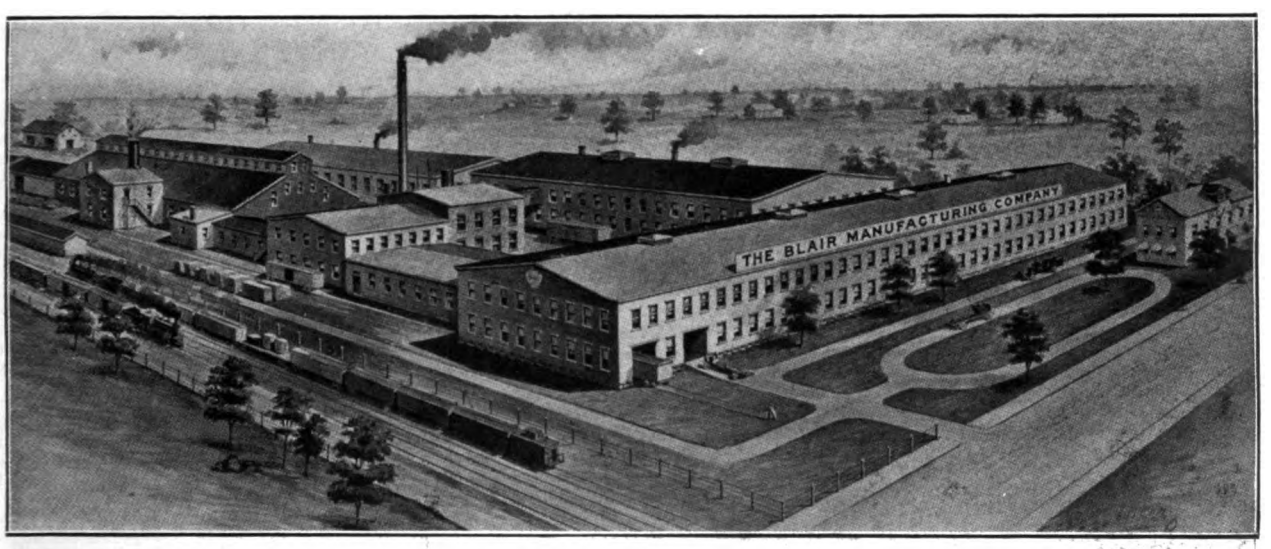
perience, covering a number of years, took him through employment with the Peerless Motor Car Company of Cleveland O., Packard Motor Car Company of Detroit, Mich., and the Olds Motor Works, Lansing, Mich.

J. J. Cole, president of the Cole Motor Car Company of Indianapolis, Ind., for which the G. E. & H. J. Habich Company of Boston is the Massachusetts distributor, and William Colt of the Colt-Stratton Company, New York City, eastern distributor for the Cole, were recent guests of automobile men in Boston. Dinner was served at one of the leading hotels, following which there were interesting addresses by the guests and a number of Boston business men.

The Abbott Motor Company of Detroit, Mich., recently purchased a large plot of land, adjoining its present factory buildings in that city. The work of erecting permanent, finely equipped buildings will be started soon. The move was made necessary by the firm's proposal to increase its output of motor cars 25 per cent. during the current year.

John F. Singleton, for the past six years advertising manager for the Firestone Tire & Rubber Company at Akron O., has organized the John F. Singleton Company and has opened offices in Cleveland, O. The new concern plans to conduct a general advertising agency business.

The Blair Manufacturing Company, Newark, O., maker of the worm driven Blair truck, is now installed in its new factory, a general view of which is shown in an accompanying illustration. The plant is admirably arranged for this work, and is thoroughly equipped in the most up-to-date manner. Every modern manufacturing facility is incorporated for the rapid production of 1.5, 2.5 and 3.5-ton models.



Plant of the Blair Manufacturing Company, Newark, O., in Which the Blair Worm Drive Trucks Are Produced in Three Models.

The Union Motor Truck Company was recently formed in Sunnyvale, Cal., for the purpose of manufacturing and placing on the market commercial vehicles. The officers are: President, C. Y. Williams; vice president, Ernest Horstman; secretary, W. P. Buckingham; treasurer, Edgar Pomeroy. A large amount of new machinery will be purchased.

The Penn Motor Car Company has just completed the removal of its plant from Pittsburg, to Newcastle, Penn. All the machinery from Pittsburg, together with a large amount of new machinery, has been installed, and the company has resumed operations.

The Motor Manufacturing Company of Geneva, N. Y., is removing its plant to Dunkirk, and will occupy a part of the Lux Light plant in the latter city. The firm will employ about 100 men in its new plant.

E. D. Bangs of Milwaukee, Wis., is organizing a stock company for the purpose of manufacturing an elastic rim, perfected by Mr. Bangs, for holding solid tires on automobile wheels. Mr. Bangs announces that it will be at least a month before all the details of the new concern are completed. According to a statement by him the resiliency of the new device can be adjusted to suit any conditions.

Henderson Motor Car Company, Indianapolis, Ind., maker of the Henderson car, which made its initial appearance in Indianapolis on the day of the 500-mile race, has found it necessary to provide for almost twice the original approximated output, and has increased its capitalization from $100,000 to $200,000.

The Dayton Engineering Laboratories Company, Dayton, O., operates two factories, one of which is located in Chicago and the other in Dayton, O. The latter is presented in an illustration herewith. It is in this plant that the Delco self-starting and lighting systems are manufactured, while the ignition equipment is produced in the Chicago plant. The entire building shown is well fitted for the work, being equipped with all of the most modern machinery. A particular feature of the construction lies in the fact that the workmen are supplied with an abundance of light and special attention is paid to the matter of ventilation.

GARAGE AND DEALER.

W. C. Durant recently arranged for the opening of branches of the Chrevolet Motor Company of Detroit, and the Little Motor Car Company of Flint, Mich., at Buffalo, N. Y. A large store has been leased and Joseph F. Rath has been appointed representative for the two companies in the district including Buffalo and surrounding territory.

The Urbana Automobile Company of Urbana, Ill., will erect an addition 100 by 50 feet to its garage. It will be of brick and concrete construction, and will give the company a floor space of 12,000 square feet. The garage is one of the best equipped and most finely appointed in the vicinity

The Seely Auto Sales & Training School of South Bend, Ind., will have new quarters at 232 North Michigan street, which will be among the finest of its kind in Indiana when completed. The basement will be used exclusively for training purposes, while the main floor will be utilized for garage and general salesrooms. Complete storage and recharging apparatus for electric machines will be installed.

Capt. F. W. Cole of the Pan-American Motors Company of San Francisco, Cal., has taken the agency for the Durable Dayton truck, built by the Dayton Auto Truck Company of Dayton, O. His territory will include California, Oregon and Nevada.

S. R. Smith has opened a new garage at 198 Church street, Poughkeepsie, N. Y. The building is a fine brick structure, and is up-to-date in every way. It has the capacity for caring for 80 automobiles.

C. D. Warner has disposed of his automobile business, conducted for a number of years on Arsenal street,

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Watertown, N. Y, to Ralph Wise, Louis Mitchell and Fred Folger. Mr. Warner has had the agency for the Ford car, built by the Ford Motor Company, Detroit, Mich.

T. E. Smith, who has taken the agency for several makes of cars, is having a garage built at Ridgefarm, Ill. The new structure will be modern in every detail and will be strictly fireproof.

The Menard Company has opened a new garage on Division street, Holyoke, Mass. It has a capacity of 30 automobiles, and among the improvements to the building are a concrete floor and the installation of an electric lighting system.

Barney Gilinsky, one of the best known business men in Council Bluffs, Ia., is having erected a pressed brick structure, 65 by 115 feet, one story in height, at the corner of Broadway and Eighth streets, which will be used as a garage and automobile supply and service station. It will be managed by his son, Joseph Gilinsky.

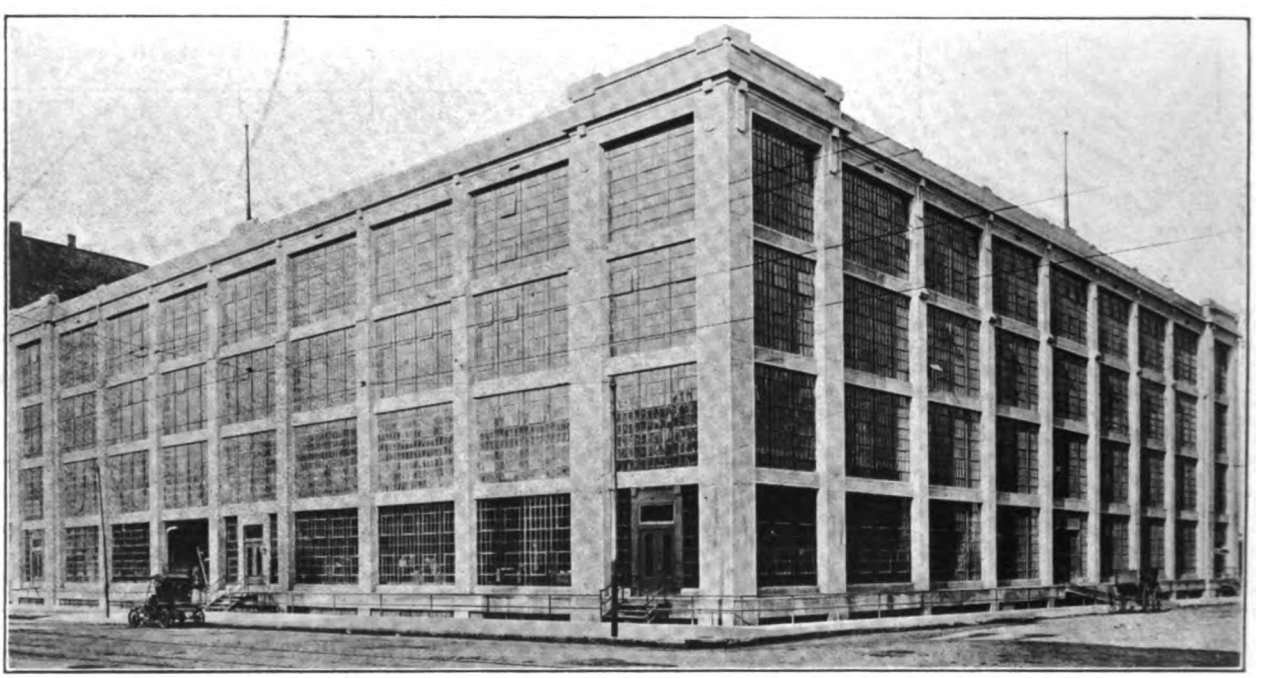
Marion Brown has installed new machinery in his garage at Graniteville, N. Y.

The J. H. Hansen Company is to open a new service station at 225 South St. Joseph street, South Bend, Ind. The building has been entirely remodelled and will be made by the Packard Motor Car Company of Detroit, and has started the erection of a sales service building at Vermont street and Capitol avenue, Indianapolis. The structure will be one of the most complete of its kind in the Middle West.

W. K. Chetwood, who went to Portland, Ore., about a year ago from San Francisco, Cal., to represent the Kelly-Springfield Tire Company of New York City, has opened headquarters in a building at 328 Pine street. Mr. Chetwood is one of the best known men on the Pacific Coast, being familiar with the trade in all the larger cities.

The Sturdy Manufacturing Company of Chicago, maker of the Sturdy spark plug, has granted the Cedar Rapids Sales Company, Cedar Rapids, Ia., the exclusive sales right of its product in the State of Iowa. An office has been opened at Avenue A and Fourth street in the latter city.

The Enterprise Motor Truck Company was recently incorporated in Baltimore, Md. G. H. Nachman of the Enterprise Fuel Company, Hanover and Fayette streets, is one of the principal owners of the new concern. A contract for the erection of a garage at Oak and 20th



Factory of the Dayton Engineering Laboratories Company in Dayton, O., Where the Delco Starting and Lighting Systems Are Made.

used as a show room for the Abbott-Detroit, made by the Abbott Motor Company, 612 Waterloo street, Detroit, and the R-C-H, manufactured by the R-C-H Corporation, Detroit.

Frank E. Block is having an automobile salesroom, 100 by 100 feet, two stories high, erected in Atlanta, Ga. The building will be of mill construction, will have two steam plants for heating and will be lighted by electricity. The cost, it is said, will be $25,000.

F. L. Niell, well known to the automobile trade throughout the State of Pennsylvania, recently purchased the Auto Supply Company's business, conducted by Ross Leonard in Washington, Penn. He will continue the business at its present location, Main street and Highland avenue.

J. S. Fowler of Anderson, S. C., in addition to being one of the largest cotton growers in the United States, and also a big corn raiser, has established the reputation very recently of being the most successful automobile salesman in his state. During the last year he has sold $200,000 worth of machines.

Carl G. Fisher, president of the Indianapolis motor speedway, has taken the agency for the Packard car,

streets has been awarded and the work will be commenced at once.

John S. Bridges has plans under consideration for the erection of a garage at Charles and 35th streets, Baltimore, Md. The building is to be of two stories and will cost $2500. The contract has been awarded to Gladfelter & Chambers.

The Capitol City Auto Company of Hartford, Conn., found it necessary recently to secure larger quarters, and salesrooms have been opened at Allyn and High streets, affording increased floor space for the storing and demonstration of machines.

The Harvard Garage Company has been formed in Boston with a capital stock of $5000. One hundred shares at $50 each have been issued. The directors are: E. F. Blake, John B. Lynch and W. E. Collins.

Commercial Motors Company, with headquarters at 432 E. Broadway, Louisville, Ky., was recently organized with the following officers: President and treasurer, Harry B. Fitch; vice president and manager, R. C. Hurt; secretary, R. E. Scharf. The company will conduct an automobile service station, and is incorporated for $10,000.

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WEED CHAIN DECISION.

Judge Coxe, in the United States court of appeals for the second district, sitting in New York City, handed down a decision June 7, in an action brought by the Weed Chain Tire Grip Company, and others, against the Atlas Chain Company. The case was brought before this court on an appeal by the defendant. It hinges upon the interpretation of the so-called Parsons patent, granted to Harry Parsons, March 24, 1903, for an improved "anti-slipping and anti-puncturing device for the tires of vehicles and like purposes," and employed in Weed chains. The opinion of Judge Coxe is of special interest and is in part as follows:

The device which is the subject of the patent consists of a network of rings, or strips of metal, or a series of small chains, or bands, fitted loosely over the periphery of the wheel or passing from side to side across the tire and prevented from coming off by two rings, hoops, or their equivalent, such rings, or one of them, being provided with means of attachment and detachment. The said rings are smaller in diameter than the periphery of the wheel and cannot come off accidentally. The rough surface provided by the network, chains or the like, will prevent the slipping of the tire on the road and the consequent skidding of the tire.

It is probable that the genius of the inventor will yet devise a more simple and efficient method of preventing the skidding of rubber tired vehicles, but so far as the art has developed, Parsons appears to have been the first to provide means which minimize the greatest danger which confronts the traveller in such vehicles.

The first claim of the patent, which is typical of the other five, is as follows: "Anti-slipping or protecting means for the peripheries of wheels, pulleys or the like, comprising attaching elements at opposite sides of the wheel, and an anti-slipping or protective medium secured to the attaching elements and extending across and around the periphery of the wheel, said parts being disconnected, though retained on the wheel whereby the anti-slipping or protective medium is free to move or shift its position around the periphery thereof."

It is said that the words, "fitting loosely over the periphery of the wheel," in the description and the words, "free to move or shift its position around the periphery thereof," in the claims, require a construction that the cross chains shall be so loose that they must necessarily hang in loops from the supporting wires and be successively laid down upon the ground immediately in front of the tread of the tire. There is nothing in the prior art requiring such a construction, and, if adopted by the court, it will enable any chauffeur who has wit enough to contract the circumferential support so that the cross chains are drawn more tightly across the tire, to evade the patent with impunity. "Loosely" is here used in contradistinction to "tightly" and means that the cross chains must be sufficiently loose to secure the advantages of the invention; viz., to creep and not pound the road as they would do if rigidly fastened to the wheel, when travelling at a high rate of speed.

That the defendant's grip creeps is expressly admitted, as is also the contention that if by use the cross chains become loose so that they are free to move or shift their position around the periphery of the wheel, the device becomes an infringement. It is also clear that the defendant's device may be so adjusted that the chains are held loosely, and if the driver of the car becomes satisfied that the best results can only be attained by a loose adjustment, it is more than probable that he will adopt that method. In other words, the defendant places in the hands of the chauffeur an apparatus which may infringe or not, according to whether it is wound up loosely or tightly. When the defendant sells a device, the natural, usual and preferential use of which constitutes an infringement, it is no answer to assert that it is possible, by limiting its efficiency, to use it innocently.

We cannot avoid the conclusion that the changes made by the defendant are attempts to secure the fruits of Parsons' invention by alterations in non-essential details.

The history of the protracted litigations shows that, with few exceptions, the courts have regarded the Parsons invention as a meritorious one and have given it a construction sufficiently liberal to include all changes of form which accomplish the same result in substantially the same way.

The defendant was practically selling the patented grip in all its essential details, but in addition it provided tension springs with directions to make a tight fitting grip. The springs may or may not be used, and the directions may or may not be followed, but even if they are followed, the same result is obtained, only in a less degree; the circumferential creeping of the cross chains is not so marked.

Believing the invention to be a meritorious one, we decline to limit the claims as practically to invalidate the patent.

TRUFFAULT-HARTFORDS IN RACING.

Special attention is being paid to the matter of accessories fitted to cars taking part in the important racing events this year, and it is of particular interest to note that Truffault-Hartford shock absorbers, made by the Hartford Suspension Company, Jersey City, N. J., were employed on all of the first nine prize winners in the recent 500-mile race on the Indianapolis motor speedway. Dawson's National, which won the first prize, utilized a double set of these shock absorbers, and it is stated that they aided materially in making it possible to maintain an average speed of 78.72 miles an hour. In accordance with its announcement the Hartford Suspension Company has paid the following special prizes as the result of the work done by Truffault-Hartford equipped cars in this event: First, Dawson, National, $250; second, Tetzlaff, Fiat, $150; third, Hughes, Mercer, $100.

DAUGHERTY WITH MICHIGAN.

Following the announcement that W. H. Cameron has been appointed chief engineer of the Michigan Buggy Company, Kalamazoo, Mich., maker of Michigan cars, comes the information that George H. Daugherty, formerly with the Lord & Thomas advertising agency in Chicago, has become advertising manager of the same company. Mr. Daugherty has had 10 years' experience in the advertising field, having been with the Long-Critchfield Corporation, previous to his connection with Lord & Thomas.

R-C-H IN DEMAND ABROAD.

Since the first R-C-H car was shipped from the factory of the R-C-H Corporation, Detroit, a little over six months ago, it has achieved considerable popularity abroad. At present dealers are handling it in 28 different countries, with hundreds of cars in operation. This representation is not confined to any one section of the globe, for the cars are to be seen on every continent and in all the principal countries. All the cars are shipped complete, with the regular bodies, in contrast to much of the export trade in automobiles, which is in the chassis alone, the bodies being built abroad according to foreign ideas.

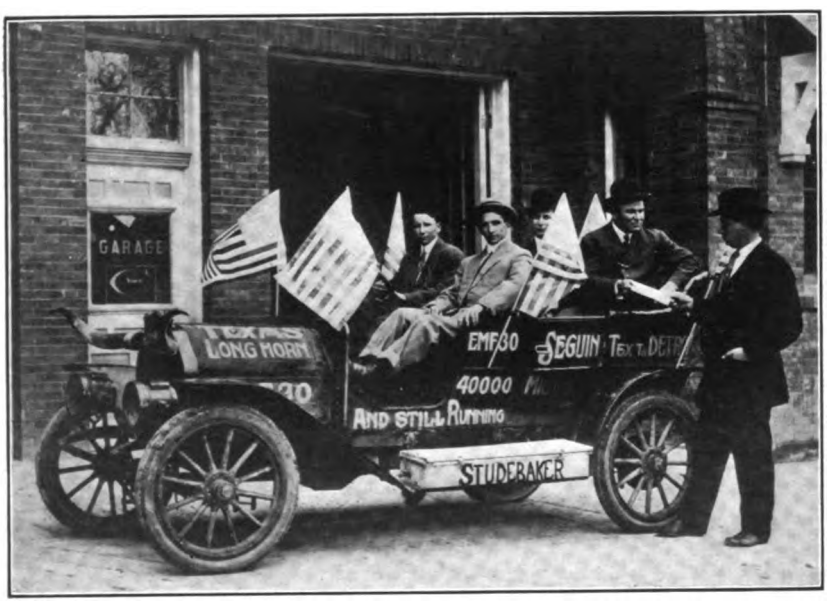
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REPUBLIC TIRES IN CLEVELAND.

To care for its rapidly growing trade in the district, the Republic Rubber Company of Youngstown, O., maker of Republic tires, recently opened a factory branch at 5919 Euclid avenue, Cleveland. The new branch is to be in charge of B. C. Swinehart, who has been situated at the factory for the past 2.5 years, where he has charge of the solid tire department, and who will continue this work in addition to his new duties. He has been closely associated with the rubber business for the past 12 years.

TEXAS LONG HORN E-M-F.

An accompanying illustration presents a 30 horsepower E-M-F, which the owner, C. F. Blumberg of Seguin, Tex., claims to have driven over 40,000 miles during the past three years, as it was about to leave its Texas home for a cross country trip to the Studebaker Corporation's E-M-F factory in Detroit for an overhaul. The car has been renamed the Texas Long Horn, and a pair of such horns is to be noted at the front of the hood. There is a story connected with this.



Texas Long Horn E-M-F, Now on an Overland Trip to the Detroit Factory.

Throughout its career this E-M-F has been the personal car of Mr. Blumberg, whose duties carry him daily on a wide range, and considerable night riding has been necessary. During one of these night trips, the machine collided with a big Texas steer, which had lain down on a shady portion of the trail. The horns were preserved and have decorated the hood ever since.

On the cross country trip, Mr. Blumberg will be accompanied by his two sons, Otto and Charles. The three men are making the trip as a vacation, and because they feel that it is a duty they owe to the car.

CLIMBS MT. HOOD IN REO.

F. W. Vogler of Portland, Ore., exceeded all previous records in a recent test in which he drove a Reo car, made by the Reo Motor Car Company, Lansing, Mich., to the government station near the top of Mt. Hood, 10,000 feet above the sea level. In many places along his trip he passed through snow five feet deep.

COTTON IN AUTOMOBILE INDUSTRY.

If one were to say that the automobile and cotton industries are very closely allied, there are few people who would not have to stop to think before they could determine whether this were so, and still over 1,000,000 bales of cotton are used annually in the manufacture of automobiles. B. C. Spitzley of the Abbott Motor Car Company of Detroit, Mich., has compiled some interesting figures with regard to the use of cotton in connection with the motor vehicle.

"Steel is the only manufactured product that exceeds cotton in importance in this country," he says. "Cotton enters into the manufacture of more articles of commerce than any other commodity except iron and steel and if you were to eliminate the stoppage of spindles and looms it would be but a trifle compared to the paralysis that would visit countless other industries. Motor cars require more than 1,000,000 bales of cotton annually, of which 400,000 bales are used in the manufacture of tires and protectors; 10,000 for stuffing and upholstering while the remainder is used in making auto clothing, slip covers, insulating wires, tool bags, tool rolls, waste and mercerized rain clothing. For simply filtrating automobile lubricating oil alone millions of yards of 40-inch wide ducking is used annually to say nothing of the vast number of cotton or canvas covers made to put over cars."

BUICK WINS TAHOE TROPHY.

The Lake Tahoe Tavern Company's trophy, offered to the first car that would reach Lake Tahoe, Cal., this season, was won recently by a Buick model 35, built by the Buick Motor Company of Flint, Mich. The car was driven by a Mr. Gross of the Howard Automobile Company of San Jose, and contained J. E. Sloan, agent for the Buick car in San Jose and Palo Alto, and Bert Lawton, a mechanic from the service department of the Howard company. Snow was first encountered two miles above Tolles and at a point near the summit, its depth had increased from 12 to 16 inches, at which point it was drifted badly in places.

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EVERITT MOTOR CAR COMPANY.

The various rumors concerning the reorganization of the Metzger Motor Car Company, Detroit, maker of Everitt cars, appear to have been set at rest by the incorporation of the Everitt Motor Car Company, under the laws of Delaware, for $3,000,000, by Byron F. Everitt, Paul Smith and Harry W. Davis. The new concern has taken over the manufacture of the Everitt. It may be mentioned, in passing, that the old company was capitalized for $1,000,000.

As yet no definite plans have been announced. A large number of men formerly connected with the Studebaker Corporation have joined those associated with the Metzger Motor Car Company. B. F. Everitt is president and Paul Smith vice president. The latter formerly was sales manager of the E-M-F and Flanders business of the Studebakers. W. E. Flanders, whose name has been associated with the new concern, is said not to be directly connected with the enterprise. Vice President Smith, who also is sales manager of the Everitt Motor Car Company, makes the following statement:

"No new models are contemplated nor any changes, even the slightest, will be made, either in the mechanical features, prices or in any other way. The advent of the Flanders group in the Everitt company simply means that the capital has been increased from $1,000,000 to $3,000,000, and this means three times the factory capacity and three times the output. In short, it will relieve any condition which has confronted our dealers everywhere and will enable them to meet more nearly the demand for Everitt cars than they have been able to do in the past."

It may be added that a large number of managers of Studebaker branches throughout the country have resigned to follow their superiors into the new venture. Among the other news items in this connection, is that of the promotion of Harry Bill, formerly general manager of the Metzger Motor Car Company, to become general manager of the Tudhope Motor Car Company of Orillia, Can., the Canadian company manufacturing Everitt cars. He has taken with him Joseph Gardham, formerly of the Chalmers plant, as factory manager.

NATIONAL RETIRES FROM RACING.

George M. Dickson, general manager of the National Motor Vehicle Company, Indianapolis, Ind., announces that National cars will not be entered by the factory in any more racing contests during the year 1912. This comes after due consideration on the part of the company, and the officials declare they will need all of their energies to take care of the increased demand for National cars as a result of the consistent winning of these machines during the past few years.

The National now holds the international championship, as a result of winning the 500-mile race at Indianapolis, Memorial Day; the world's stock championship, and several other marks in road racing, hill climbing and speedway events. The announcement with respect to 1912, is stated by the company to have no bearing upon the situation for 1913 or any other year.

AUTOMOBILE CLUB OF AMERICA.

Frederick W. Whitredge of New York was recently elected president of the Automobile Club of America at the annual meeting in New York City. Other officers chosen were: First vice president, Henry Evans; second vice president, Henry R. Taylor; treasurer, Dudley Olcott, 2d; secretary, W. A. Edwards. The following chairmen of committees were named: Executive, Henry Evans; entertainment, Henry R. Taylor; membership, Edward S. Pearson; aviation, James A. Blair, Jr.; contest, William K. Vanderbilt, Jr.; technical, Frederick R. Hutton; law and ordinance, W. W. Miller; good roads, A. R. Shattuck; foreign relations, Dave H. Morris; power boat, Frederick W. Whitredge.

JOHN DREW BUYS HUDSON.

A fine tribute has been paid the American made automobile by John Drew, the actor. After using high priced foreign cars for years, he recently became owner of a self-starting Hudson, made by Hudson Motor Car Company, Detroit. His manager, John Henry Mears, who was an automobile engineer before he entered the theatrical profession, also has purchased a Hudson.

PARKWAY ADDITION OPENED.

Forty miles of beautiful parkway and excellent roads are provided motorists by the formal opening of the Long Island motor parkway, which took place May 31, when William K. Vanderbilt was a host at a function which included a complete inspection from Great Neck Lodge to a section near Lake Ronkonkoma. There is no speed limit on the parkway, and it is claimed to be free from dust. By the time it is finished it is estimated that fully $500,000 will have been spent, as $300,000 has been expended to date.

ORGANIZE IN NEW LONDON.

Given an impetus by the New London Business Men's Association, the Automobile Club of New London, Conn., was formed recently, with the following officers: President, Henry R. Bond, Jr.; secretary, J. P. T. Armstrong, and treasurer, Alexander E. Fournier. One of the commendable objects of the organization will be to urge the building and maintenance of first class roads in and around New London.

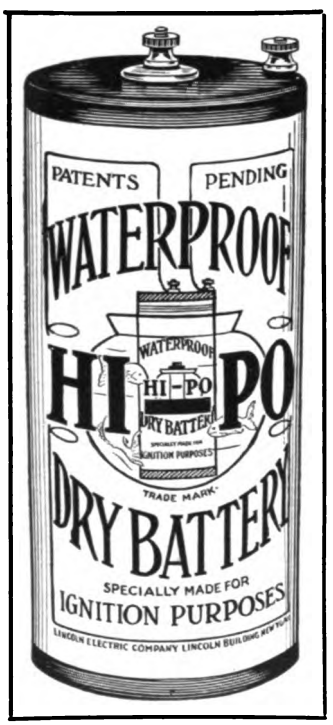
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LOS ANGELES ASSOCIATION ELECTS.

P. H. Greer was recently elected president of the Los Angeles Motor Car Dealers' Association, Los Angeles, Cal., at the annual meeting. The other officers chosen were: Vice president, E. Roger Stearns; treasurer, Bonnie Berges; secretary, Earl Y. Booth. The new board of directors includes the officers and Paul A. Renton, Leon T. Shettler and Clarence Smith. After the election a banquet, complimentary to the retiring officers, was held. The association now has 31 active members, and approximately $3500 in its treasury.

HI-PO WATER PROOF DRY CELLS.

When dry cells are installed properly they give efficient service both for ignition and open circuit work. One of the drawbacks to these members has been their susceptibility to moisture, or water, and when thus exposed their life is considerably shortened. This difficulty has been overcome by the Lincoln Electric Company, 1007 Atlantic avenue, Brooklyn, N. Y., which concern produces a cell known as the Hi-Po and which is stated to be impervious to moisture; in fact, the maker points out that the cells may be left standing in salt water without risk of a short circuit, a feature which will be regarded important in itself. This water proof quality is due to a patent process by which the cell is constructed, and each battery is built up and sealed in an insulated casing. It is also claimed that the Hi-Po is not affected by climatic changes and that it may be utilized on land, sea or air. It is made in three standard sizes, Nos. 6, 7 and 8, respectively, and the dimensions are 2.5 by six, three by seven and 3.5 by eight inches. The amperage is purposely made moderate, it being stated that longer life is assured thereby.



Hi-Po Water Proof Dry Cell.

LIBERTY RUBBER FACTORY.

Announcement is made by the Liberty Rubber Company, Orange, N. J., of the building of a new factory in that place, a step necessary by the rapidly increasing demand for Men-Do, a tire and tube repair outfit manufactured by the company, as well as other rubber specialties. The new structure will be located on Standish avenue and will be of fireproof material containing every modern convenience. The design is such that additions may be made as required. When the new plant is completed it will enable the concern to produce 100,000 Men-Do outfits annually.

The Liberty Rubber Company is incorporated under the laws of New Jersey and was reorganized recently to increase its capitalization. The management, however, remains the same, Harold T. Ray being president and general manager and Charles A. Whelan, secretary and treasurer. The selling force of the company has been augmented by the addition of four more travelling salesmen.

ON LONG TOUR IN AN OAKLAND.

Leaving Detroit recently in an Oakland car, made by the Oakland Motor Car Company, Pontiac, Mich., George B. Spangler, a motorist of well known experience as a tourist, started on a trip which will take him to San Francisco, thence to Galveston, New Orleans, Savannah, Washington, Philadelphia, New York and back to Detroit. The total distance covered will be about 15,000 miles and approximately 500 cities and towns will be visited. The touring load is 4500 pounds. Spangler has motored through large sections of Europe, and on one trip piloted a touring car through Cape Colony and the Transvaal Republic to Pretoria and return on a wager.

STUDEBAKER SEES NEW ERA.

According to Clement Studebaker, Jr., first vice president of the Studebaker Corporation, maker of the E-M-F and Flanders cars and Studebaker electrics, the automobile industry has entered upon a new era. He holds that business practises which have been in vogue must be replaced by more substantial efforts with respect to the future. What this future will be, he is unable to venture a guess, but he suggests that some idea may be gleaned from the fact that if the cars produced by his concern this year were placed end to end, they would extend from New York to Boston, a distance of 214 miles.

"The automobile business cannot be run in the future as it has been in the past," says Mr. Studebaker. "The automobile is no longer an experiment, a novelty or a toy. It is an immensely important mechanical feature of our natural life. The wild cat times are over. Mushroom growths are at an end. The rush into automobile manufacture, the craze for flash and novelty, the systems of making and selling, the reckless disregard of after service in a car, will not be tolerated, and careful manufacturers must think of the future."

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MILLER SUIT WITHDRAWN.

Because of the prominence of the defendant, Chas. E. Miller, 97-103 Reade street, New York City, who has been engaged in the automobile accessory business, as manufacturer, exporter, importer and jobber for 16 years, being in fact the pioneer accessory house in America, the action of the Lovell-McConnell Manufacturing Company, Newark, N. J., against this concern, asking for a preliminary injunction restraining it from dealing in Klaxon horns, is of decided interest. Inasmuch as Miller has 15 stores in eight states throughout the country, the outcome of the suit is of far reaching effect.

Miller also handled Newtone horns, made by the Automobile Supply Manufacturing Company of Brooklyn, N. Y., and it was claimed by the Klaxon people that this device infringed theirs. The action was brought on the ground that Miller's position as representing both horns was in violation of the conditional license granted by the patentee. After it was brought, much correspondence passed between Miller and the Lovell-McConnell company, as a result of which Miller declared the Klaxon product would be handled no longer under any condition.

When the matter came before the United States district court in New York City early in the month, the motion for the injunction was withdrawn by the plaintiff. Arthur W. Weil, Miller's attorney, states that this action was voluntary, after the defendant announced it was ready to argue the motion.

CURRENT PAIGE-DETROITER.

The current issue of the Paige-Detroiter, published by the Paige Detroit Motor Car Company, Detroit, is replete with information which is timely and of interest to owners and contemplated owners of Paige-Detroit cars, made by this concern. The cover design is quite in keeping with the season, and the text matter is equally pertinent. Three articles are worthy of special mention, these being: "Glad Hand," a story by Clarence E. Goodard and Lewis A. Deffner, both of Springfield, Mass., concerning the first leg of their transcontinental trip from Boston to San Francisco; "The Advantages of Co-Operative Advertising," by James M. Dunlap, and "Coming with Culley," by O. R. Hardwell, advertising manager of the company.

REGISTRATION IN NEW JERSEY.

Despite the cry raised by opponents of automobile reciprocity in New Jersey, the registrations up to June 1 showed a large increase over last year. The total number of machines registered up to this date was 39,790 as against 25,878 for the corresponding period in 1911, when reciprocity was not in force. The opponents to the new legislation asserted that foreign car owners would not take out yearly car licenses, but would depend entirely on the 10 days' touring privilege. This has not proved to be the case, for in the registration to date there has been a higher number of foreign machines listed than during the whole of last year. The registration shows heavier cars and more extremely light ones among the new machines, indicating that the two extreme styles in up-to-date car building are well patronized.

UNITED STATES MOTOR COMPANY.

A meeting of the directors of the United States Motor Company, New York City, selling organization for the Columbia, Maxwell, Stoddard-Dayton, Brush and Courier pleasure cars and Sampson trucks, has been called for the purpose of taking action on a proposition to issue $4,000,000 of five-year serial bonds, convertible into common stock at par and bearing six per cent. interest. These debentures would be a portion of the $6,500,000 still in the company's treasury out of the $12,500,000 authorized a year ago.

It is understood that the company is in need of working capital since it is necessary to finance the coming season's output before completely disposing of the 1912 product. An official of the company is authority for the statement that the concern is in better condition than at any other time in its history, insofar as the relative values of the assets and liabilities are to be considered. With the question of working capital settled, there seems reason for believing that the present difficulty will be entirely overcome.

HILLS IS SUPERINTENDENT.

Clarence A. Hills, son of Mr. and Mrs. F. O. Hills of Prescott street, Torrington, Conn., has been made superintendent of the Abbott Motor Company's works at Detroit, Mich. For the past two years he has been connected with the Hupp Motor Car Company of Detroit, maker of the Hupmobile, in the same capacity. At the close of his engagement a short time ago the employees of the firm gave him a gold watch and the officers of the company presented him with a diamond stick pin.

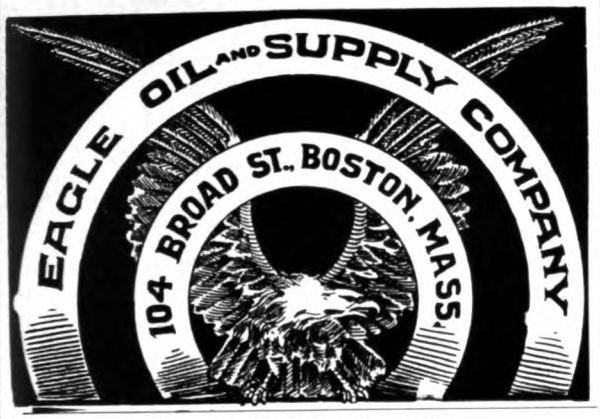
As a boy, Mr. Hills took his first lessons in mechanical drawing in the Y. M. C. A. classes at Torrington. Later he went to a technical school in Kingston, R. I., and then took a position with a manufacturing concern in Bantam, Conn. As soon as he had earned sufficient money he went to Ann Arbor, Mich., where he completed a course in mechanical engineering and at once accepted a position with the Olds Motor Works in Detroit as draftsman. When this plant was removed from Detroit to Lansing, he secured a position with the Chalmers Motor Company, leaving the latter concern to go with the maker of the Hupmobile.

J. O. Moore, New England manager for the Warner Instrument Company, Beloit, Wis., maker of the Warner Auto-Meter, addressed the Boston Y. M. C. A. automobile school June 14. During the lecture the small parts of the instrument were exhibited.

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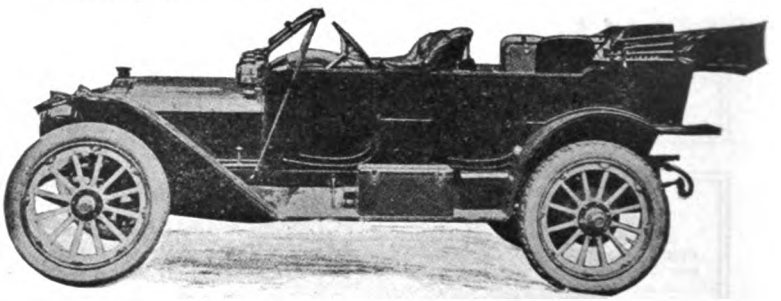
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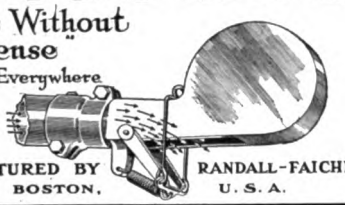
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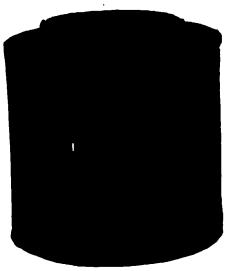
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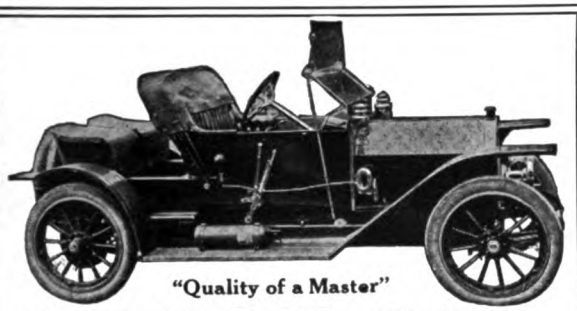
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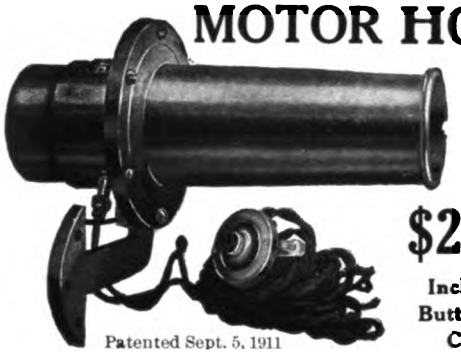
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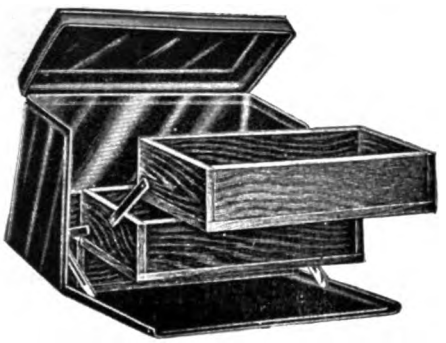
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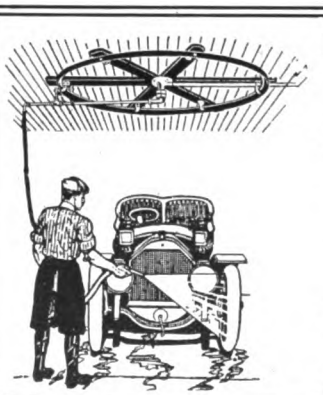
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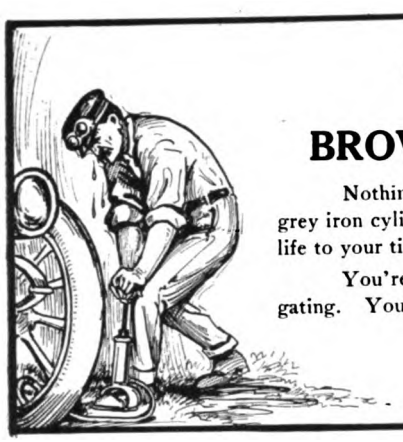
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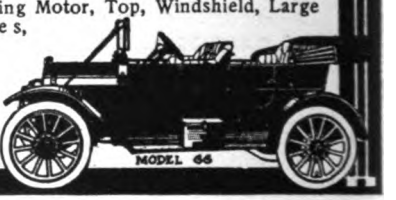
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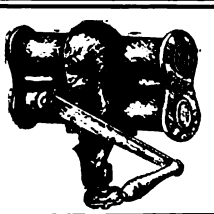
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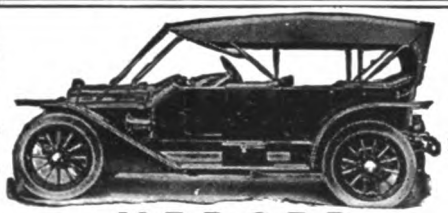
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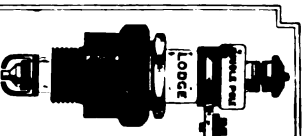
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Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

HORNS.

Automobile Supply Mfg. Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)

Dean Electric Co., Elyria, O. (Tuto.)

Randall-Faichney Co., Boston, Mass. (Jericho, Jubilee.)

JACKS AND LIFTING DEVICES.

Canton Foundry & Machine Co., Canton, O. (Universal Combination Auto Jack and Emergency Truck.)

Hartford Suspension Co., 146 Bay St., Jersey City, N. J.
Branches: 1700 Broadway, 212-214 W. 88th St., New York City; 325 Columbus Ave., Boston, Mass.; 1437 Vine St., Philadelphia, Penn.; 1458 Michigan Ave., Chicago, Ill.; 289 Halsey St., Newark, N. J.; 1524 Grand Ave., Kansas City, Mo.; 801 Woodward Ave., Detroit, Mich.

LAMP COVERS.

Hopewell Brothers Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LAMPS—HEAD, TAIL AND SIDE.

Gray & Davis, 55 Lansdowne St., Boston, Mass.

Hawthorne Mfg. Co., 29 Spruce St., Bridgeport, Conn. (Old Sol.)

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

LIGHTING, ELECTRIC.

Dean Electric Co., Elyria, O. (Dynalux.)

Esterline Company, Lafayette, Ind. (Matchless)
Branches: Detroit, Mich.; San Francisco, Cal.; 196 Pine St., Atlanta, Ga.; 114 Liberty St., New York City; Exchange Bldg., 53 State St., Boston, Mass.; 16 E. Main St., Waterbury, Conn.; 310½ Chapel St., New Haven, Conn.

Geissler Bros. Storage Battery Co., 514-520 W. 57th St., New York.

Gray & Davis, 55 Lansdowne St., Boston, Mass.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O.

Remy Electric Co., Anderson, Ind. (Remy.)

Sager Co., J. H., 271 South Ave., Rochester, N. Y.

LOCK SWITCHES.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland, O. (Automatic.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York City.
Branches: 119-121 E. 24th St., Chicago, Ill.; 1250 Woodward Ave., Detroit, Mich.; 357 Van Ness Ave., San Francisco, Cal.

Bretz Co., J. S., 250 W. 54th St., New York City (U. & H.)

Kimball Manufacturing Co., The, Motor Mart, Boston, Mass. (Mea.)

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O.

Marburg Bros., 1777 Broadway, New York City (Mea.)

Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., Walton Ave. and 138th St., New York City.
Branches: 1679 Broadway, New York City; 1110 S. Michigan Ave., Chicago, Ill.; Motor Mart, Boston, Mass.; 430-36 Van Ness Ave., San Francisco, Cal.; 368 Woodward Ave., Detroit, Mich.; 1226 S. Olive St., Los Angeles, Cal.

MATS, ETC.

Sidwell Pedal Mat Co., 245 Columbus Ave., Boston, Mass. (Pedal.)

MEASURES, ETC.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Simplex.)

MOTORCYCLES AND SUPPLIES.

American F. N., Co., Boston (F. N.)
Branches: 49 Union St., Providence, R. I.; 415 Trumbull St., Hartford, Conn.

Emblem Mfg. Co., Angola, N. Y. (Emblem.)

Hawthorne Mfg. Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)

Liberty Rubber Co., Orange, N. J. (Motorcycle, Rubber-Mend.)

Swenson, B. A., 298 Blackstone St., Providence, R. I. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Hazard Motor Mfg. Co., 785 Coates St., Rochester, N. Y. (Hazard.)

Western Motor Company, Marion, Ind. (Rutenber.)

OILS, GREASES AND OTHER LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York City (Colonial.)
Branches: Boston, Mass.; Fall River, Mass.; Philadelphia, Penn.

Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)

Eagle Oil & Supply Co., 104 Broad St., Boston (Eagleine No-Karbon.)

Fiske Bros. Refining Co., New York City (Lubroleine.)
Branch: Pittsburg, Penn.

Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.

Havoline Oil Co., 17 Battery Place, New York City (Havoline.)
Branches: Pacific Coast — Kohl Bldg., San Francisco, Cal.; Western—People's Gas Bldg., Chicago, Ill.; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O., Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.

Haws, Geo. A., 77 Pine St., New York City (Panhard.)
Branch: 899 Boylston St., Boston.

Kellom & Co., Chas. F., 113 Arch St. Philadelphia, Penn. (Invader.)
Branch: 284 Columbus Ave., Boston, Mass.

Miller, Chas. E., 97-103 Reade St., New York City (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York Lubricating Oil Co., 116 Broad St., New York. (Monogram.)
Branches: 126 Massachusetts Ave., Boston, Mass.; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia, Penn.; 1436 Michigan Ave., Chicago, Ill.; 1111 Superior Ave., N. W., Cleveland, O.; 435 Turk St., San Francisco, Cal.; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle, Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.

New York & New Jersey Lubricant Co., 165 Broadway, New York City (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York City (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York City.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston,

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CLASSIFIED BUYERS' GUIDE—Continued

Mass.; 605 Brown Bros. Bldg., Philadelphia, Penn.; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

Valvoline Oil Co., 27 State St., Boston, Mass. (Valvoline.)

OIL AND GREASE PUMPS, GUNS, ETC.

Randall-Faichney Co., Boston, Mass. (B-Line.)

PATCHES.

Liberty Rubber Co., Orange, N. J. (Cementless.)

PUMPS, TIRE.

Brown Co., The, Syracuse, N. Y., (Brown Impulse.)

Clarke Pump Co., 1489 Washington St., W. Newton, Mass. (Crown.)

Hawthorne Mfg. Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RIMS — REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.

Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York City (Continental and Whittlesey Demontachable.)

Branches: New York, Chicago, San Francisco.

RIM REMOVERS.

Wm. L. Tobey, 20 Lewis St., East Boston, Mass. (S. D.)

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York City (Tarvia.)

Branches: Chicago, Ill.; Philadelphia, Penn.; Boston, Mass.; St. Louis, Mo.; Cleveland, O.; Pittsburg, Penn.; Cincinnati, O.; Kansas City, Mo.; Minneapolis, Minn.; New Orleans, La.; Seattle, Wash.; London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

RUBBER CEMENT.

Liberty Rubber Co., Orange, N. J. (Liberty Patching.)

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago (National.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland, O. (L B A)

Branches: 136 West 52nd St., New York City; 1191 Woodward Ave., Detroit, Mich.; 436 South Dearborn St., Chicago, Ill.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston, Mass.

Hartford Suspension Co., 146 Bay St., Jersey City, N. J. (Truffault-Hartford.)

Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia, Penn. ("J-M.")

Branches: 218 W. 84th St., New York City; 222 Eliot St., Boston, Mass.; Teck Building, Buffalo, N. Y.; 10 W. Eager St., Baltimore, Md.; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

Sumner, George, Inc., 1841 Broadway, New York; 55 Boylston St., Boston (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)

Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York City.

Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo, N. Y. (All-in-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago, Ill. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia, Penn.

Kimball Mfg. Co., Motor Mart, Boston (Lodge Double-Pole.)

Randall-Faichney Co., Boston, Mass. (Mac-Kae.)

Progressive Mfg. Co., The, Torrington, Conn. (Black Eagle.)

Splitdorf Electrical Co., Walton Ave. and 138th St., New York City.

Branches: See Magnetos and Magneto Supplies.

SPARK PLUG TERMINALS.

Randall-Faichney Co., Boston, Mass. (Mac-Kae Universal.)

SPEEDOMETERS, ETC.

Jones Speedometer, New Rochelle, N. Y.

Branches: Broadway and 76th St., New York City; 109 Massachusetts Ave., Boston, Mass.; 1416 Vine St., Philadelphia, Penn.; 1430 Michigan Ave., Chicago, Ill.; 852 Main St., Buffalo, N. Y.; 41 Washington Boulevard, Detroit, Mich.; 544 Van Ness Ave., San Francisco, Cal.; 1229 So Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Stewart & Clark Mfg. Co., 1828 Diversey Boulevard, Chicago, Ill. (Stewart.)

Branches: 1312 Michigan Ave., Chicago, Ill.; 233 West 58th St., New York City; 1211 Woodward Ave., Detroit, Mich.; 307 Golden Gate Ave., San Francisco, Cal.; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia, Penn.; 514 North Capitol Ave., Indianapolis, Ind.; 1825 Grand Ave., Kansas City, Mo.; 45 South 10th St., Minneapolis, Minn.; 1849 Euclid Ave., Cleveland, O.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)

Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston, Mass.; 720 Main St., Buffalo, N. Y.; 2420 Michigan Ave., Chicago, Ill.; 807 Main St., Cincinnati, O.; 2062 Euclid Ave., Cleveland, O.; 1518 Broadway, Denver, Col.; 870 Woodward Ave., Detroit, Mich.; 330½ North Illinois St., Indianapolis, Ind.; 1613 Grand Ave., Kansas City, Mo.; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York City; 302 N. Broad St., Philadelphia, Penn.; 5940 Kirkwood Ave., Pittsburg, Penn.; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco, Cal.; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis, Mo.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland, O.

STORAGE SYSTEMS — GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia, Penn.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia, Penn.

THERMO CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland, O. (Master Vibrator.)

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)

Branch: 1974 Broadway, New York.

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CLASSIFIED BUYERS' GUIDE---Concluded

TIRE CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston, Mass.; 1731 Michigan Ave., Chicago, Ill.; 905 First Ave., South, Minneapolis, Minn.; 1529 Cleveland Place, Denver, Col.; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco, Cal.; 917 East Pike St. Seattle, Wash.; 316 North Broad St., Philadelphia, Penn.; 1197 Broadway, New York City; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit, Mich.; 1616 Grand Ave., Kansas City, Mo.

Diamond Rubber Co., Akron, O., (Diamond.)

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston, Mass.; 1305 Michigan Ave., Chicago, Ill.; 842 Woodward Ave., Detroit, Mich.; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York City; 148 Chambers St., New York City; 322 North Broad St., Philadelphia.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims — Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston, Mass.; 17 1-2 Dorrance St., Providence, R. I.

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In principal cities.

Shawmut Tire Co., 97 Bedford St., Boston, Mass.

United States Tire Co., Broadway and 58th St., New York City (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRE CHAIN GRIPS.

Weed Chain Tire Grip Co., 28 Moore St., New York City. (Weed.)

TIRE INFLATING TANKS.

Prest-O-Lite Company (Baby Tire Filler, The Emancipator.) See under Acetylene Tanks for address of main office and list of branches.

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.

Leather Tire Goods Co., Suspension Bridge Station, Niagara Falls, N. Y. (Woodworth treads, repair boots and emergency stops.)

Liberty Rubber Co., Orange, N. J. (Treadmend and Everstick.)

Page-Lester Co., 129 W. Van Buren St., Chicago, Ill. (Tite-Wad Rubber Putty.)

Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRE REPAIR OUTFITS.

Liberty Rubber Co., Orange, N. J. (Mend-Do and Rubber-Mend.)

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Chicago, Detroit, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York City (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tire Casings and Inner Tubes.

Diamond Rubber Co., Akron, O. (Diamond.)

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., The, Chicopee Falls, Mass.
Branches: See Tire Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York City.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TORSION SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston, Mass. (Acme.)

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCK BODIES.

Lynch Manufacturing Co., Hammond, Ind.
Branches: East Chicago, Ind.; South Chicago, Ill.

Motor Truck Body Co., 320 Franklin St., Detroit, Mich.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Mfg. Co., 1756 Cranston St., Providence, R. I.

TURNTABLES.

Canton Foundry & Machine Co., Canton, O. (Universal.)

Lansing Co., formerly Lansing Wheelbarrow Co., Lansing Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston, Mass.; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.

Portland Garage, Portland, Me. (Portland.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 250 W. 54th St., New York City (Hartford.)

Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE DRESSERS.

Crone, F. G., 331 Genesee St., Buffalo, N. Y.

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O. (Garage and Individual.)
Branches: In all principal cities.

Williams Foundry & Machine Co., Akron, O.

WASHING DEVICES.

Perfect Mfg. Co., Albany, N. Y.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis (Prest-O-Welder.)
Branch: See Acetylene Tanks.

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York City (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.

Cutter, George A., Taunton, Mass.

Walworth Manufacturing Company, Boston, Mass. (Stillson.)

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This oil possesses peculiar properties which make it invaluable as a lubricant for gears. It contains no foreign matters, such as ground cork, sawdust, etc., but is 100% oil. It is stronger and more serviceable than any other lubricant made. Being free from water and chemicals, it will not foam in the gear case when running or allow the bearings to rust when idle.

Invader Gear Oil being a fluid lubricant it is only necessary to fill the case sufficiently to allow the gears to dip. It is not necessary to pack the case full, as is customary when grease is used. It faces the gears with a coating which is practically indestructible, thereby preventing wear and reducing *noise* and friction to a minimum. A trial will convince the most skeptical that "**Invader**" Gear Oil is the only practical and economical gear lubricant.

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AUTOMOBILE JOURNAL

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TIMES BUILDING — **PAWTUCKET, R. I.**

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VOL. XXXIII. No. 11

AUTOMOBILE JOURNAL

$1.00 the Year.
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PAWTUCKET, R. I.

July 10, 1912

JUL 13 1912

A plain talk on Carbon Deposit.

THERE are three mistaken ideas on carbon deposit.

(1) Light colored oil is commonly supposed to leave the least carbon deposit. (2) Heavy-bodied oils are often avoided through fear of excessive carbon deposit. (3) Claims that some lubricating oils are "non-carbon" are often accepted as sound.

Our experience has clearly shown that:

(1) Color is an unsafe guide in determining the amount of carbon in an oil.

(2) The body of the oil does not determine the amount of carbon deposit. The heaviest oil that can be properly used gives the most efficient automobile lubrication.

(3) "Non-carbon" oils do not exist. Lubricating oils are a hydro-carbon product. Were all carbon eliminated, *the oil could not lubricate.* The *free* carbon is the only carbon that can be safely removed.

The amount of carbon deposited in the cylinders depends partly on the carburetion and gasoline combustion, partly on the oil, partly on its fitness for the car.

Unfortunately, the more the layman tries to comprehend carbon deposit, the more he is bewildered. He needs authoritative guidance.

Equipped with the experience gained from our authoritative position in lubrication, we studied every make of American automobile and many foreign makes.

We found that no one grade of lubricating oil would suit all cars. We produced our Gargoyle Mobiloils in several grades, and prepared a schedule showing the correct grade for each make of car.

The complete schedule will be mailed you on request.

We refined and filtered these oils to remove free carbon. Aside from furnishing the correct oil for each car, that is the most that any producer can do toward eliminating carbon deposit.

We can say without fear of successful contradiction, that these oils establish a world standard for automobile lubrication.



Gargoyle Mobiloils are put up in barrels, half-barrels, in 5 and 1 gallon sealed white cans.

All are branded with the Gargoyle, which is our mark of manufacture. They are handled by the higher class garages, auto-supply stores and others who supply lubricants.

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A grade for each type of motor.

If oil saves power, it follows that one oil saves more power than another.

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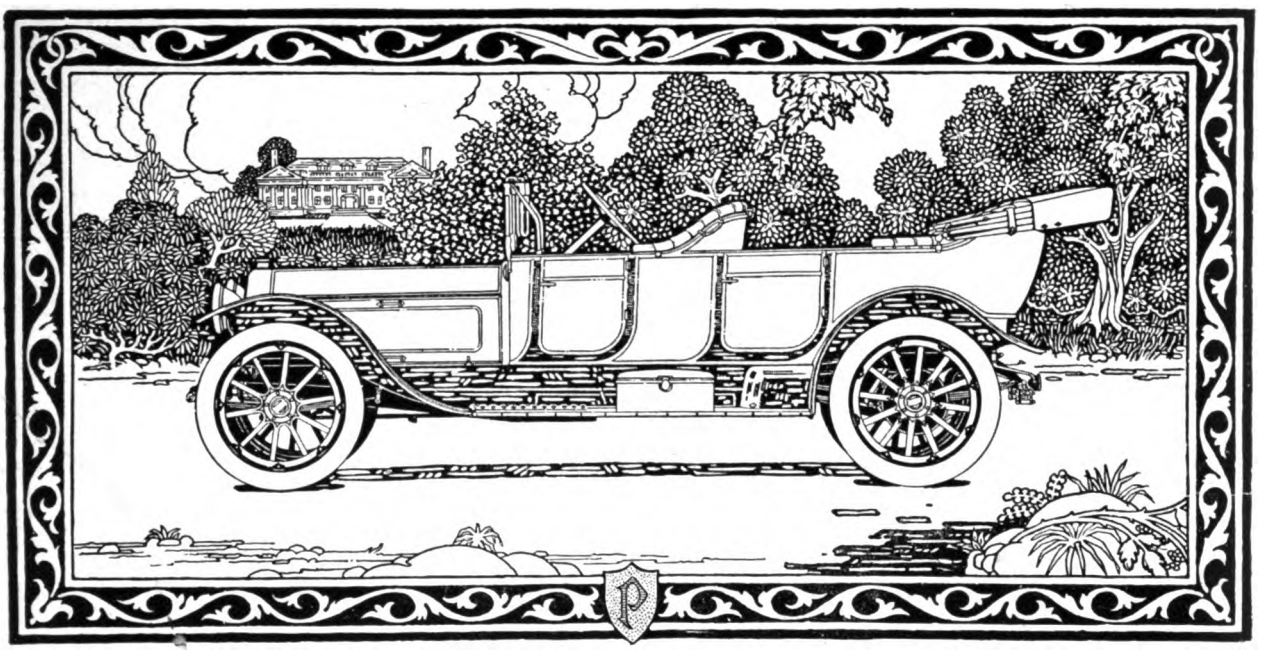
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It is individual, distinctive; it is apparent at a glance; it grows with familiarity; it lingers with you like the beauty of a living being; there is something personal in it.

This beauty—inevitably associated with a Peerless car—is no thing of chance. It is the beauty of studied harmony—for every part and piece is perfectly proportioned to every other.

It is the beauty of long, clean lines and graceful curves—in the sweep of the fenders, in the unbroken line of the parapet, in the gradual taper of the bonnet, in the broad, continuous curve of top and body-back.

It is the beauty of simplicity—the extra tires are carried below the parapet, the chairs in the tonneau fold away out of sight, there is no break or jarring contrast to the long lines and the broad expanse of body-surface.

It is, too, the beauty of utility and strength—of power in reserve. The three six-cylinder chassis, equipped with various types of open and closed bodies, meet the requirements of experienced motorists. All have the flexibility of a motor unusually long of stroke, with the convenience of an automatic dynamo electric-lighting system and a power-driven tire-pump.

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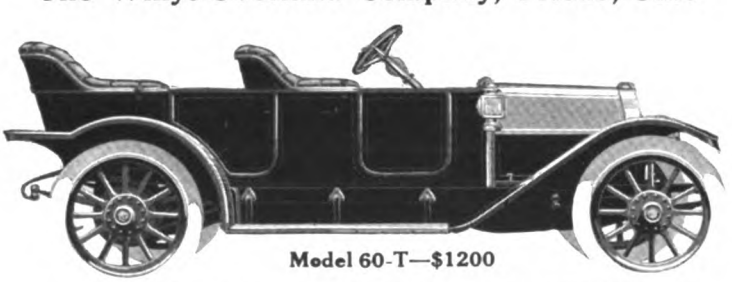
To sell you a model 60 we want you to know the price first. We do not base our arguments on worthless special selling points in the manner of some manufacturers. Others will tell you of a thousand special features first of all. You may even have to ask the price.

You can get more automobile satisfaction for $1200 in an Overland Model 60 than for $1500 in any other line. That is why, when you come to inspect this car, we tell you the price first. Its merit is then self-evident.

The Overland Model 60 will never be equaled in low price until there is a duplication of the mammoth Willys-Overland production methods.

Ask for book K-47.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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True Merit and Real Value
Now Recognized

The only Anti-Skid device which can be relied upon and the only one in which absolute confidence can be placed.

Proven to be a necessity and not a luxury.

Weed Chains
"With the Creeping Grip"

No car is safe without them. They have stood the test of time and are regarded as the *most important* and profitable accessory handled and sold by automobile dealers. *Victory after victory* has perched on the banner of Weed Chains.

The courts, in emphatic language, after carefully considering the facts, have in numerous cases issued injunctions, *restraining infringers* from manufacturing or selling their infringing devices. Weed Chains are *the only genuine* Anti-Skid device—all others are infringements.

Join today the army of "Anti-Skidders"

Consider your own safety—consider the safety of the road users. Take no chances.

Wise motorists are victorious in overcoming skidding accidents by the use of Weed Chains.

Cannot injure tires because they creep. *Absolutely necessary* on wet and greasy pavements, or on muddy, slippery roads. By our *new, secret process of hardening*, just adopted, the cross sections are more perfect and wear better than ever before. Packed and shipped in canvas bags.

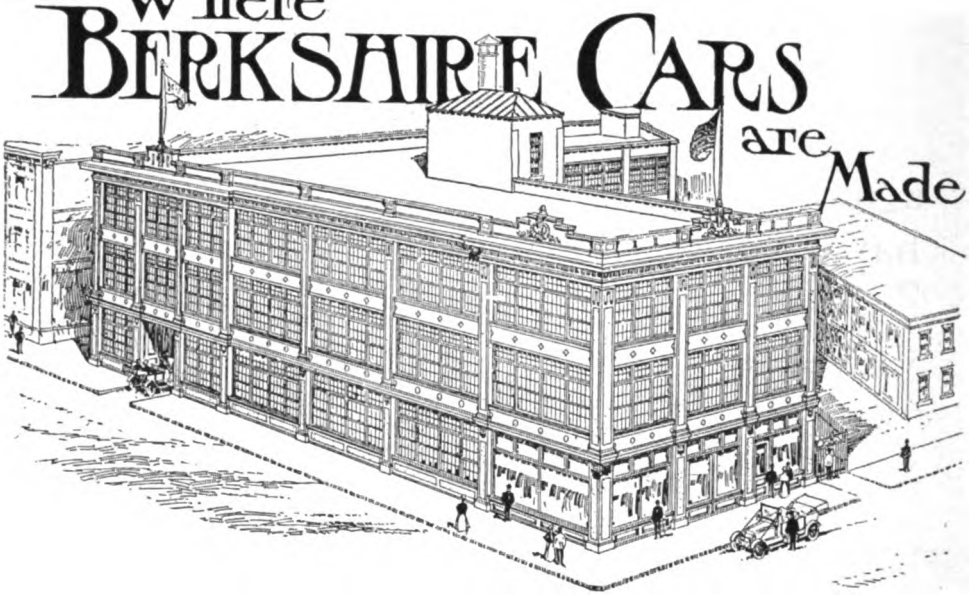
Equip your own car with *Weed Chains* and insist, for your own protection, that other drivers do the same.

Recommended and sold by all reputable dealers.

Weed Chain Tire Grip Co.
28 Moore Street **New York City**

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Where BERKSHIRE CARS are Made



The New Plant of the "Berkshire" Cambridge, Mass.

Simple! Speedy!

THE BERKSHIRE

"The Made to Order Car."

4 CYLINDER CARS

Motors—4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—119 inches.
Springs—Semi-Elliptic front, ¾ rear.
Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
Price—$3,000.

6 CYLINDER CARS

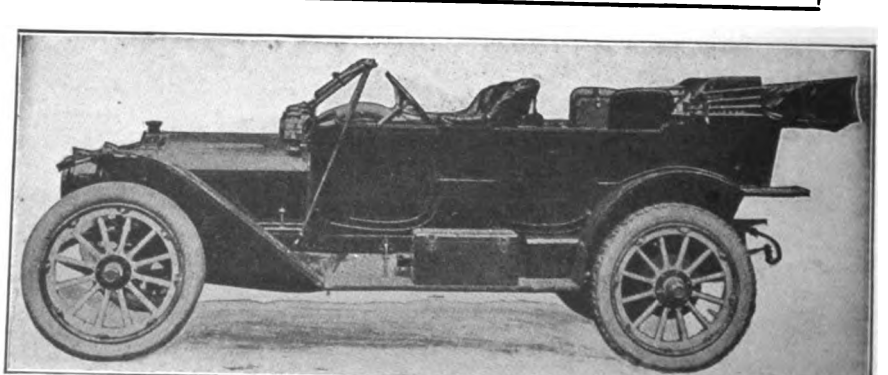
Motor—6 cylinder, 4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective, 4 speeds and reverse.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—134 inches.
Springs—Semi-Elliptic front, ¾ rear.
Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
Price—$4,000.

A Special Speed Model at $2800

Strong! ☞ All models equipped with self-starter Silent!

BERKSHIRE MOTORS COMPANY

Cambridge Mass.



1912 Model, 4 Cylinder, 35-40 H. P.

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Your Protection

against poor lubrication is in insisting on having an oil with an established reputation. That is why you should insist on having Colonial, because it is made by a firm with a reputation of over thirty years standing for high-class products.



Use COLONIAL and NOTE the DIFFERENCE

COLO GREASE

A real transmission grease

Will make your gears run smoothly and quietly because it is made especially for gear lubrication.

COLONIAL Timing Gear Oil

overcomes all trouble with your timing gear. Use it and NOTE the DIFFERENCE

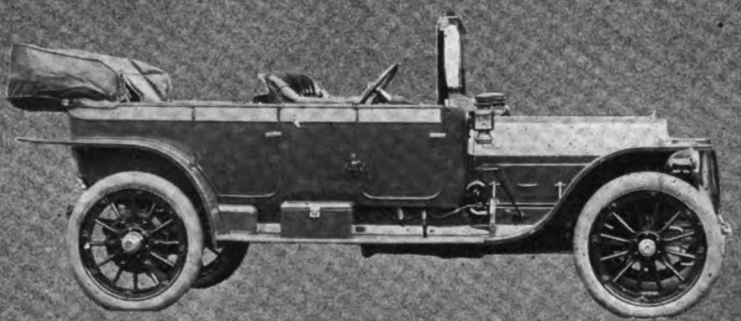
SILEX GREASE

The greasiest grease made

The real test of a grease is not its looks or the feeling but its lubricating properties. SILEX is made to lubricate and last.

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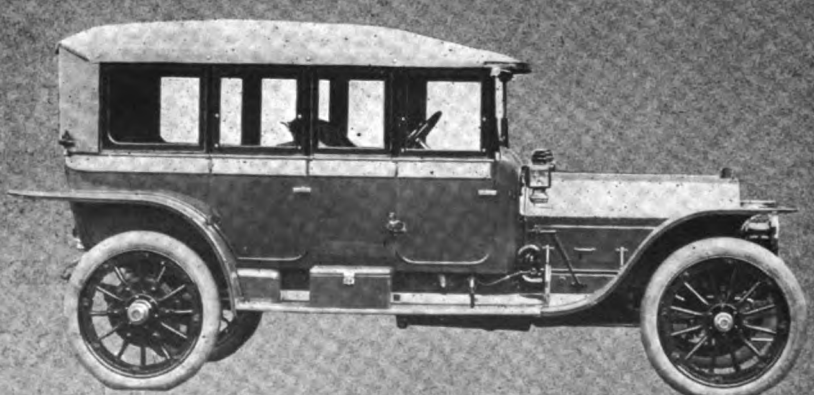
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

SPRINGFIELD METAL BODY CO.,
SPRINGFIELD-MASS.



SPRINGFIELD, MASSACHUSETTS.

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This truck saved $1546.12 the first year

KisselKar 3 Ton Truck

Saved $1546.12 First Year

The purchase price of this four-ton truck, owned and operated by the Howard Company of New Haven, Conn., plus interest, depreciation, overhauling, fuel and driver's salary for one year, amounted to $5,921.88.

It replaced three double trucking teams. The cost of the horses, wagons and harnesses, plus interest, maintenance and drivers' salaries for one year amounted to $7,468.00. A balance in favor of the truck of $1.546.12—the first year.

A Kissel truck is your logical selection because it is the truck of surest economy and slowest depreciation. It is strong, simple and silent. It carries 50% overload without harm. It rides easiest. It consumes the least fuel.

Note these striking KisselKar merits: its wonderful engine—its lock on the differential which equalizes power between rear wheels, when without it, a slipping wheel would absorb all the power—its fourth geared up speed which saves the engine when driving empty and makes fast time judicious when haste is necessary.

At the disposal of KisselKar owners is the unrivaled KisselKar service, consisting of completely equipped service buildings at leading centers, where the mechanical end of motor trucks is taken off your hands.

KISSELKAR TRUCKS

Write and tell us how many horses you use, how many trips they make per day, single or in teams, the average number of stops per load, carrying capacity of your equipment, average daily distance covered, cost of drivers and aids, general nature of the highways traveled.

Do this and we will tell you how motor haulage may be most advantageously used in your business.

Your copy of the new catalog is ready. Send for it.

Kissel Motor Car Co., 174 Kissel Avenue, Hartford, Wis.

Boston New York Chicago Milwaukee Kansas City Los Angeles
Minneapolis St. Paul St. Louis Dallas

Philadelphia, Cleveland, Detroit, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburg, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout America.

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NEW PRICE LIST IN EFFECT OCTOBER 1, 1911, Cancelling all former price lists

The 8-DAY HIGH GRADE "BOSTON" AUTO CLOCKS

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST— PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch . . .	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices.—A great convenience for winding clock and setting the hands without opening the clock case.

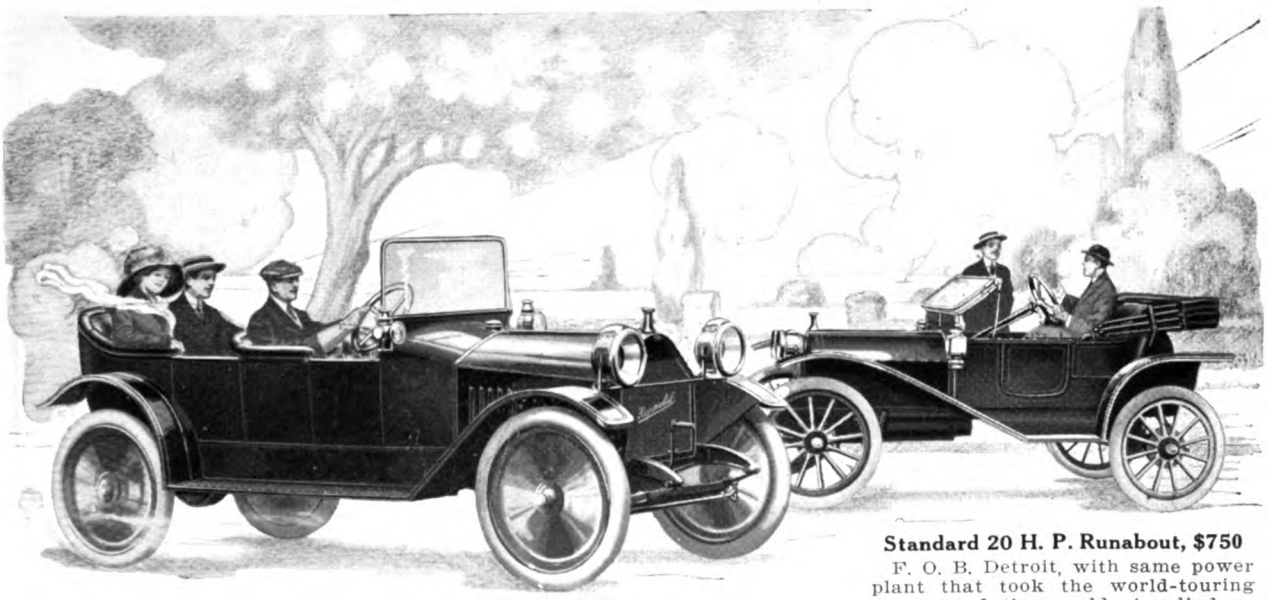
☞ All sizes stated are the approximate diameters of the dials

The 8-Day High Grade "BOSTON" AUTO CLOCK For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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Long-Stroke "32" Touring Car, $900

F. O. B. Detroit, including equipment of windshield, gas lamps and generator, oil lamps, tools and horn. Three speeds forward and reverse; center control; sliding gears. Four cylinder motor, 3 1-4 in. bore and 5 1-2 in. stroke. Bosch magneto. 106-in. wheelbase, 32 x 3 1-2 in. tires. Color, Standard Hupmobile blue. Roadster, $900.

Standard 20 H. P. Runabout, $750

F. O. B. Detroit, with same power plant that took the world-touring car around the world—4 cylinders, 20 H. P., sliding gears, Bosch magneto. Equipped with top, windshield, gas lamps, and generator, oil lamps, tools and horn. Roadster, 110-inch wheelbase, $850.

How the Long-Stroke "32" Pulls on the Road

Hupmobile

Power in plenty to take the car and its load through sand and mud and up the hills is one of the most valued characteristics of the Long-Stroke "32" Touring Car.

How the steady, bull-dog pull of the long-stroke motor works to the tourist's advantage is convincingly told in the experience we cite here.

Late last March, when the country roads were at their worst, Earl Sowards drove a recently-bought Hupmobile "32" touring car, fresh from the Detroit factory, to his home in Decatur, Ind.

"It is the best mud-turtle you ever saw. I could not tell you how bad the roads were, for if I did you would not believe me," he wrote after completing the trip.

"I had 23 miles where I never saw a place that the mud was less than six inches deep; and one place the mud came above the running board for a space of 40 rods or more. It is impossible to stick the car.

"The Model '32' is the best car on earth to pull in the mud. I know for I have driven several of the best makes. I have had eight years of experience.

"I was pulling through the mud along by a farmer's house. Just in front of the house I thought I would have some fun; so I let my motor die slowly and stopped for a chat. I asked the farmer if he would get his team and pull me out. He answered: 'There are no two teams in the country that could do it.'

"Then I told him that I would have to pull myself, and he said: 'I guess you can stay with me until the mud dries up a little.'

"When I was ready to go on, I started as if nothing had happened.

"He said he was going to have a car of that kind."

All country roads are not boulevards; and many a tourist finds himself in difficulty when the bad stretches are reached.

On the other hand, the Hupmobile owner tackles any road, serenely sure that his power will take him through.

Added to this, are a low center of gravity, lines and style not approximated in any other car of Hupmobile price, and mechanical features that you should certainly know about.

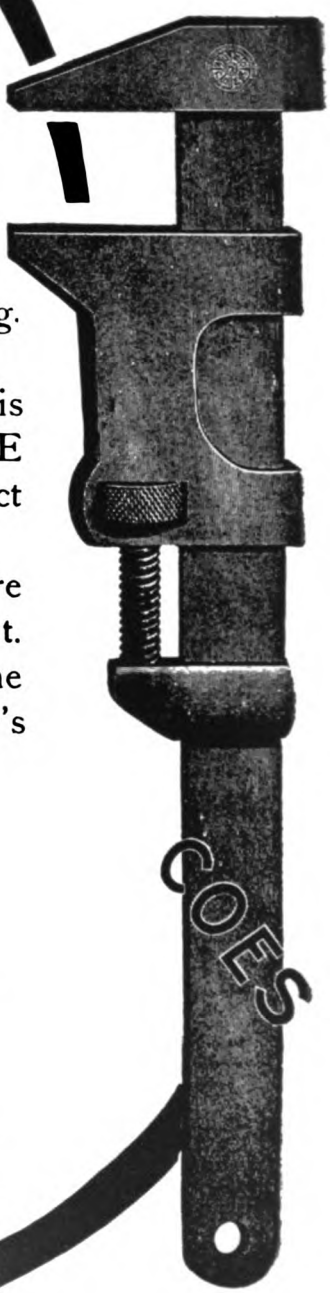
Write for catalog.

Hupp Motor Car Company, 1268 Milwaukee Avenue, Detroit, Mich.

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COES

THE
Wrench Supreme



Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.

Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

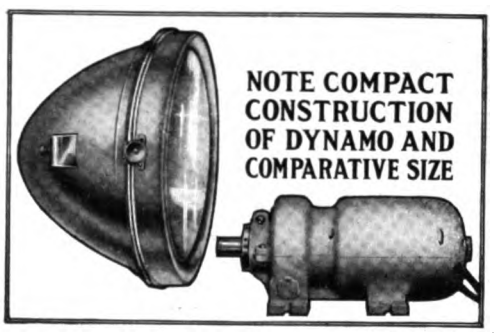
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Driving A Car At Night

The Necessity For Installing
The Best Lighting Equipment

Safety, convenience and comfort depend on the quality of the lighting equipment of every car. After sundown, some roads—especially strange highways—offer many opportunities for trouble. Ruts, holes, dangerous curves and crossings constantly present themselves. With powerful, brilliant light the motorist need not fear any road. A broad bright ribbon of light makes every highway safe.

The best system
to use is
the reliable and efficient



GRAY & DAVIS
Lighting Dynamo

Gives the most brilliant light. Operated by the motor and requires but 1-6 H. P. Charges batteries, furnishes current for all auxiliary purposes and enables you to light your lamps without battery connection. Has the necessary CONSTANT SPEED feature. You need no other system.

Write for catalog.

Gray & Davis, Inc., Manufacturers of Automobile Lamps **Boston, Mass.**
55 Lansdowne Street

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Studebaker

Flanders "20"

Forget the nameplate—and still the car stands pre-eminent

If it bore no nameplate—the Studebaker Flanders "20" would be bound to make an immediate and an impressive appeal to your preference.

If it had no reputation—your sense of value would instantly recognize the wonderful money-worth of the car.

If it had enjoyed no sales-success—a demonstration of its splendid response to every normal, or even abnormal demand would drive you straight to the decision that your $800 could not be better expended.

Study it from any of the ordinarily accepted specification standards — motor-measurement, power, wheel-base, axle-strength, ease, style—and rivalry, in its class, recedes into the remote background.

But you are not asked to draw a check for $800 on the evidence of your own eyes; or your own experience; or your own sense of value.

The Studebaker "20" will speak for itself on that close-range inspection which should precede a purchase—but another voice speaks to you in its behalf, louder and more impressive still.

Seventy-five thousand of your fellow citizens vouch for Studebaker value.

And we would like you to feel the impact of that tremendous pressure of public opinion.

We would like you to summon up a mental picture of that mighty host of Studebaker cars rendering yeoman service in every nook and corner of the nation.

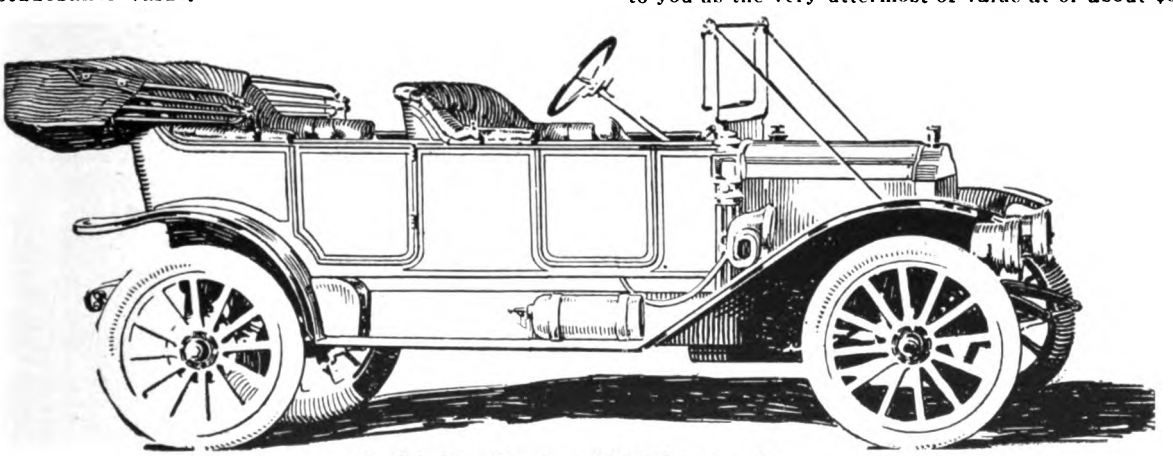
We would like you to remember that the satisfaction of these 75,000 citizens has its *source* in the name Studebaker.

We would like you to realize that each and every one of these 75,000 cars does its full duty, day by day, precisely *because* it is a Studebaker car.

The Studebaker "20" which you buy and drive is the embodyment and the expression of the sixty-year-old Studebaker policy of serving its public.

We want you to remind yourself that the Studebaker word has been good as gold to the buying world for more than a century—and that it is being made good in every car that issues from the mighty Studebaker plants.

The globe-girdling sales system of the Studebaker Corporation—the 1,800 Studebaker stores in America—the superb laboratory and manufacturing equipment in the Studebaker plant—and the low cost of production and distribution which they involve—in these factors you find the reason why the Studebaker "20" lays immediate hold upon your preference—why it appeals to you as the very uttermost of value at or about $800.



Studebaker Flanders "20" Touring Car.

$800 F. O. B. Detroit, standard equipment.
Equipped, as above, with Top, Windshield, Prest-O-Lite Tank and Speedometer, $885.

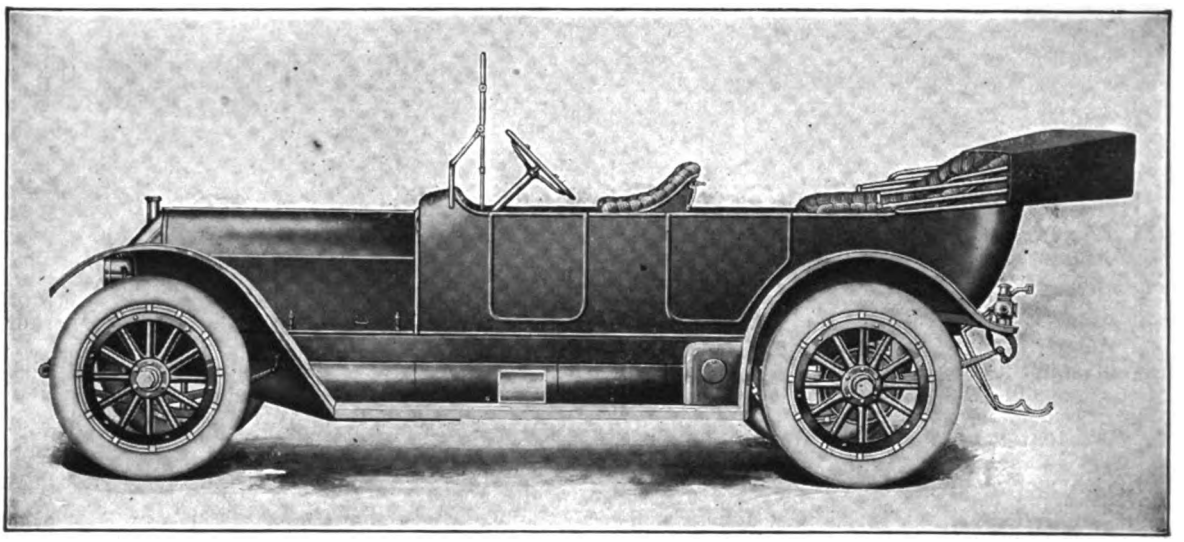
THE STUDEBAKER CORPORATION, DETROIT, MICHIGAN.

When Writing to Advertisers, Please Mention The Automobile Journal.

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ANNOUNCEMENT
1913 PLEASURE MODELS

"If You Have Never Driven One Up A Hill, You Have Missed Half The Sport Of Motoring!"



A KNOX LITTLE SIX—Model 46

A new distinctive car of unusual power, quietness, comfort and style, embodying the most advanced American and European ideas in approved design and construction. Among the important features of Model 46 are the V-shaped radiator, silent chain driven cam and magneto shafts, option on right or lefthand steer and unusual provision for taking up wear and preventing noise. "The car of surprising economy."

Motor 6-cylinder, 4⅜" x 5½". A. L. A. M. rating, 46 H. P.
Wheel-base 130". Tires 37" x 5".

Price with all open type bodies and complete equipment **$4350**
Price with Limousine type bodies and complete equipment **$5350**
Price with Landaulet type bodies and complete equipment **$5400**

60 H. P. SIX—MODEL 66

An ideal, powerful, spacious family car, incorporating the famous Knox 6-cylinder motor in its fourth year of refinement without radical change.

Motor 6-cylinder, 5" x 5½". A. L. A. M. rating, 60 H. P.
Wheel-base 134". Tires 38" x 5½".

Price with all open type bodies and complete equipment **$5000**
Price with Limousine type bodies and complete equipment **$6200**

4-CYLINDER- MODEL 44

The lightest Knox Model.

Trim, comfortable, a powerful hill climber, quiet and flexible, embodying the famous Knox motor in its fifth year of service without important change.

Motor 4-cylinder, 5" x 5½". A. L. A. M. rating, 40 H. P. Wheel-base 117" and 122". Tires 36" x 4½".
Prices completely equipped:—

2-Passenger Raceabout	**$3300**	**7-Passenger Touring Car**	**$3550**
Double Rumble Raceabout	**$3350**	**5-Passenger Touring Car**	**$3500**
4-Passenger Torpedo	**$3400**	**2-Passenger Coupe**	**$4300**
5-Passenger Torpedo	**$3450**	**Limousine**	**$4400**

4-CYLINDER—MODEL 45

Longer body and wheel-base than Model 44.
A roomy, comfortable family car. An ideal chassis for spacious, open and closed types of bodies.
Motor 4-cylinder, 5" x 5½". A. L. A. M. rating, 40 H. P.
Wheel-base 126". Tires 37" x 5".

Price with 6-passenger open bodies and complete equipment **$3700**
Price with 7-passenger open bodies and complete equipment **$3800**
Price with Limousine open bodies and complete equipment **$4700**

Knox 4-cylinder models are completely equipped, including electric side and tail-lamps with storage battery, acetylene starters and automatic gas lighters for headlights.

Knox 6-cylinder models are regularly equipped with self-starters and dynamo lighting systems.

Send for advance folder with detailed specifications.

KNOX AUTOMOBILE COMPANY — SPRINGFIELD, MASS.

BRANCHES: NEW YORK, CHICAGO

"A DEMONSTRATION IS IRRESISTIBLE."

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SHOCK ABSORBER

ALMOST UNIVERSALLY USED IN FRANCE

THE RAGE IN ENGLAND

TRADE MARK

"Look at the rear springs"

if you want to know why some cars ride so comfortably—why comfort is possible when only one or two persons ride in a 7-passenger car.

It's because they are equipped with

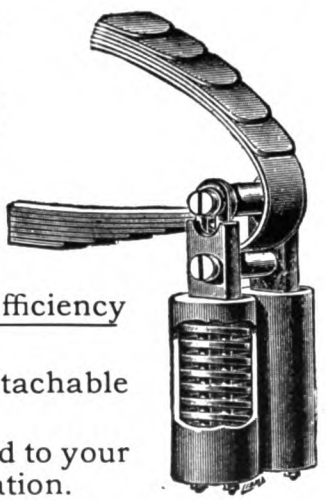
"J. M." Shock Absorbers

which not only *absorb* all jolts and jars, but *actually prevent* them.

By keeping the rear wheels on the ground, the "J. M." secures continuous traction, and eliminates:

First—Racing of the engine when the car jumps the ground;

Second—Grinding of the tires when they hit on the rebound.



This means maximum comfort, increased engine efficiency and decreased tire expense.

Made in three models---attachable in an hour, detachable in fifteen minutes.

Prices, $35 to $50 per set. Send coupon below pinned to your business letterhead for booklet D, with full information.

THE "J. M." SHOCK ABSORBER CO.

Main Office and Factory, 210 S. 17th St.
PHILADELPHIA, PA.

NEW YORK, N. Y., 218 W. 84th St.
CHICAGO, ILL., 1509 Michigan Ave.
BOSTON, MASS., 222 Eliot St.
BUFFALO, N. Y., Teck Building
ROCHESTER, N. Y., 334 East St.
PITTSBURGH, PA., 5919 Baum St.
BALTIMORE, MD., 10 W. Eager St.
WASHINGTON, D. C., 1803 M St., N. W.
PAWTUCKET, R. I., 41 Dexter St.
DETROIT, MICH., 1001 Woodward Ave.

BRANCHES IN France, England, Germany, Russia, Belgium, Austria, Italy, Spain, Argentine Republic, South Africa and Australia.

N. E. 7-10

CUT ALONG THIS LINE

The "J. M." Shock Absorber Co., 210 S. 17th St., Phila.

Gentlemen: Please send me full information on your trade proposition.

Name .....
Address .....
.....

DEALERS — GET OUR ATTRACTIVE TRADE PROPOSITION DESIRABLE TERRITORY STILL OPEN

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YOU STOP
Surely and Silently

If your brakes are lined with the best lining.

TRADE MARK
Raybestos
REG. U.S. PAT. OFF.



"Grips with a Bull Dog Grip"

RAYBESTOS is composed of high grade asbestos woven with copper wire. It wears for thousands of miles on the heaviest cars. It is built for hard usage. Mud, oil, dust, water does not injure it and you secure the highest co-efficient of friction.

Put RAYBESTOS in those old brakes of yours. Note the difference. No trouble to attach RAYBESTOS. Your dealer sells RAYBESTOS and he has it in all widths with name stamped in every foot of fabric.

Write for handsome booklet.

THE ROYAL EQUIPMENT COMPANY

422 Housatonic Ave., BRIDGEPORT, CONN.

We also manufacture Duplex and Raymond Brakes and Gyrex, The Mixer.

When Writing to Advertisers, Please Mention The Automobile Journal.

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BOSCH

A Product of True Merit

On Tour

Perfect ignition is essential for complete enjoyment of your trip: it is then that you appreciate the thorough reliability and perfection of

BOSCH
Magnetos and Plugs

The numerous displays of unequalled efficiency whether on Track, Speedway or Hill, likewise the continual high percentage of drivers to use Bosch products in the events where forced conditions prevail, afford an idea as to the confidence those on tour may place in the Bosch Magneto and Plugs.

Most tourists use Bosch equipment; they insure themselves safe and timely arrival without attention or worry. They are sure that Bosch Magnetos and Plugs

Are Best

Ask your dealer or write us concerning any information you may desire.





BOSCH MAGNETO CO.
223-225 WEST 46TH STREET
DETROIT - CHICAGO - SAN FRANCISCO - TORONTO

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Directory of Touring Information

KEY TO ROUTE INDEX.

Suppose that a motorist in Boston, Mass., desires to visit Milwaukee, Wis., to witness the Vanderbilt Cup race. Study of the map on pages 40-41 will indicate that he must pass through Chicago. Follow the directions under the heading **BOSTON, MASS., TO—Chicago, Ill.** to Chicago. Next turn to **CHICAGO, ILL., TO—Milwaukee, Wis.**, and full directions will be found for reaching the latter city.

Assume that a Milwaukee motorist desires to visit the Pacific Coast. He knows that he must pass through Chicago, and in order to reach that city, he will reverse the routing supplied in **CHICAGO, ILL., TO—Milwaukee, Wis.** Study of the double-page map will reveal that Chicago is on the Transcontinental Tour, which has been designated A. This will give him complete running directions to San Francisco, from which point he may select any itinerary offered.

Should a tourist who has reached Los Angeles, for instance, over Transcontinental Tour A and Pacific Coast South, desire to return to the East by another route than that suggested in Transcontinental Tour B, he may connect with the outward bound route at Denver, Col., by following Transcontinental Tour B to Phoenix, Ariz., and the routing indicated in **PHOENIX, ARIZ., TO—Denver, Col.** Reaching Denver, he has the option of returning to Chicago by reversing Transcontinental Tour A, or by following the routing outlined in **DENVER, COL., TO—Kansas City, Mo.**, thence by way of **KANSAS CITY, MO., TO—St. Louis, Mo.**, and **ST. LOUIS, MO., TO—Boston, Mass.**, etc.

It is believed that by the use of this Directory of Touring Information, combined with the itineraries elsewhere in this issue, a motorist may start from any point in the United States and reach any other point without difficulty.

ALBANY, N. Y., TO—

Atlanta, Ga.—Reverse Transcontinental Tour A to New York; reverse Transcontinental Tour B to Atlanta; 1184.1 miles.

Green Mountains, Vt.—Reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 95.2 miles.

Jacksonville, Fla.—See Albany-Atlanta-Jacksonville; 1670.5 miles.

New Orleans, La.—Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn; see Memphis-New Orleans; 2040.9 miles.

Phoenix, Ariz. — Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 3680.5 miles.

Rangeley Lakes, Me.—Reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Portsmouth, N. H.; reverse Vacation Tour No. 1 to Portland, Me.; reverse Tour No. 31 to Rangeley lakes; 442.9 miles.

St. Louis, Mo. — Transcontinental Tour A to Chicago; see Chicago-St. Louis; 1232.1 miles.

White Mountains, N. H.—Reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; Tour No. 22 to White mountains; 245.1 miles.

ATLANTA, GA., TO—

Adirondacks, N. Y.—Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 1365.1 miles.

Chicago, Ill.—Reverse Transcontinental Tour B to Tuscumbia, Ala.; reverse Louisville-Tuscumbia and Chicago-Louisville; 849 miles.

Green Mountains, Vt.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 1273.8 miles.

Jacksonville, Fla.—Jonesboro, Lovejoy, Hampton, Pomona, Griffin, Milner, Barnesville, Forsyth, Smarrs, Bolingbroke, Loraine, Macon, Milledgeville, Saundersville, Davisboro, Louisville, Waynesboro, Perkin, Millen, Scarboro, Rockyford, Statesboro, Stilson, Savannah, Riceboro, Eulonia, Darien, Brunswick, Old Sterling, Tarboro and Owens Ferry, Ga.; Kings Ferry, Callahan and Jacksonville; 486.4 miles.

Niagara Falls, N. Y.—Transcontinental Tour B to Newark, N. J.; reverse Vacation Tour No. 2 to Niagara Falls; 1443.5 miles.

Rangeley Lakes, Me.—Transcontinental Tour B to New York City; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Portsmouth, N. H.; reverse Vacation Tour No. 1 to Portland, Me.; reverse Tour No. 31 to Rangeley lakes; 1542.2 miles.

White Mountains, N. H.—Transcontinental Tour B to New York City; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 1410.4 miles.

AUGUSTA, ME., TO—

Adirondacks, N. Y.—Tour No. 12 to Rumford, Me.; reverse Vacation Tour No. 1 to St. Johnsbury, Vt.; Tour No. 43 to Montpelier, Vt.; Vacation Tour No. 1 to Burlington, Vt.; Tour No. 42 to Adirondacks; 392.1 miles.

Chicago, Ill.—Reverse Tour No. 31 to Portland, Me.; Vacation Tour No. 1 to Boston, Mass.; reverse Tour No. 13 to Worcester, Mass.; Tour No. 22 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1271 miles.

Green Mountains, Vt.—See Augusta-Adirondacks to St. Johnsbury, Vt.; Tour No. 43 to Green mountains; 303.6 miles.

Jacksonville, Fla.—Reverse Tour No. 31 to Portland, Me.; Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1939 miles.

BALTIMORE, MD., TO—

Chicago, Ill.—Transcontinental Tour B to Newark, N. J.; reverse Vacation Tour No. 2 to Buffalo, N. Y.; Transcontinental Tour A to Chicago; 1161.5 miles.

Green Mountains, Vt.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 391.4 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1368.8 miles.

White Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 528.8 miles.

BINGHAMTON, N. Y., TO—

Adirondacks, N. Y.—Tour No. 53 to Richfield Springs, N. Y.; reverse Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 333 miles.

Atlanta, Ga.—Tour No. 61 to Scranton, Penn.; Tour No. 63 to Trenton, N. J.; reverse Transcontinental Tour B to Atlanta; 1194.5 miles.

Green Mountains, Vt.—Reverse Tour No. 61 to Wurtsboro, N. Y.; reverse Tour No. 51 to New Paltz, N. Y.; Vacation Tour No. 3 to Catskill, N. Y.; Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 344.3 miles.

White Mountains, N. H.—See Binghamton-Green mountains to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; Tour No. 22 to White mountains; 526.9 miles.

BOSTON, MASS., TO—

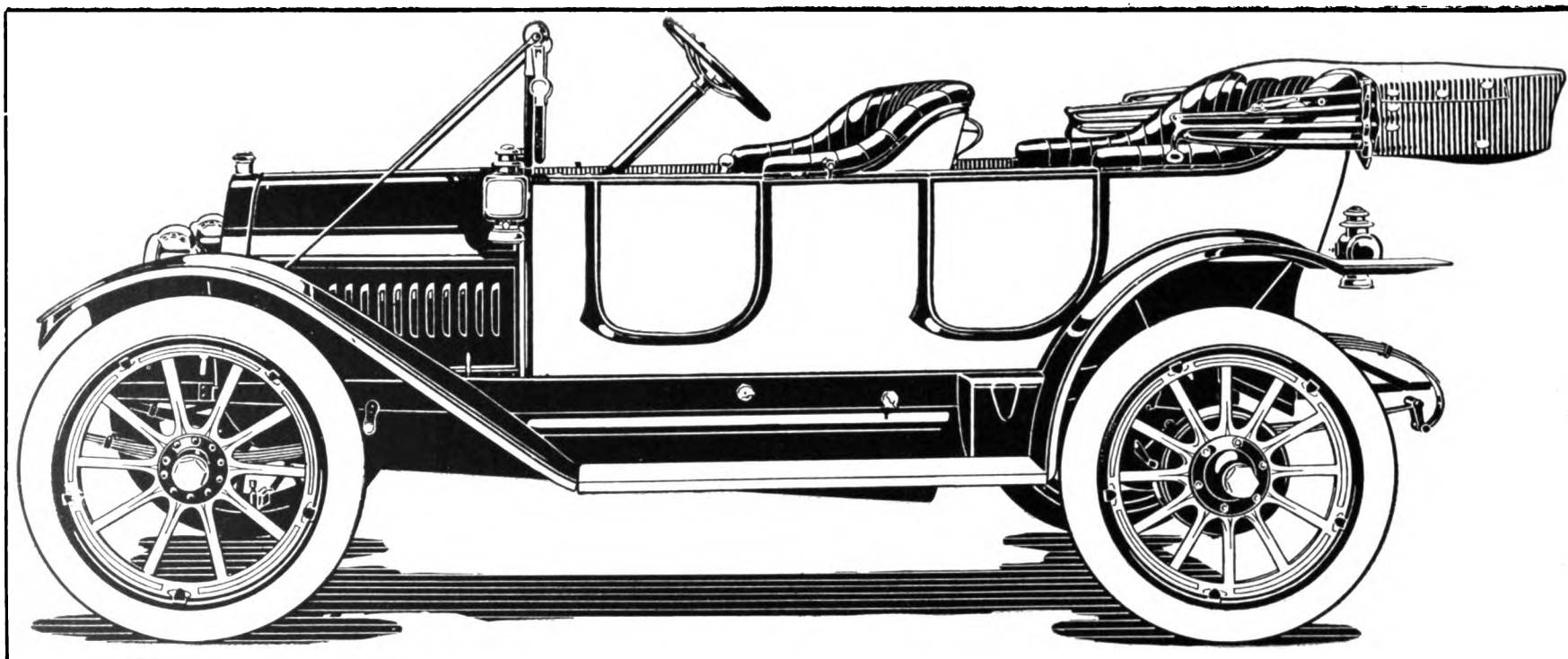
Adirondacks, N. Y.—Reverse Tour No. 11 to Plymouth, N. H.; reverse Tour No. 43 to White River Junction, Vt.; Vacation Tour No. 1 to Burlington, Vt.; Tour No. 42 to Adirondacks; 417.7 miles.

Atlanta, Ga.—Reverse Tour No. 13 to Worcester, Mass.; Tour No. 22 to Springfield, Mass.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1294.9 miles.

Chicago, Ill.—See Boston-Atlanta to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1083.2 miles.

Green Mountains, Vt.—See Boston-Chicago to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 250.7 miles.

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Directory of Touring Information

(Boston, Mass., Continued.)

Jacksonville, Fla.—See Boston-Atlanta and Atlanta-Jacksonville; 1781.3 miles.

New Orleans, La.—See Boston-Chicago to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2226.8 miles.

Phoenix, Ariz.—See Boston-Chicago; Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 3175.9 miles.

St. Louis, Mo.—See Boston-Chicago and Chicago-St. Louis; 1417.7 miles.

BRIDGEPORT, CONN., TO—

Adirondacks, N. Y.—Reverse Tour No. 51 to Tarrytown, N. Y.; Vacation Tour No. 3 to Adirondacks; 347 miles.

Atlanta, Ga.—Reverse Tour No. 51 to Stamford, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1086.6 miles.

Chicago, Ill.—Reverse Tour No. 51 to Tarrytown, N. Y.; Transcontinental Tour A to Chicago; 1053.3 miles.

Green Mountains, Vt.—Tour No. 51 to Canaan, Conn.; Tour No. 21 to Green mountains; 167.7 miles.

White Mountains, N. H.—Tour No. 51 to Danbury, Conn.; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 337.5 miles.

BUFFALO, N. Y., TO—

Atlanta, Ga.—Vacation Tour No. 2 to Newark, N. J.; reverse Transcontinental Tour B to Atlanta; 1421.8 miles.

Boston, Mass.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 503.2 miles.

Green Mountains, Vt.—See Buffalo-Boston to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 400.8 miles.

Jacksonville, Fla.—See Buffalo-Atlanta and Atlanta-Jacksonville; 1908.2 miles.

New Orleans, La.—Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 1733.3 miles.

Phoenix, Ariz. — Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 2660.7 miles.

St. Louis, Mo. — Transcontinental Tour A to Chicago; see Chicago-St. Louis; 912.5 miles.

White Mountains, N. H.—See Buffalo-Boston to Springfield, Mass.; Tour No. 22 to White mountains; 618.7 miles.

BURLINGTON, VT., TO—

Atlanta, Ga.—Reverse Tour No. 42 to Plattsburg, N. Y.; Tour No. 42 to Cascade Lake, N. Y.; reverse Vacation Tour No. 3 to New York; reverse Transcontinental Tour B to Atlanta; 1401.9 miles.

Boston, Mass.—Reverse Vacation Tour No. 1 to White River Junction, Vt.; Tour No. 43 to Plymouth, N. H.; Tour No. 11 to Boston; 291.2 miles.

Chicago, Ill.—Reverse Tour No. 42 to Plattsburg, N. Y.; Tour No. 42 to Cascade Lake, N. Y.; reverse Vacation Tour No. 3 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1088.1 miles.

Lake Sunapee, N. H.—Reverse Vacation Tour No. 1 to White River Junction, Vt.; Tour No. 43 to Lebanon, N. H.; Tour No. 16 to Lake Sunapee; 132.9 miles.

Moosehead Lake, Me.—Reverse Vacation Tour No. 1 to Montpelier, Vt.; reverse Tour No. 43 to St. Johnsbury, Vt.; Vacation Tour No. 1 to Rumford Point, Me.; reverse tour No. 12 to Farmington Falls, Me.; reverse Tour No. 31 to Moosehead Lake; 332.5 miles.

CHICAGO, ILL., TO—

Atlanta, Ga.—See Chicago-Louisville; see Cleveland-New Orleans to Tuscumbia, Ala.; Transcontinental Tour B to Atlanta; 849 miles.

Louisville, Ky.—South Chicago, Ill.; Hammond, Dyer, St. Johns, Crown Point, Thayer, Morocco, Brook, Goodland, Fowler, Oxford, Otterbein, Montmorenci, Lafayette, Elston, Crawfordsville, New Ross, Jamestown, Indianapolis, Franklin, Taylorville, Columbus, Jonesboro, Seymour, Brownstown, Vallonia, Medora, Leesville, Bedford and Fort Rittner, Ind.; Campbellsburg, Salem, Pekin, Borden, New Albany and Louisville, Ky.; 178.5 miles.

Milwaukee, Wis.—Evanston, Highland Park, Lake Forest, Waukegan and Zion City, Ill.; Kenosha, Racine, South Milwaukee, St. Francis and Milwaukee, Wis.; 91.2 miles.

Minneapolis, Minn.—Transcontinental Tour A to Clinton, Ia.; Lyons, Charlotte, Maquoketa, Fulton, Lamotte, Dubuque, Julien, Centralia, Epworth, Farley, Dyersville, Petersburg, Colesburg, Osterdock, Garnaville, National, Girard and McGregor Ia.; Prairie di Chien, Eastman, Seneca, Mt. Sterling, Rising Sun, Liberty Pole, Viroqua, Westby, Newry, Portland, Middle Ridge, Newberg Corners, St. Joseph and La Crosse, Wis.; La Crescent, Ridgeway, Witoka, Winona, Lewiston, Utica, St. Charles, Dover, Eyota, Chester, Rochester, Pine Island, Zumbrota, Hader, Wastedo, Canon Falls, Westcott, St. Paul, Minneapolis, Minn.; 559.7 miles.

St. Louis, Mo.—La Grange, Joliet, Minooka, Morris, Dwight, Odell, Cayuga, Pontiac, Chenoa, Lexington, Towanda, Bloomington, Lincoln, Elkhart, Williamsville, Springfield, Litchfield, Mt. Olive, Staunton, Worden, Carpenter, Edwardsville, Marysville, Collinsville and East St. Louis, Ill.; St. Louis, Mo.; 334.5 miles.

White Mountains, N. H.—Reverse Transcontinental Tour A to Albany, N. Y.; see Albany-White mountains; 1132.7 miles.

CLEVELAND, O., TO—

Atlanta, Ga.—See Cleveland-Louisville and Louisville-Tuscumbia; Transcontinental Tour B to Atlanta; 1127.6 miles.

Boston, Mass.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 695.1 miles.

Green Mountains, Vt.—See Cleveland-Boston to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 604.7 miles.

Louisville, Ky.—Sandusky, Bellevue, Bloomville, Lykens, Brokensward, Bucyrus, Marion, Norton, Delaware, Worthington, Columbus, Alton, West Jefferson, Lafayette, Brighton, Harmony, Springfield, Fairfield, Dayton, Ridgeville, Lebanon, Pisgah, Reading and Cincinnati, O.; Covington, Florence, Kensington, Crittenden, Williamstown, Corinth, Georgetown, Lexington, Frankfort, Fisherville, Shelbyville, Middletown and Louisville, Ky.; 457.2 miles.

Pittsburg, Penn.—Bedford, Twinsburg, Streetsboro, Ravenna, Edinburg, Deerfield, North Benton, Salem, Washingtonville, Columbiana and Unity, O.; Darlington, Beaver Falls, New Brighton, Rochester, Freedom, Ambridge, Sewickley and Pittsburg, Penn.; 128.9 miles.

White Mountains, N. H.—See Cleveland-Boston to Springfield, Mass.; Tour No. 22 to White mountains; 754.6 miles.

DANBURY, CONN., TO—

Adirondacks, N. Y.—Tour No. 14 to Litchfield, Conn.; Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 293.3 miles.

Atlanta, Ga.—Reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1096.6 miles.

Chicago, Ill.—Reverse Vacation Tour No. 1 to Stamford, Conn.; reverse Tour No. 51 to Tarrytown, N. Y.; Transcontinental Tour A to Chicago; 1063.3 miles.

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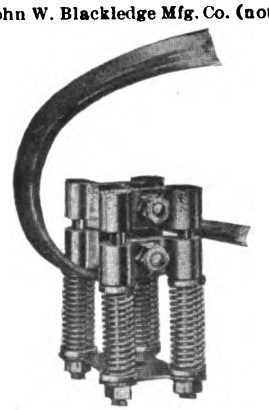
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(Danbury, Conn., Continued.)

Green Mountains, Vt.—See Danbury-Adirondacks to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 152.4 miles.

Newport, R. I.—Reverse Tour No. 14 to New London, Conn.; reverse Vacation Tour No. 1 to Narragansett Pier, R. I.; ferry to Newport; 130.2 miles.

White Mountains, N. H.—Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 313.8 miles.

DENVER, COL., TO—

Kansas City, Mo.—Watkins, Bennett, Strausburg, Byers, Peoria, Deer Trail, Agate, Limon, Bovina, Arriba, Flagler, Siebert, Vona, Stratton, Muskoka and Burlington, Col.; Kanorado, Ruelton, Goodland, Levant, Colby, Mingo, Oakley, Grinnell, Grainfield, Quinter, Voda, Ogallah, Ellis, Hays, Victoria, Walker, Gorham, Russell, Dorrance, Wilson, Ellsworth, Kanopolis, Brookville, Salina, Solomon, Abilene, Junction City, Fort Riley, Ogden, Manhattan, Wamego, Belvue, St. Mary, Rossville, Silver Lake, Topeka, Lawrence, Endora, De Sota and Kansas City, Kan.; Kansas City, Mo.; 674.3 miles.

Phoenix, Ariz.—Littleton, Gann, Sedalia, Colorado Springs, Pueblo, Walsenburg, Pryor, Aculiar, Bowen, Trinidad and Morley, Col.; Raton, Maxwell, French, Springer, Wagon Mound, Las Vegas, Tecolote, Bernal, Pajarita, Bowe, Pecos, Glorieta, Canoncito, Santa Fe, Augua Fria, La Bajada, Algodones, Bernalillo, Sandia, Alameda, Albuquerque, El Rito, Laguna, Paraje, Cuberto, La Vega, Nation's Ranch, Laguna, Salina, Springerville, Cooley's Ranch and Rice, N. M.; Globe, Goldfield, Mesa, Frankenburg and Phoenix, Ariz.; 960.6 miles.

DETROIT, MICH., TO—

Atlanta, Ga. — Ecorse, Wyandotte, Sibley, Trenton, Oldport, Monroe, La Salle and Erie, Mich.; Toledo, Stony Ridge, Luckey, Pemberville, Bradner, Hatton, Fostoria, Alveda, Carey, Crawford, Upper Sandusky, Little Sandusky and Marion, O.; see Cleveland-Atlanta; 1148.1 miles.

Buffalo, N. Y.—Windsor, Blenheim, Guild, Morpeth, Palmyra, Clearville, Wallacetown, Iona, Fingal, Middlemarch, St. Thomas, Lambeth, London, Thamesford, Ingersoll, Beachville, Woodstock, Cathcart, Brantford, Alberton, Ancaster and Hamilton, Ont.; Vacation Tour No. 2 to Buffalo; 188 miles.

Chicago, Ill.—See Detroit-Atlanta to Toledo, O.; Transcontinental Tour A to Chicago; 325.6 miles.

Green Mountains, Vt.—See Detroit-Atlanta to Toledo, O.; reverse Transcontinental Tour A to Albany, N. Y.; see Albany-Green mountains; 774.2 miles.

White Mountains, N. H.—See Detroit-Buffalo; reverse Transcontinental Tour A to Albany, N. Y.; see Albany-White mountains; 740.7 miles.

HARTFORD, CONN., TO—

Adirondacks, N. Y.—Vacation Tour No. 1 to Springfield, Mass; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 282.2 miles.

Atlanta, Ga.—Reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1165.4 miles.

Atlantic City, N. J.—Reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Philadelphia, Penn.; reverse Tour No. 64 to Atlantic City; 324.5 miles.

Boston, Mass.—Tour No. 14 to Worcester, Mass.; Tour No. 13 to Boston; 132.8 miles.

Chicago, Ill.—Vacation Tour No. 1 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1013.3 miles.

Delaware Water Gap, Penn.—Reverse Vacation Tour No. 1 to New York; reverse Vacation Tour No. 2 to Delaware Water Gap; 211.5 miles.

Jacksonville, Fla.—See Hartford-Atlanta and Atlanta-Jacksonville; 1651.8 miles.

Lake Sunapee, N. H.—Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to Lake Sunapee; 141.4 miles.

Moosehead Lake, Me.—See Hartford-Boston; reverse Vacation Tour No. 1 to Portland, Me.; Tour No. 31 to Moosehead lake; 423.8 miles.

Narragansett Pier, R. I.—Tour No. 23 to Providence, R. I.; Vacation Tour No. 1 to Narragansett Pier; 113.2 miles.

New Haven, Conn.—Berlin, Meriden, Tracy, Wallingford, North Haven and New Haven; 37.1 miles.

Newport, R. I.—Tour No. 23 to Providence, R. I.; reverse Tour No. 13 to Newport; 109.8 miles.

White Mountains, N. H.—Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 245 miles.

KANSAS CITY, MO., TO—

Fort Worth, Tex.—Rosedale, Merriam, Shawnee, Lenexa, Pleasant View, Olathe, Bonita, Gardner, Edgerton, Wellsville, Ottawa, Ransomeville, Williamsburg, Silkville, Waverly, Emporia, Elinor, Cottonwood Falls, Elmdale, Clements, Florence, Peabody, Elbing, Newton, Wichita, Peck, Riverdale, Wellington, South Haven, Drury and Caldwell, Kan.; Renfrow, Pond Creek, Kremlin, Enid, Orlando, Mulhall, Guthrie, Edmond, Oklahoma City, Yukon, Elreno, Minco, Pocasset, Chickasha, Verden, Anadarko, Apache, Lawton, Geronimo, Walter, Temple, Hastings, Waurika, Ryan and Terral, Okla.; Ringgold, Stoneburg, Bowie, Fruitland, Sunset, Alvord, Decatur, Rhome, Hicks, Saginaw and Fort Worth, Tex.; 763.9 miles.

Omaha, Neb.—Kansas City, White Church, Piper, Wallula, Lansing, Leavenworth, Lowemont and Atchison, Kan.; Winthrop, Rushville, Halls, South St. Joseph, St. Joseph, Pike, Savannah, Maryville, Wilcox, Burlington Junction and Tarkio, Mo.; Shenandoah, Randolph, Tabor, Glenwood and Council Bluffs, Ia.; Omaha, Neb.; 242.3 miles.

St. Louis, Mo.—Independence, Blue Town, Levasy, Wellington, Lexington, Dover, Waverly, Grand Pass, Malta Bend, Marshall, Arrow Rock, Lamine, Boonville, New Franklin, Columbia, Millersburg, Fulton, Calwood, Williamsburg, Mineola, Danville, Warrenton, Wright City, Wentzville, Colterville, St. Charles, Pattonville, Wellston and St. Louis, Mo.; 299.9 miles.

LOUISVILLE, KY., TO—

Boston, Mass.—Reverse Cleveland-Louisville; reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 1152.3 miles.

Jacksonville, Fla.—See Louisville-Tuscumbia; Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1156.9 miles.

Tuscumbia, Ala.—Mount Washington, Bardstown, New Haven, Athertonville, Buffalo, Canmer, Bear Wallow, Cave City, Mammoth Cave, Glascow Junction, Bowling Green, and Franklin, Ky.; White House, Goodlettsville, Nashville, Brentwood, Neapolis, Columbia, Ridley, Mt. Pleasant, Sandy Hook, Williamsville, Crestville, Summertown, Lawrenceburg, Dunn, Leoma, Pleasant Point and Loretto, Tenn.; Green Hill, St. Florian, Florence, Sheffield and Tuscumbia, Ala.; 341.3 miles.

MEMPHIS, TENN., TO—

New Orleans, La. — Tunica and Evansville, Tenn.; Clayton, Dundee, Lula, Rich, Coahoma, Cloverhill, Clarksdale, Tutwiler, Sumner, Whitehead, Glendora, Black Bayou, Schlater, Greenwood, Lexington, Franklin, Goodman, Pickens, Canton, Madison, Ridgeland, Tougaloo, Jackson, Terry, Crystal Springs, Hazlehurst, Beauregard, Brookhaven, Norfield, Johnston and Osyka, Miss.; Kentwood, Greensburg, Baton Rouge, Darrow, Kenner and New Orleans, La.; 583.5 miles.

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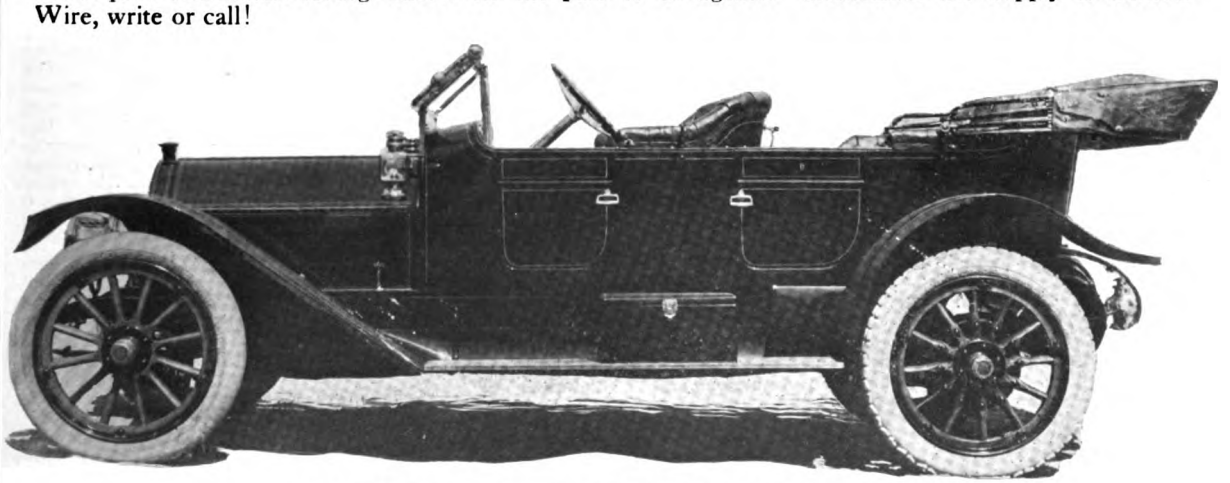
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(Memphis, Tenn., Continued.)

nental Tour B to Forrest City, Ark.; reverse St. Louis-Forrest City; 440.6 miles.

MINNEAPOLIS, MINN., TO—

Atlanta, Ga.—Reverse Chicago-Minneapolis; see Chicago-Atlanta; 1408.7 miles.

Boston, Mass. — Reverse Chicago-Minneapolis; reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 1642.9 miles.

Helena, Mont.—Robinsdale, Osseo, Anoka, Elk River, Becker, Clear Lake, Cable, St. Cloud, St. Joe, Avon, Albany, Freeport, Melrose, Sauk Center, Osakis, Alexandria, Garfield, Brandon and Evansville, Minn.; Melby, Ashby, Dalton, Fergus Falls, Rothsay, Barnesville, Baker, Moorhead, Fargo, Georgetown, Halstad, Shelley, Neilsville, Climax, Eldred, Carmen, East Grand Forks, Grand Forks, Ojata, Emerado, Arvilla, Larimore, Niagara, Petersburg, Michigan, Mapes, Lakota, Bartlett, Crary, Devils Lake, Penn, Church's Ferry, Leeds, Knox, Pleasant Lake, Fero, Rugby, Tunbridge, Towner, Denbeigh, Riga, Granville, Surrey, Minot, Burlington, Tasker, Berthold, Blaisdale, Palmero, Wians, Tioga, Temple, Williston and Buford, N. D.; Mondak, Bainesville, Lanark, Culberson, Brockton, Poplar, Nashua, Glasgow, Sago, Malta, Dodson, Harlem, Zurick, Chinnock, Yantic, Havre, Fort Assinniboine, Big Sandy, Teton, Fort Benton, Great Falls, Ulm, Riverdale, Cascade, St. Peter, Wolf Creek, Mitchell, Silver and Helena, Mont.; 1288.5 miles.

Winnipeg, Man.—See Minneapolis-Helena to Grand Forks, N. D.; Manville, Ardoch, Minto, Grafton, Auburn, St. Thomas, Glasston, Hamilton and Pembina, N. D.; Emerson, Letellier, St. Jean Baptiste, Morris, St. Nagarde, St. Norbert and Winnipeg, Man.; 520.4 miles.

NEW HAVEN, CONN., TO—

Adirondacks, N. Y.—Tour No. 14 to Litchfield, Conn.; Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 328.2 miles.

Atlanta, Ga. — See New Haven-Bridgeport; reverse Tour No. 51 to Stamford, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1204.1 miles.

Boston, Mass.—Reverse Tour No. 14 to New London; reverse Vacation Tour No. 1 to Boston; 172.4 miles.

Bridgeport, Conn. — West Haven, Woodmont, Milford, Stratford and Bridgeport; 17.5 miles.

Chicago, Ill. — See New Haven-Bridgeport; reverse Tour No. 51 to Tarrytown, N. Y.; Transcontinental Tour A to Chicago; 1070.8 miles.

Green Mountains, Vt.—Tour No. 14 to Danbury, Conn.; Tour No. 51 to Canaan, Conn.; Tour No. 21 to Green mountains; 173.5 miles.

Jacksonville, Fla.—See New Haven-Atlanta and Atlanta-Jacksonville; 1690.5 miles.

New Orleans, La.—See New Haven-Chicago to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis; see Memphis-New Orleans; 2244 miles.

New Orleans, La.—See New Haven-Atlanta; reverse Transcontinental Tour B to Memphis; see Memphis-New Orleans; 2276.2 miles.

White Mountains, N. H.—Reverse Hartford-New Haven; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 292.1 miles.

NEWPORT, R. I., TO—

Adirondacks, N. Y.—Tour No. 13 to Providence, R. I.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 365.2 miles.

Atlanta, Ga.—Ferry to Narragansett Pier, R. I.; Vacation Tour No. 1 to New London, Conn.; Tour No. 14 to New Haven, Conn.; see New Haven-Bridgeport; reverse Tour No. 51 to Stamford, Conn.; reverse Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1299.4 miles.

Chicago, Ill.—Tour No. 13 to Providence, R. I.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1089.9 miles.

Jacksonville, Fla.—See Newport-Atlanta and Atlanta-Jacksonville; 1785.8 miles.

Rangeley Lakes, Me.—Tour No. 13 to Providence, R. I.; reverse Vacation Tour No. 1 to Portland, Me.; reverse Tour No. 31 to Rangeley lakes; 346.8 miles.

White Mountains, N. H.—See Newport-Rangeley lakes to Boston, Mass.; reverse Tour No. 11 to Portsmouth, N. H.; reverse Tour No. 16 to White mountains; 263.3 miles.

NORFOLK, VA., TO—

Atlanta, Ga.—See Norfolk-Petersburg; reverse Transcontinental Tour B to Atlanta; 739.2 miles.

Green Mountains, Vt.—See Norfolk-Petersburg; Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 729.8 miles.

Petersburg, Va.—Portsmouth ferry, Hodge's ferry, Shoulder Hill, Morris Fork, Stevers, Suffolk, King's Forks, Windsor, Zuni, Ivor, Wakefield, Waverly, Disputanta, Estes and Petersburg; 98 miles.

White Mountains, N. H.—See Norfolk-Petersburg; Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 867.2 miles.

PHILADELPHIA, PENN., TO—

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 357 miles.

Chicago, Ill.—See Philadelphia-Pittsburg; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 842.8 miles.

Green Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 355.1 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1424.3 miles.

New Orleans, La.—Reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2010 miles.

Pittsburg, Penn.—Bryn Mawr, Devon, Malvern, Downingtown, Coatesville, Sadsburyville, Strasburg, Paradise, Lancester, Columbia, Wrightsville, York, Abbottstown, New Oxford, Gettysburg, Seven Stars, McKnightstown, Cashtown, Fayetteville, Chambersburg, St. Thomas, Fort Loudon, McConnellsburg, Harrisonville, Breezewood, Everett, Bedford, Pleasantville, Felix, Windber, Geistown, Johnstown, Cramer, Armagh, Blairsville, New Alexandria, Greensburg, Adamsburg, East McKeesport, Wilmerdling, Wilkinsburg and Pittsburg; 315.5 miles.

White Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 472.5 miles.

PHOENIX, ARIZ., TO—

Boston, Mass. — Reverse Denver-Phoenix; reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 3175.9 miles.

Grand Canyon, Ariz.—Clarks, Alhambra, Glendale, Peoria, Marinette, Beardsley, Hot Springs Junction, Wickensburg, Congress Junction, Stanton, Yarnell, Kirkland, Skull Valley, Prescott, Dewey, Cherry Creek, Camp Verde, Flagstaff, Grand View and Grand Canyon; 351.6 miles.

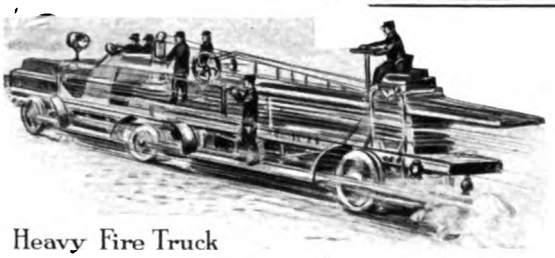
PORTLAND, ME., TO—

Adirondacks, N. Y.—Reverse Tour No. 31 to Poland Spring, Me.; reverse Tour No. 12 to Conway, N. H.; Tour No. 16 to Wells River, Vt.; Tour No. 43 to Montpelier, Vt.; Va-

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Meets All Demands That Any Motor Can Put Upon It

TEXACO MOTOR OIL



Heavy Fire Truck



Heavy Pleasure Car



Light Pleasure Car

Greater Mileage, Less Consumption, No Carbon —Proven by Test

Texaco Motor Oil has been put to many severe and interesting tests. The results are important to every car owner. They are proofs of quality—of service rendered.

A brief summary of three of these tests tells the story. They include use in a very heavy truck, in a heavy pleasure car and in a light pleasure car. Note the increase in power, decrease in consumption, absence of carbon, and cleanness of spark plugs.

Tests in Hook and Ladder Fire Truck at Factory

Three oils used in this test. Competitors' oils indicated by letters "A" and "B." Conditions under which oils were tested were the same except that at the beginning of third test, that of Texaco Motor Oil, motor was badly overheated due to the two tests that had preceded. Motor cooled during the test of Texaco Motor Oil. About ten minutes intervened between first and second and second and third tests. For the purpose of the test a long, very steep hill was used. Truck was sent at it from a standing start.

	"A"	"B"	Texaco
Oil used			
Distance run	¾ way up hill. Motor stalled. Truck backed down under brakes.	½ way up hill. Motor stalled. Truck backed down under brakes.	To top of hill. Truck turned and descended with motor running.
Condition of motor beginning of test	Perfect	Overheated	Badly Overheated.
Condition of motor end of test	Overheated	Badly Overheated	*Good*
Saving in Oil consumption	None	None	25%

Tests in "Cadillac" and "Winton Six"

	In "Cadillac"	In "Winton"
Oil used	Texaco	Texaco
Duration of use	*Two years*	One year
Distance traveled, miles	5,000	20,000
Condition of motor, beginning	Perfect	Perfect
Condition of motor, end	*Perfect*	*Perfect*
Repairs of motor	*None*	*None*
Carbon deposit	*None*	*None*
Cleaning of spark plugs	*None*	*None*

Texaco Motor Oil is sold in one and five gallon cans at most garages and supply shops. Look for the can with the inner seal and long, detachable spout. Colors—green with red star.

We have prepared a booklet, "About Motor Lubrication." We want every owner of a motor car to read it. Your copy is waiting for you. Address Dept. E. 7 West St., N. Y. City.

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Directory of Touring Information

(Portland, Me., Continued.)

cation Tour No. 1 to Burlington, Vt.; Tour No. 42 to Adirondacks; 364.6 miles.

Atlanta, Ga.—Vacation Tour No. 1 to New London, Conn.; Tour No. 14 to New Haven, Conn.; see New Haven-Bridgeport; reverse Tour No. 51 to Stamford, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1403.8 miles.

Chicago, Ill.—Vacation Tour No. 1 to Boston, Mass.; see Boston-Chicago; 1210 miles.

Green Mountains, Vt.—Reverse Tour No. 31 to Poland Spring, Me.; reverse Tour No. 12 to Plymouth, N. H.; reverse Tour No. 43 to Green mountains; 237.1 miles.

Jacksonville, Fla.—See Portland-Atlanta and Atlanta-Jacksonville; 1890.2 miles.

PROVIDENCE, R. I., TO—

Adirondacks, N. Y.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 337 miles.

Atlanta, Ga.—Vacation Tour No. 1 to New London, Conn.; Tour No. 14 to New Haven, Conn.; see New Haven-Bridgeport; reverse Tour No. 51 to Stamford, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1231.5 miles.

Chicago, Ill.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1061.9 miles.

Green Mountains, Vt.—Tour No. 23 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 196.1 miles.

Jacksonville, Fla.—See Providence-Atlanta and Atlanta-Jacksonville; 1717.9 miles.

New Orleans, La.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2215.2 miles.

Rangeley Lakes, Me.—Reverse Vacation Tour No. 1 to Portland, Me.; reverse Tour No. 31 to Rangeley lakes; 318.6 miles.

White Mountains, N. H.—Reverse Vacation Tour No. 1 to Portsmouth, N. H.; Tour No. 16 to White mountains; 235.1 miles.

RICHMOND, VA., TO—

Adirondacks, N. Y.—Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 701.2 miles.

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 631 miles.

Chicago, Ill.—Transcontinental Tour B to Washington, D. C.; reverse Vacation Tour No. 3 to Pittsburg, Penn.; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 909.3 miles.

Green Mountains, Vt.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 609.1 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1150.3 miles.

White Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 746.5 miles.

ROCHESTER, N. Y., TO—

Atlanta, Ga.—Transcontinental Tour A to Buffalo, N. Y.; Vacation Tour No. 3 to Washington, D. C.; reverse Transcontinental Tour B to Atlanta; 1482.3 miles.

Green Mountains, Vt. — Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 329 miles.

Jacksonville, Fla.—See Rochester-Atlanta and Atlanta-Jacksonville; 1969.1 miles.

White Mountains, N. H.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Rutland, Vt.; Tour No. 43 to Conway, N. H.; Tour No. 16 to White mountains; 520.7 miles.

RUTLAND, VT., TO—

Adirondacks, N. Y.—Vacation Tour No. 2 to Keeseville, N. Y.; Tour No. 42 to Adirondacks; 131.4 miles.

Atlanta, Ga.—Reverse Vacation Tour No. 2 to New York; reverse Transcontinental Tour B to Atlanta; 1273.8 miles.

Chicago, Ill.—Reverse Vacation Tour No. 2 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1017.2 miles.

Moosehead Lake, Me.—Tour No. 43 to Plymouth, N. H.; Tour No. 12 to Augusta, Me.; Tour No. 31 to Moosehead lake; 352.5 miles.

White Mountains, N. H.—Tour No. 43 to Plymouth, N. H.; Tour No. 2 to Conway, N. H.; Tour No. 16 to White mountains; 158.4 miles.

SALT LAKE CITY, UTAH, TO—

Yellowstone National Park, Wyo.—Transcontinental Tour A to Ogden, Utah; North Ogden, Pleasant View, Utah Hot Springs, Willard, Brigham City, Honeyville, Deweyville, Collinston, Fielding and Cherry Creek, Utah; Malad, Arimo, McCammon, Onyx, Inkom, Portneuf, Pocatello, Ross Fork, Gibson, Blackfoot, Firth, Shelly, Bach, Idaho Falls, Rigby, Lorenzo, Rexburg, Salem, St. Anthony, Ora, Uden's Elk Ranch and Continental Divide, Idaho; Yellowstone National Park; 343.3 miles.

ST. LOUIS, MO., TO—

Atlanta, Ga.—See St. Louis-Forrest City; Transcontinental Tour B to Atlanta; 929.2 miles.

Boston, Mass.—Reverse Chicago-St. Louis; reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 1417.7 miles.

Forrest City, Ark.—Maxville, Antonia, Hillsboro, Victoria, De Soto, Bonne Terre, Des Loge, St. Francois, Flat River, Farmington, Valley Forge, Weingarten, New Offenburg, Ste. Genevieve, Perryville, Longtown, Uniontown, Appleton, Fruitland, Jackson, Cape Girardeau, Dutchtown, Allenville, Aquilla, Bloomfield, Dexter, Campbell and St. Francis, Mo.; Piggott, Rector, Marmaduke, Paragould, Brookland, Jonesboro, Greenfield, Harrisburg, Whitehall, Wynne and Forrest City, Ark.; 392.6 miles.

New Orleans, La.—See St. Louis-Forrest City; Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 1024.1 miles.

Phoenix, Ariz. — Reverse Kansas City-St. Louis and Denver-Kansas City; see Denver-Phoenix; 1934.8 miles.

San Francisco, Cal.—See St. Louis-Phoenix to Denver, Col.; Transcontinental Tour A to San Francisco; 2599.3 miles.

SAVANNAH, GA., TO—

Adirondacks, N. Y.—Reverse Atlanta-Jacksonville; Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 1675.2 miles.

Boston, Mass. — Reverse Atlanta-Jacksonville; Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 1605 miles.

Chicago, Ill.—Reverse Atlanta-Jacksonville; see Atlanta-Chicago; 1159.1 miles.

White Mountains, N. H.—Reverse Atlanta-Jacksonville; see Atlanta-White mountains; 1720.5 miles.

SEATTLE, WASH., TO—

Boise, Idaho—North Bend, Lake Keehaulis, Easton, Ellensburg, North Yakoma, Prosser and Walla Walla, Wash.; Sommerville, Union Station, North Powderle and Baker City, Ore.; Olds Ferry, Weiser and Boise, Idaho; 521 miles.

Vancouver, B. C.—Everett, Bellingham and Blaine, Wash.; Douglas,

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More Jewelers Than Blacksmiths Work on the Warner Auto-Meter

For the Warner is a *jeweled* instrument. It is the product of *jewelers* and experienced instrument makers.

It is built with more care than many watches.

For it must *do* more than any watch ever built.

It must possess Waltham *exactness*, Elgin *sensitiveness*, Howard *dependability* yet be able to endure the persistent cruelty of severe vibration at all times, in all weather, in frigid or torrid temperature. It must possess, above all, Warner *endurance*.

Some watches are sold at retail for four dollars. There is a certain market for these watches.

But there is a *greater* market for *high quality* watches since the advent of the cheaper tickers.

The *high* quality watches win by *contrast*, by *comparison*.

More quality Warners have been sold this year because 1912 is a *quality* year.

By comparison and contrast the Warner is chosen by far-sighted car manufacturers, dealers and owners.



Model K-2

Price Complete

$75

Diameter 4 1-2 inches. Season odometer registers 100,000 miles and repeat. Trip odometer, 1,000 miles and repeat. Indicates all speeds up to 60 miles an hour. Finished in brass, nickel or black enamel with brass or nickel bezel. Hooded electric light connection under the glass concentrates rays of light on speed and distance figures.

Automobile Manufacturers

are *glad* to *pay* for quality because the Warner, as part of their car's equipment, helps to give the car class and distinction—allows the owner to drive the car *intelligently*—to *know* what the car is *doing*—to put the x-ray on the car's service *every minute*.

Such a manufacturer *must* be far-sighted to do this. He *must* be figuring on the owner's *lasting* satisfaction.

For the Warner is built to *last*. It is about as hard to figure the duration of Warner service as to know the exact life of the high-grade watch. We *do* know that the instruments we made in the very earliest days of manufacture are still giving the same accurate service. Many of these have registered over 100,000 miles and have been used on five and six different cars.

Warner Instrument Co.,

Main Offices and Factory: 1287 Wheeler Avenue,

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The Warner may be secured through reputable automobile dealers in any city or town in the United States.

WARNER AUTO-METER

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(Seattle, Wash., Continued.)

New Westminster and Vancouver, B. C.; 156 miles.

SPRINGFIELD, MASS., TO—

Adirondacks, N. Y.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 254.4 miles.

Atlanta, Ga.—Reverse Vacation Tour No. 1 to New York; reverse Transtinental Tour B to Atlanta; 1193.2 miles.

Catskills, N. Y.—Tour No. 23 to Pittsfield, Mass.; reverse Tour No. 52 to Catskills; 160.8 miles.

Chicago, Ill.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 983.2 miles.

Green Mountains, Vt.—Tour No. 23 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 113.5 miles.

Jacksonville, Fla.—See Springfield-Atlanta and Atlanta-Jacksonville; 1697.6 miles.

New Orleans, La.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2136.5 miles.

Newport, R. I.—Reverse Tour No. 23 to Providence, R. I.; reverse Tour No. 13 to Newport; 110.8 miles.

Phoenix, Aris.—Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 3776.1 miles.

Rangeley Lakes, Me.—Reverse Tour No. 22 to Portsmouth, N. H.; reverse Vacation Tour No. 1 to Portland, Me.; reverse Tour No. 31 to Rangeley lakes; 300.1 miles.

St. Louis, Mo.—See Springfield-Chicago and Chicago-St. Louis; 1317.7 miles.

SYRACUSE, N. Y., TO—

Atlanta, Ga.—Reverse Transcontinental Tour A to New York; reverse Transcontinental Tour B to Atlanta; 1329.7 miles.

Boston, Mass.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 342.9 miles.

Green Mountains, Vt. — Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 3 to Green mountains; 240.8 miles.

New Orleans, La.—Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 1895.2 miles.

Phoenix, Aris. — Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 3535.3 miles.

White Mountains, N. H.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Rutland, Vt.; Tour No. 43 to Plymouth, N. H.; Tour No. 12 to Conway, N. H.; Tour No. 16 to White mountains; 432.5 miles.

TOLEDO, O., TO—

Adirondacks, N. Y.—Reverse Transcontinental Tour A to Buffalo, N. Y.; reverse Vacation Tour No. 3 to Adirondacks; 754.2 miles.

Atlanta, Ga.—Reverse Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; Transcontinental Tour B to Atlanta; 1248.6 miles.

Boston, Mass.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; reverse Tour No. 23 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 816.1 miles.

St. Louis, Mo. — Transcontinental Tour A to Chicago; see Chicago-St. Louis; 601.6 miles.

New Orleans, La.—Reverse Transcontinental Tour A to Cleveland O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 1662.4 miles.

Washington, D. C.—Reverse Transcontinental Tour A to Cleveland, O.; see Cleveland-Pittsburg; Vacation Tour No. 3 to Washington; 520.6 miles.

White Mountains, N. H.—Reverse Transcontinental Tour A to Albany, N. Y.; reverse Tour No. 52 to Pittsfield, Mass.; Vacation Tour No. 2 to Rutland, Vt.; Tour No. 43 to Plymouth, N. H.; Tour No. 12 to Conway, N. H.; Tour No. 16 to White mountains; 908.5 miles.

TRENTON, N. J., TO—

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 322.9 miles.

Chicago, Ill.—Reverse Transcontinental Tour B to Philadelphia; see Philadelphia - Pittsburg; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 877.9 miles.

Green Mountains, Vt.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 266.7 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1458.4 miles.

Niagara Falls, N. Y.—Reverse Tour No. 63 to Delaware Water Gap, Penn.; reverse Vacation Tour No. 2 to Niagara Falls; 431.1 miles.

White Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 438.4 miles.

WASHINGTON, D. C., TO—

Adirondacks, N. Y.—Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 583.6 miles.

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 509.4 miles.

Chicago, Ill.—Reverse Vacation Tour No. 3 to Pittsburg, Penn.; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 787.7 miles.

Green Mountains, Vt.—Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 487.5 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1291.9 miles.

White Mountains, N. H.—Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 624.9 miles.

WATERBURY, CONN., TO—

Adirondacks, N. Y.—Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 274.9 miles.

Atlanta, Ga.—Reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1128.6 miles.

Boston, Mass.—Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 166.3 miles.

Chicago, Ill.—Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 999.6 miles.

Jacksonville, Fla.—See Waterbury-Atlanta and Atlanta-Jacksonville; 1615 miles.

New Orleans, La.—See Waterbury-Adirondacks to Albany, N. Y.; Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2152.9 miles.

Niagara Falls, N. Y.—Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Buffalo, N. Y.; reverse Vacation Tour No. 2 to Niagara Falls; 441.2 miles.

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Preserves Roads
Prevents Dust~



Boulevard--East Side Mississippi River--Minneapolis, Minn. Road treated with Tarvia A.

Tarvia "makes good" in Minneapolis

MINNEAPOLIS has been using Tarvia since 1907—and is using it still. On November 24, 1911, Mr. Theodore Wirth, Superintendent of the Board of Park Commissioners, Minneapolis wrote—

"The Tarvia applied on Minnehaha Avenue in October, 1907, *gave very satisfactory results.* The application was made under the most ideal conditions, the new road-bed being just right to receive the binder and the screenings used for covering being of excellent quality. The surface withstood the traffic well and although the treatment has not been repeated, the road-bed is *still in fairly good condition.*

The 46th St. section of King's Highway was similarly treated in September, 1908, but in place of using stone screenings for covering, we used a fine pea gravel, which gave a pleasing color and a still better wearing surface.

The last piece of tarviating we did was on the new River Road, East from Franklin Avenue, South to the City limits, where we also used pea gravel for dressing over Tarvia coating, with the same excellent results.

This road was finished in June, 1910, and has been in constant use ever since by an immense amount of automobile traffic. I hope to be able to treat this road again with Tarvia next Spring. I am *well pleased* with the results of Tarvia on our roads."

There are three kinds of Tarvia—Tarvia X for road and pavement construction, Tarvia A for surface work and Tarvia B for dust suppression and road preservation.

Booklet describing these treatments free on request

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TRADE B MARK

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(Waterbury, Conn., Continued.)

White Mountains, N. H.—Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 281.8 miles.

WHEELING, W. VA., TO—

Adirondacks, N. Y.—See Wheeling-Washington, Penn.; reverse Vacation Tour No. 3 to Adirondacks; 756 miles.

Atlanta, Ga.—See Wheeling-Washington, Penn.; Vacation Tour No. 3 to Washington, D. C.; reverse Transcontinental Tour B to Atlanta; 1059.4 miles.

Chicago, Ill.—See Wheeling-Washington, Penn.; reverse Vacation Tour No. 3 to Pittsburg, Penn.; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 589.7 miles.

Green Mountains, Vt.—See Wheeling-Washington, Penn.; reverse Vacation Tour No. 3 to Pittsburg, Penn.; reverse Philadelphia-Pittsburg; Transcontinental Tour B to New York; Vacation Tour No. 2 to Green mountains; 731 miles.

Jacksonville, Fla.—See Wheeling-Atlanta and Atlanta-Jacksonville; 1546.8 miles.

Washington, Penn.—Elm Grove, W. Va., West Alexander and Washington, Penn.; 32.7 miles.

White Mountains, N. H.—See Wheeling-Green mountains to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 850.4 miles.

WILKESBARRE, PENN., TO—

Atlanta, Ga.—Vacation Tour No. 2 to Newark, N. J.; reverse Transcontinental Tour B to Atlanta; 1059.6 miles.

Chicago, Ill.—Reverse Vacation Tour No. 2 to Buffalo, N. Y.; Transcontinental Tour A to Chicago; 843.2 miles.

Green Mountains, Vt.—Vacation Tour No. 2 to New York and Vacation Tour No. 2 to Green mountains; 382.7 miles.

White Mountains, N. H.—Vacation Tour No. 2 to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 520.1 miles.

WILLIMANTIC, CONN., TO—

Adirondacks, N. Y.—Reverse Tour No. 23 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 315.1 miles.

Atlantic City, N. J.—Reverse Tour No. 23 to Hartford, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Philadelphia; reverse Tour No. 64 to Atlantic City; 348 miles.

Green Mountains, Vt.—See Willimantic-Adirondacks to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 202.8 miles.

Newport, R. I.—Tour No. 23 to Providence, R. I.; reverse Tour No. 13 to Newport; 72 miles.

White Mountains, N. H.—Reverse Tour No. 23 to Springfield, Mass.; Tour No. 22 to White mountains; 271 miles.

WILMINGTON, DEL., TO—

Adirondacks, N. Y.—Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 457.7 miles.

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Stamford, Conn.; Tour No. 51 to Bridgeport, Conn.; reverse New Haven-Bridgeport; reverse Tour No. 14 to New London, Conn.; reverse Vacation Tour No. 1 to Boston; 369.1 miles.

Chicago, Ill.—Transcontinental Tour B to Philadelphia; see Philadelphia-Chicago; 873.3 miles.

Jacksonville, Fla.—Reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1393.8 miles.

Moosehead Lake, Me.—See Wilmington-Boston; reverse Vacation Tour No. 1 to Portland, Me.; Tour No. 31 to Moosehead lake; 660.1 miles.

White Mountains, N. H.—Transconnental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 503 miles.

WINCHESTER, VA., TO—

Atlanta, Ga.—Vacation Tour No. 3 to Washington, D. C.; reverse Transcontinental Tour B to Atlanta; 955.6 miles.

Boston, Mass.—Vacation Tour No. 3 to Washington, D. C.; Transcontinental Tour B to New York City; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 597.5 miles.

Chicago, Ill. — Reverse Vacation Tour No. 3 to Pittsburg, Penn.; reverse Cleveland-Pittsburg; Transcontinental Tour A to Chicago; 717.6 miles.

Jacksonville, Fla.—Vacation Tour No. 3 to Washington, D. C.; reverse Transcontinental Tour B to Atlanta, Ga.; see Atlanta-Jacksonville; 1442 miles.

White Mountains, N. H.—Vacation Tour No. 3 to Washington, D. C.; Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 695 miles.

WINSTED, CONN., TO—

Adirondacks, N. Y.—Norfolk, East Canaan, Conn.; Tour No. 21 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Vacation Tour No. 3 to Adirondacks; 250.3 miles.

Atlanta, Ga.—Reverse Tour No. 14 to Danbury, Conn.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1132 miles.

Boston, Mass.—Tour No. 14 to Worcester, Mass.; Tour No. 13 to Boston; 178.5 miles.

Chicago, Ill.—See Winsted-Adirondacks to Albany, N. Y.; Transcontinental Tour A to Chicago; 976 miles.

Green Mountains, Vt.—See Winsted-Adirondacks to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 141.4 miles.

Jacksonville, Fla.—See Winsted-Atlanta and Atlanta-Jacksonville; 1628.4 miles.

White Mountains, N. H.—Tour No. 14 to Hartford, Conn.; Vacation Tour No. 1 to Springfield, Mass.; Tour No. 22 to White mountains; 290.7 miles.

WINSTON-SALEM, N. C., TO—

Adirondacks, N. Y.—Transcontinental Tour B to New York; Vacation Tour No. 3 to Adirondacks; 995.6 miles.

Boston, Mass. — Transcontinental Tour B to New York; Vacation Tour No. 1 to Springfield, Mass.; reverse Tour No. 22 to Worcester, Mass.; Tour No. 13 to Boston; 925.4 miles.

WORCESTER, MASS., TO—

Adirondacks, N. Y.—Tour No. 15 to Brattleboro, Vt.; Vacation Tour No. 1 to Burlington, Vt.; Tour No. 42 to Adirondacks; 390.2 miles.

Atlanta, Ga.—Tour No. 22 to Springfield, Mass.; reverse Vacation Tour No. 1 to New York; reverse Transcontinental Tour B to Atlanta; 1213.7 miles.

Chicago, Ill.—Tour No. 22 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass., tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Chicago; 1033.7 miles.

Green Mountains, Vt.—Tour No. 22 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Vacation Tour No. 2 to Green mountains; 195 miles.

Jacksonville, Fla.—See Worcester-Atlanta and Atlanta-Jacksonville; 1700.1 miles.

Moosehead Lake, Me.—Reverse Tour No. 22 to Portsmouth, N. H.; reverse Vacation Tour No. 1 to Portland, Me.; Tour No. 31 to Moosehead lake; 316.4 miles.

New Orleans, La.—Tour No. 22 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass.; Tour No. 52 to Albany, N. Y.; Transcontinental Tour A to Cleveland, O.; see Cleveland-Louisville and Louisville-Tuscumbia; reverse Transcontinental Tour B to Memphis, Tenn.; see Memphis-New Orleans; 2180.8 miles.

Phoenix, Ariz.—See Worcester-Chicago; Transcontinental Tour A to Denver, Col.; see Denver-Phoenix; 3820.4 miles.

St. Louis, Mo.—See Worcester-Chicago and Chicago-St. Louis; 1372 miles.

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ARE, without doubt, the best known motor trucks in the United States today. Among the prominent users of motor trucks in this country, the owners of White trucks are by far in the majority.

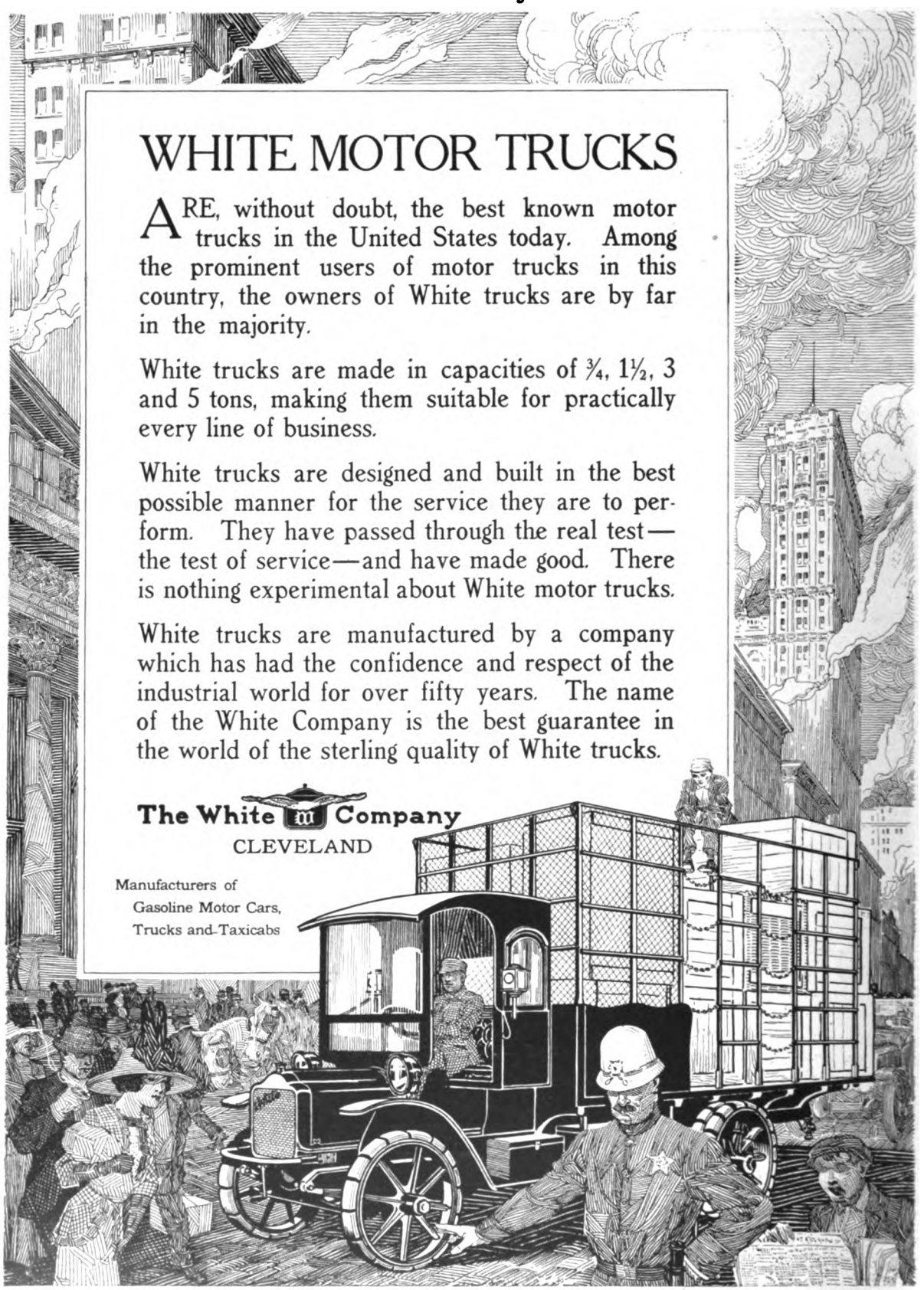
White trucks are made in capacities of ¾, 1½, 3 and 5 tons, making them suitable for practically every line of business.

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White trucks are manufactured by a company which has had the confidence and respect of the industrial world for over fifty years. The name of the White Company is the best guarantee in the world of the sterling quality of White trucks.

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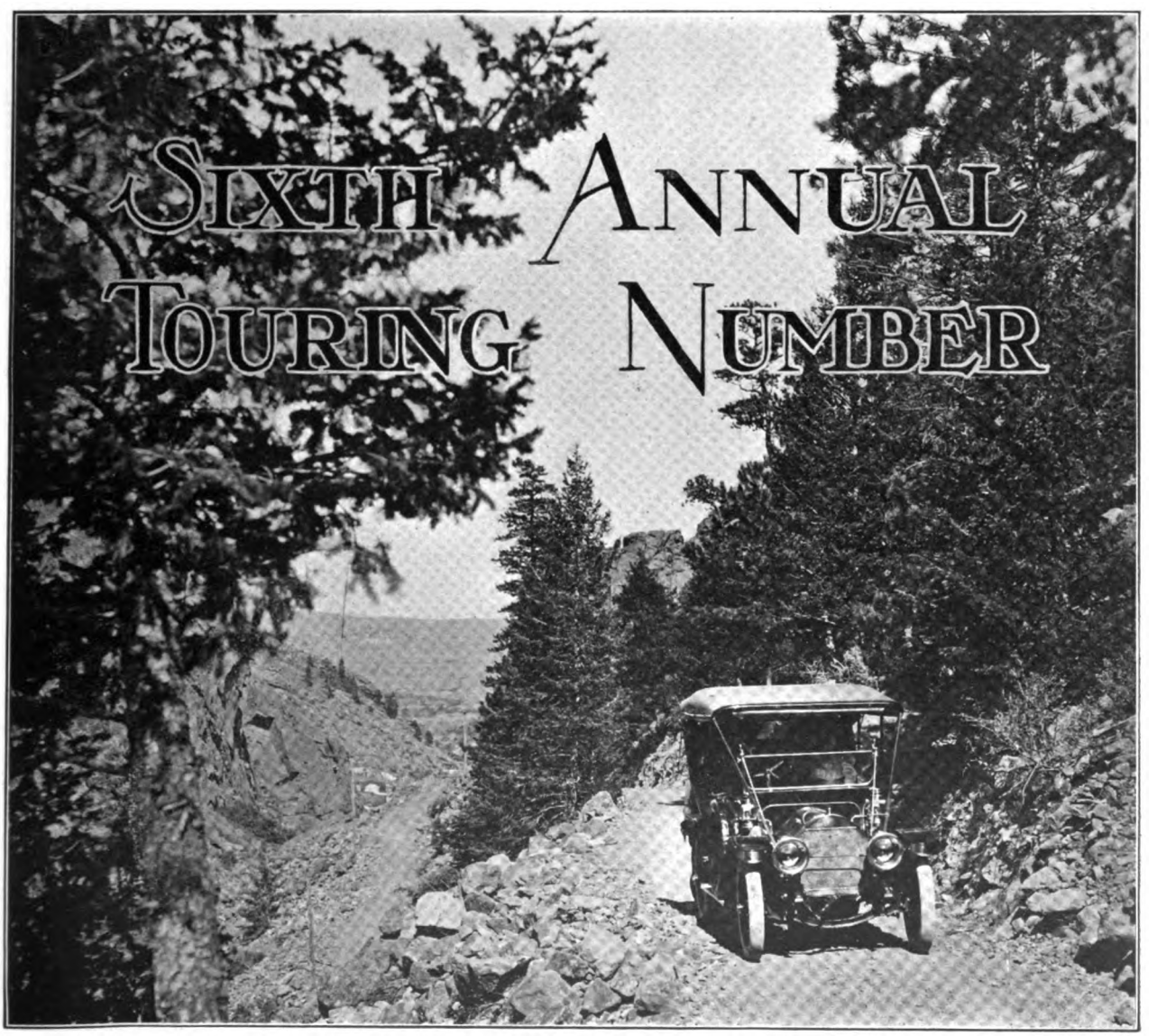
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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 11 July 10, 1912 Price $1.00 the Year



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THE SIXTH ANNUAL TOURING NUMBER.

FOLLOWING a plan which has met with decided approval on the part of thousands of motoring tourists, The Automobile Journal presents its Sixth Annual Touring Number. There is little need of enlarging upon the benefits accruing from spending the vacation in the motor car, or upon the value of this compendium of touring information. Each of the five numbers which have preceded it has been retained throughout the season as an authoritative compilation—a book of reference to be carried in the car continuously.

America is still a land of magnificent distances, but the automobile has demonstrated that distance is no longer a deterrent to the thorough enjoyment of what nature has provided. In view of the growing interest in transcontinental touring, it has been thought advisable to extend the scope of this year's Annual Touring Number to include the entire country. The splendid vacation grounds of New England and the East have not been neglected, however. In this respect, the information will be found to be even more complete than in previous years.

While the tendency to "See America First" is more marked than ever before, it is recognized that many Americans still delight in visiting Continental Europe. The information contained herein will place at the disposal of these every facility for making the trip a pleasure. The same thing holds true of those tours which enter the Dominion of Canada.

The digest of motoring laws in the United States, the preparation of the car and its equipment, the suggestions as to accessories and fittings that increase the enjoyment of touring, the hints as to wearing apparel—each has its place in a comprehensive number of this nature, and each will be appreciated by the thoughtful tourist. Nothing has been omitted. In every respect this Sixth Annual Touring Number is the most complete publication of its kind that ever has been placed before the motoring public.

Regarding the American section, it may be stated that each itinerary has been prepared with a view to connecting with every other tour, so that the motorist may start from any section of the country and visit any other section. In the preceding pages will be found an index to this information, the idea being simply to offer a few suggestions as to the possibilities of the itineraries which follow. Inasmuch as it would be impractical to index every combination, this list is suggestive merely. However, by a careful study of the general plan the tourist should have no difficulty in arranging his vacation to suit his fancy in every respect.

It ought to be said, that the various tours presented have been laid out primarily to suit the busy man, who may have opportunity to get away from work for a few days, but hesitates through lack of information as to where to go and how best to employ his time. The routes are not necessarily the shortest between the given points, but have been selected as offering a wide diversity of interesting scenery or for some similar reason. While some the itineraries have been published previously, all have been thoroughly revised and present the very latest information of the territory covered.

A feature of this number is the very handsome photographs illustrating the text matter, and The Automobile Journal is indebted to a large number of parties for courtesies in this regard, as well as for information concerning road conditions and other detail. Among those who have rendered valuable assistance may be mentioned: Boston & Maine, Bangor & Aroostook, Pennsylvania, Philadelphia & Reading, New York, Ontario & Western, Delaware, Lackawanna & Western, New York Central, Lehigh Valley, Grand Trunk and Great Northern railroads, the boards of trade in practically all the cities of the West and Pacific Coast, Raymond & Whitcomb Company, and a large number of individuals some of whom are mentioned by name elsewhere in this issue.



Macadam Way Invites the Motoring Tourist to Explore the Wonders of the Garden of the Gods.

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PRACTICAL TRANSCONTINENTAL ITINERARIES.

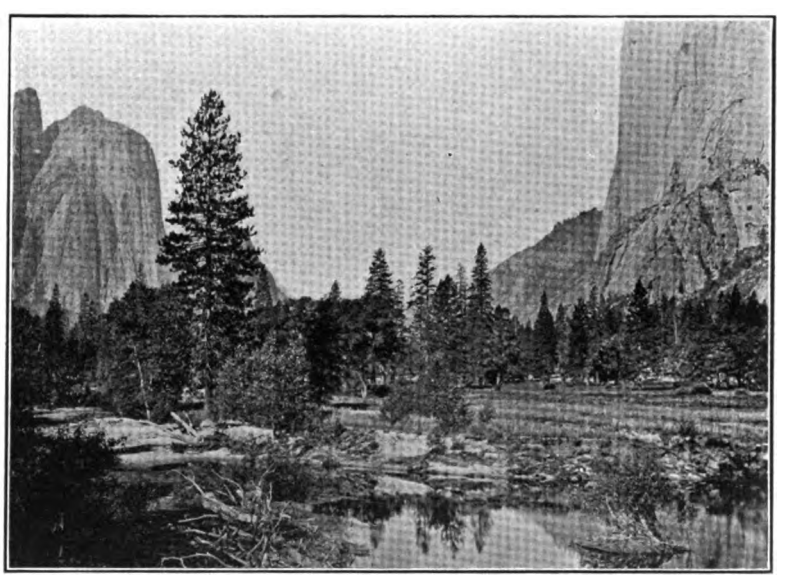
Suggestion for a Motoring Trip from New York City to San Francisco, Los Angeles and Return, with Pacific Coast Routes Connecting with Seattle.

OBVIOUSLY, it would be impossible to present in the space which must necessarily be allotted to the subject in a work of this character, complete and detailed information concerning any given route across the Continent. That there is much to be seen is indicated in a faint manner by some of the illustrations accompanying these itineraries. It is assumed, however, that the motorist who decides upon a transcontinental tour is fully aware of the natural wonders which await his pleasure in the great West and Northwest. What he is particularly desirous of obtaining in a touring number is information as to how to reach the section in which these phenomena abound. That is what The Automobile Journal has attempted to present in these columns.

Transcontinental Tour A contemplates that the tourist will leave New York City, going to San Francisco, over what has come to be known as the northern route. As outlined, it is expected that at least 23 days will be needed. It should be remembered, however, that the road conditions throughout the Rocky mountain district can hardly be termed ideal, and it is more than probable that some of the daily mileages will be found excessive, particularly for those who are accustomed to driving over the excellent highways of the East or of the Pacific Coast. In addition, it is expected that numerous stop-overs will be decided upon en route.

Transcontinental Tour B leaves Los Angeles for a return to New York by the so-called southern route, reaching the Atlantic seaboard at Atlanta, Ga., and continuing the journey over what has been termed the national highway from New York to Jacksonville, Fla. As outlined this tour is expected to occupy at least 29 days.

Those who desire to return to New York by a more direct route may do so by traversing the Sante Fe trail from Phoenix, Ariz., to Denver, Col., connecting at the latter point with Transcontinental Tour A, or with roads leading to Kansas City, St. Louis, etc. Full information as to running time, mileages and road conditions may be obtained from The Automobile Journal, or the boards of trade and automobile clubs in Phoenix, Colorado Springs, Denver, or other cities of that section will give the tourist necessary data. Space does not permit of presenting more than the two transcontinental routes in detail.



Massive Granite Walls That Guard the Entrance to the Yosemite Valley in California.

Much of the information contained in the two itineraries presented was prepared for The Automobile Journal by Dr. C. G. Percival, who recently covered much of this territory in the Abbott-Detroit "Bull Dog." He suggests that as E. L. Ferguson had previously routed many of these highways, particularly the southern route, while accompanying the Ohio "Mud Hen" on its famous transcontinental journey of 1910, due credit should be given that source as well.

The tour listed as Pacific Coast South, is designed to connect the two transcontinental tours between San Francisco and Los Angeles. That denominated Pacific Coast North offers an interesting side trip to Seattle, Wash. It may be said in this connection that Dr. Percival is believed to be the first to route this tour in detail and that this is the first presentation of his information in the East.

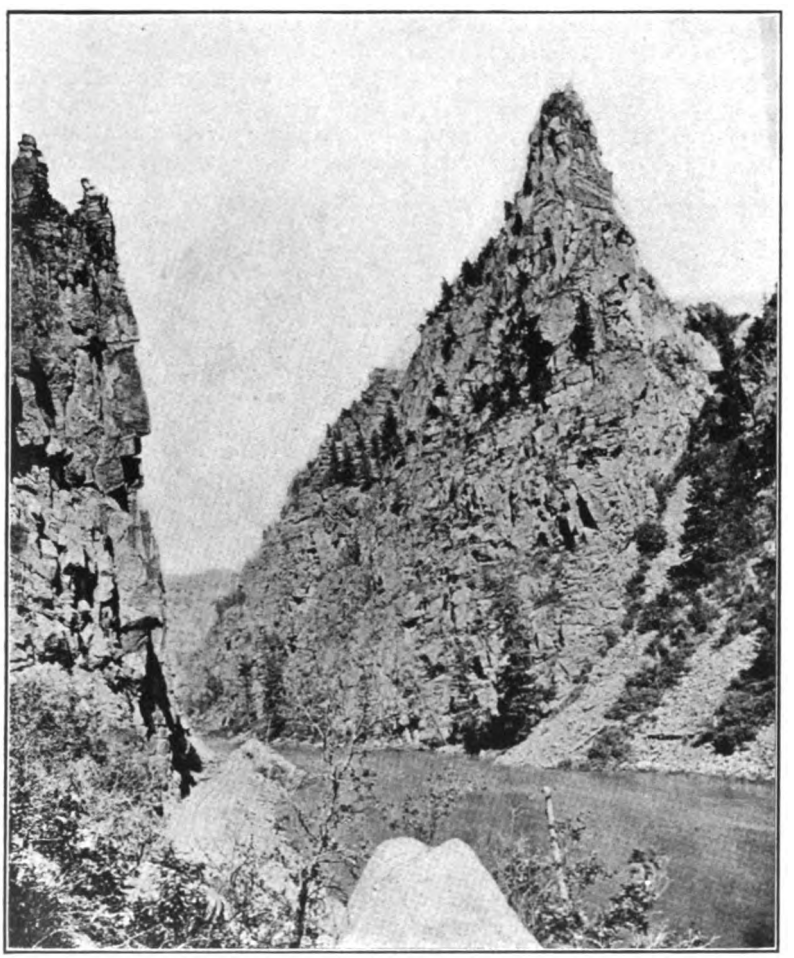
It will be noted that Transcontinental Tour A leaves the main route across country at Julesburg, Col., for a visit to Denver. This suggestion lengthens the tour by at least one day, as it would be possible to drive from Julesburg to Cheyenne, Wyo., in a direct line. This detour is made for the purpose of offering the tourist an opportunity to visit Denver, and

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connect there for the famous drive to Colorado Springs and the Garden of the Gods. Other touring information to be presented in The Automobile Journal throughout the touring season will go into this section in still more detail.

The same thing will apply in a measure to the visit to Salt Lake City, since it would be possible to reach Ogden, Utah, direct from Green River, Wyo., reducing the mileage materially. It is believed, however, that these detours will be appreciated by the tourist, and it is probable that still other places of interest will be included in the itinerary, when this section of the country has been reached. The Automobile Journal is prepared to supply information covering practically all points of interest and will be only too glad to place the tourist in communication with those who can aid in the proper selection of such points to be reached within any definite specified time.

The road conditions over the routes selected in these itineraries are considered as the best that obtain in the respective districts. In many places, the tourist will be surprised to find that modern macadam has replaced the ancient trails of the Indians. The good roads organizations throughout the West have been particularly active during the past year. Unless weather conditions interfere the tourist should experience no difficulty in making a transcontinental tour today.



Currecanti Needle in the Black Canyon of the Gunnison, Another of Colorado's Natural Wonders.

From a close study of the itineraries, it will be noted that in various places the route does not touch towns or settlements except at rare intervals. It is not anticipated, however, that the tourist will find it difficult to follow the itinerary as given, since the motoring clubs of the Rocky mountain district have been exceedingly active in posting the roads. In many places the highway will be found so thoroughly supplied with guide boards that routing directions would prove superfluous.

There was a time when it was considered absolutely necessary to equip the car with some sort of camping paraphernalia to be used after leaving Denver on the western trip. The roads have been improved so materially within the past year, that this is now quite a matter of option with the tourist. On Transcontinental Tour A there is but one point where it is possible that such equipment might prove advisable.

The road from Elko, Nev., to Eureka and Austin is not ideal in many places. It would depend largely upon the weather conditions as to whether or not the car would be able to reach Austin in one day. If everything were favorable, no trouble ought to be experienced. It is advisable to secure a liberal supply of gasoline at Elko, for although fuel may be obtained at Eureka, it commands an excellent price.

On Transcontinental Tour B, the roads in many places in Arizona, New Mexico and Texas are decidedly in contrast with those of the East. Macadam ways will appear at most unexpected points, and at others, the trail will be but dimly outlined, appearing to go in the wrong direction at times. It is best to make frequent inquiries. Ranches and settlements are sufficiently near together to make camping unnecessary, except under the most unfortunate circumstances.

It is anticipated that the tourist will appreciate the information covering the South, which is presented in this connection. It will be admitted that New York City might be reached over shorter routes from many points on this

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itinerary. It would be possible, for instance, to connect with Kansas City from Fort Worth, Tex., or with St. Louis from Forrest City, Ark. But there is much interesting scenery in Mississippi, Alabama and Georgia, which ought to become more familiar to the American citizen.

Of course, the Blue Ridge country has a historical interest all its own. Many of the famous battlefields are passed on this itinerary, and opportunity should be taken to visit these scenes if time will permit. Accompanying illustrations indicate that nature has been quite liberal in endowing the Atlantic seaboard, south of Washington, with phenomena which are little known to the people of the North.

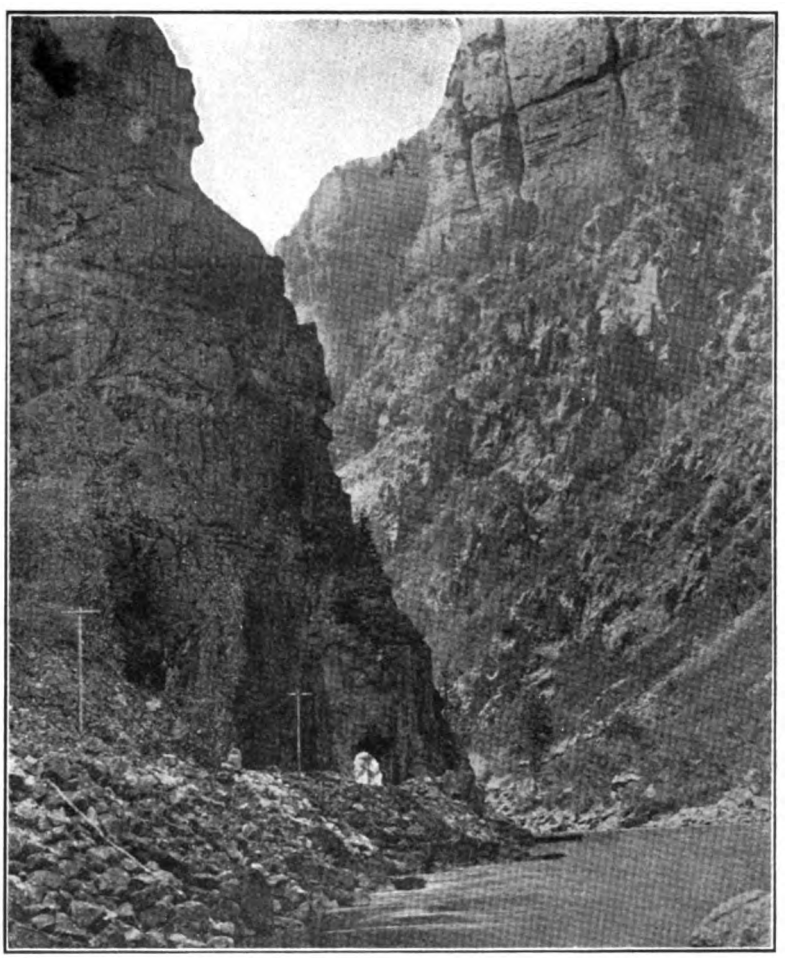
The roads throughout this section have been improved materially within the past two years. It will be found, however, that in many places extreme care in driving will be necessary. Still, the tourist that has passed the dangers of the Rocky mountain district and of the desert country of the Southwest will have little difficulty in traversing these ways.

Reference already has been made to the illustrations, but particular attention may be called to those accompanying this transcontinental touring section. Many of the natural wonders presented have peculiar significance to the American, who may have long desired to visit these localities. Undoubtedly he has been deterred heretofore by the fact that it would mean a long tiresome railroad journey. The rich mountain scenery of Europe, mention of which will be found elsewhere in this issue, has been decidedly more available to the motorist.

The people of the West, in their desire to act upon the suggestion that Americans should "See America First," have so planned their good roads movement that it includes a large number of these natural wonders. For instance, the Grand Canyon of the Colorado is now quite as easy of access to the motorist as Niagara Falls. An excellent automobile road runs to the most interesting portion of the splendid gorge from Phoenix, Ariz., and it may be added that the government has aided materially in bringing this about, with its macadam way to the Roosevelt dam, so-called, and through the famous Superstition mountains.

Good roads also lead to the Yosemite valley, where it is possible to gain a close view of the giant trees, the well known Bridal Veil falls and the other beauties of this prehistoric California forest. Unfortunately, while good roads lead the tourist to the very gateway of Yellowstone national park, automobiles are rigorously excluded from the park itself. This is not true of the Garden of the Gods, however, and the tourist may spend a number of days in the vicinity of Denver with profit.

To include a full list of the magnificent mountain and valley scenes now possible of reach on a transcontinental tour would prove impractical. It is sufficient to state that the tourist who follows the itineraries listed below cannot fail to appreciate the remarkable resources of the country.



Some of the Picture Rocks in the Grand Canyon of the Colorado, Now Within Easy Reach by Automobile.

TRANSCONTINENTAL TOUR A.

New York City—Albany, N. Y.—Syracuse, N. Y.—Buffalo, N. Y.—Ashtabula, O.—Toledo, O.—South Bend, Ind.—Chicago, Ill.—Clinton, Ia. — Marshalltown, Ia. — Omaha, Neb. — Kearney, Neb. — Julesburg, Col. — Denver, Col. — Cheyenne, Wyo.—Rawlins, Wyo.—Green River, Wyo.—Salt Lake City, Utah—Kelton, Utah—Elko, Nev.—Austin, Nev. — Reno, Nev. — Sacramento, Cal.—San Francisco, Cal.

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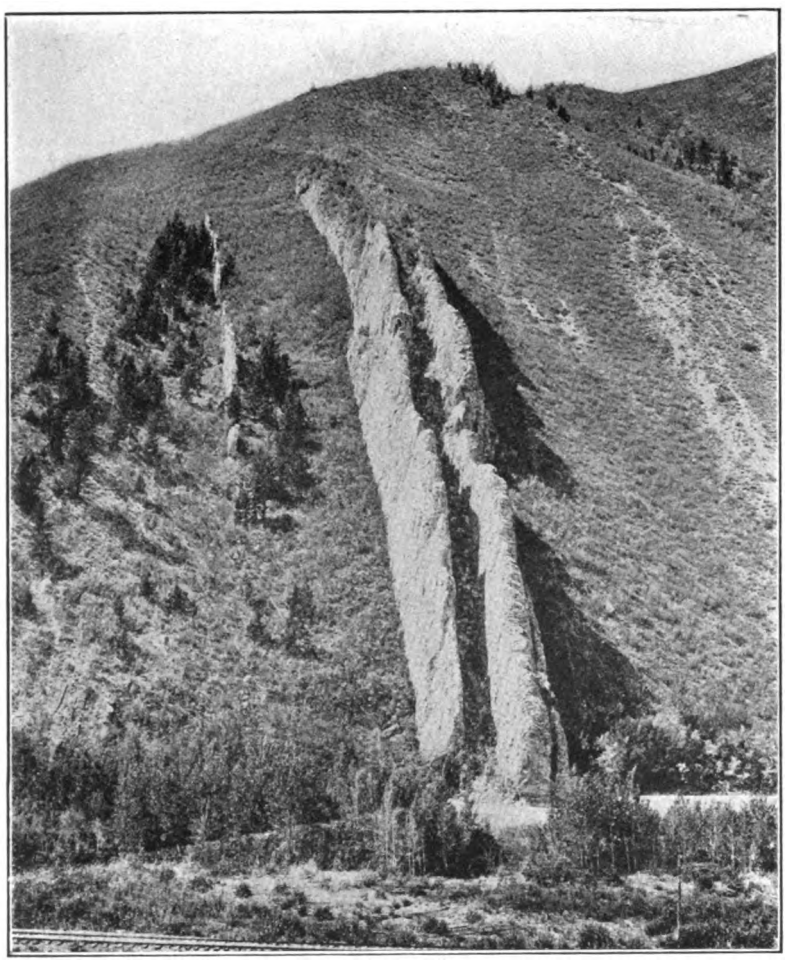
Twenty-Three Days, 3813.1 Miles.

First Day, New York to Albany, N. Y., 149.3 Miles.

New York to	Miles to	Total Miles
Yonkers	12.7	12.7
Irvington	7.7	20.4
Tarrytown	2.7	23.1
Ossining	6.2	29.3
Croton-on-Hudson	3.9	33.2
Peekskill	7.4	40.6
Cold Spring	11.4	52.0
Fishkill Landing	7.7	59.7
Hughsonville	6.3	66.0
Wappinger Falls	1.4	67.4
Poughkeepsie	7.4	74.8
Hyde Park	6.1	80.9
Rhinebeck	10.1	91.0
Red Hook	5.9	96.9
Nevis	5.3	102.2
Clermont	2.0	104.2
Blue Stores	1.7	105.9
Hudson	10.2	116.1
Staatsville	3.4	119.5
Stockport	2.2	121.7
Rossmans	0.4	122.1
Stuyvesant Falls	2.7	124.8
Kinderhook	3.8	128.6
Schodack Center	13.5	142.1
East Greenbush	1.7	143.8
Rensselaer	4.4	148.2
Albany	1.1	149.3

Second Day, Albany to Syracuse, N. Y., 145.6 Miles.

Albany to	Miles to	Total Miles
Schenectady	15.0	15.0
Scotia	1.6	16.6
Amsterdam	14.1	30.7
Aiken	3.0	33.7
Fonda	7.7	41.4
Yost's Station	5.3	46.7
Palatine Bridge	6.2	52.9
St. Johnsville	8.8	61.7
Little Falls	10.5	72.2
Herkimer	7.3	79.5
Ilion	2.7	82.2
West Schuyler	10.4	92.6
Deerfield	1.0	93.6
Utica	1.4	95.0
New Hartford	3.5	98.5
Kirkland Village	5.1	103.6
Vernon	8.3	111.9
Oneida Castle	5.2	117.1
Oneida	1.4	118.5
Wampsville	3.4	121.9
Canastota	2.2	124.1
Sullivan	5.1	129.2
Mycenae	4.3	133.5
Fayettville	4.5	138.0
Syracuse	7.6	145.6



The Devil's Slide in Weber Canyon, About Forty Miles North of Salt Lake City, Utah.

Third Day, Syracuse to Buffalo, N. Y., 162 Miles.

Syracuse to	Miles to	Total Miles
Camillus	8.3	8.3
Elbridge	7.2	15.5
Weedsport	6.4	21.9
Port Byron	3.5	25.4
Montezuma	4.6	30.0
Savannah	5.4	35.4
Clyde	6.4	41.8
Lock Berlin	4.4	46.2
Lyons	4.2	50.4
Newark	6.1	56.5
East Palmyra	4.6	61.1
Palmyra	4.9	66.0
Yellow Mills	1.2	67.2
Macedon	2.7	69.9
Fairport	8.3	78.2
Brighton	6.8	85.0
Rochester	3.2	88.2
North Chili	10.4	98.6
Churchville	4.4	103.0
Bergen	3.4	106.4
Byron	6.6	113.0
Batavia	9.8	122.8
East Pembroke	6.6	129.4
Pembroke	6.6	136.0
Clarence	7.9	143.9
Williamsville	8.3	152.2
Buffalo	9.8	162.0

Fourth Day, Buffalo to Ashtabula, O., 134.6 Miles.

Buffalo to	Miles to	Total Miles
Evans	21.2	21.2
Irving	7.6	28.8
Silver Creek	3.4	32.2
Sheridan	5.9	38.1
Fredonia	6.0	44.1
Brocton	6.8	50.9
Portland	1.4	52.3
Westfield	6.9	59.2
Forsythe	5.3	64.5
Ripley	3.8	68.3
Northeast, Penn.	7.4	75.7
Harbor Creek	7.2	82.9
Wesleyville	3.8	86.7
Erie	3.3	90.0
Fairview	12.4	102.4
Girard	3.8	106.2
East Springfield	5.5	111.7
West Springfield	3.8	115.5
Conneaut, O.	4.6	120.1
Amboy	3.4	123.5
Kingsville	4.6	128.1
Ashtabula	6.5	134.6

Fifth Day, Ashtabula to Toledo, O., 178.3 Miles.

Ashtabula to	Miles to	Total Miles
Saybrook	5.6	5.6
Geneva	4.2	9.8
Unionville	4.3	14.1
Madison	2.5	16.6
Painesville	11.1	27.7
Mentor	5.8	33.5
Willoughby	4.9	38.4
Wickcliffe	5.8	44.2
Euclid	2.8	47.0
Cleveland	10.3	57.3
Rocky River	8.0	65.3
Finney's Corners	1.8	67.1
Dover	4.4	71.5
Bement	3.4	74.9
Ridgeville	3.7	78.6
Elyria	4.7	83.3
Amherst	7.4	90.7
Henrietta	3.3	94.0
Birmingham	2.7	96.7
Berlinville	8.8	105.5
Norwalk	7.0	112.5
Monroeville	4.8	117.3
North Monroeville	3.8	121.1

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Bellevue	6.0	127.1
Clyde	7.6	134.7
Fremont	7.6	142.3
Woodville	14.6	156.9
Lemoyne	6.5	163.4
Stony Ridge	2.0	165.4
Toledo	12.9	178.3

Sixth Day, Toledo to South Bend, Ind., 166 Miles.

Toledo to	Miles to	Total Miles
Java	17.0	17.0
Swanton	6.5	23.5
Delta	6.8	30.3
Wauseon	8.6	38.9
Archbold	10.3	49.2
Stryker	7.1	56.3
Bryan	8.1	64.4
Edgerton	11.6	76.0
Butler, Ind.	7.0	83.0
Waterloo	7.7	90.7
Kendallville	13.5	104.2
Brimfield	7.0	111.2
Wawaka	4.5	115.7
Ligonier	6.2	121.9
Millersburg	9.2	131.1
Goshen	9.4	140.5
Elkhart	10.2	150.7
Osceola	6.0	156.7
Mishawaka	5.3	162.0
South Bend	4.0	166.0

Seventh Day, South Bend to Chicago, Ill., 101.1 Miles.

South Bend to	Miles to	Total Miles
New Carlisle	13.6	13.6
La Porte	12.3	25.9
Westville	11.1	37.0
Valparaiso	10.3	47.3
Wheeler	7.5	54.8
Hobart	5.2	60.0
Highlands	11.4	71.4
Hessville	2.2	73.6
Hammond	4.4	78.0
Chicago, Ill.	23.1	101.1

Eighth Day, Chicago to Clinton, Ia., 147.5 Miles.

Chicago to	Miles to	Total Miles
Austin	7.9	7.9
Oak Park	3.4	11.3
Maywood	0.8	12.1
Elmhurst	5.3	17.4
Lombard	4.1	21.5
West Chicago	9.1	30.6
Geneva	5.5	36.1
Elburn	8.4	44.5
De Kalb	15.8	60.3
Creston	11.2	71.5
Rochelle	6.1	77.6
Ashton	12.0	89.6
Franklin Groves	4.6	94.2
Dixon	9.7	103.9
Sterling	14.4	118.3
Emerson	3.6	121.9
Morrison	10.7	132.6
Union Grove	3.7	136.3
Fulton	7.6	143.9
Lyons, Ia.	1.3	145.2
Clinton	2.3	147.5

Ninth Day, Clinton to Marshalltown, Ia., 167.4 Miles.

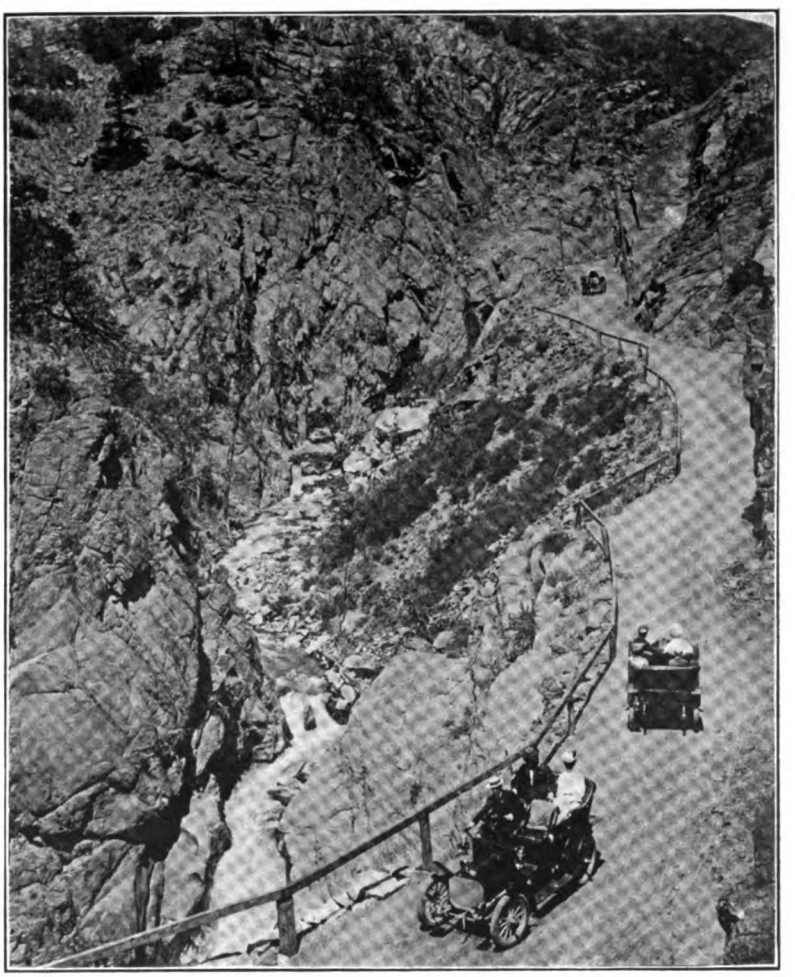
Clinton to	Miles to	Total Miles
Elvira	9.5	9.5
De Witt	11.6	21.1
Grand Mound	5.7	26.8
Wheatland	10.3	37.1
Lowden	6.2	43.3
Clarence	8.5	51.8
Mechanicsville	10.8	62.6
Lisbon	7.0	69.6
Mt. Vernon	1.8	71.4
Marion	13.2	84.6
Cedar Rapids	5.8	90.4
Belle Plaine	36.5	126.9
Chelsea	6.5	133.4
Tama	11.5	144.9
Montour	8.5	153.4
Marshalltown	14.0	167.4

Tenth Day, Marshalltown to Omaha, Neb., 219.3 Miles.

Marshalltown to	Miles to	Total Miles
State Center	14.5	14.5
Colo	8.8	23.3
Nevada	7.3	30.6
Ames	8.1	38.7
Jordan	10.6	49.3
Boone	5.6	54.9
Ogden	10.3	65.2
Missouri Valley	9.7	191.9
Loveland	4.7	196.6
Crescent	10.4	207.0
Council Bluffs	7.9	214.9
Omaha, Neb.	4.4	219.3

Eleventh Day, Omaha to Kearney, Neb., 196.5 Miles.

Omaha to	Miles to	Total Miles
Elkhorn	17.1	17.1
Waterloo	3.2	20.3
Fremont	17.2	37.5
Ames	8.3	45.8
North Bend	8.2	54.0
Rogers	7.2	61.2
Schuyler	8.2	69.4



Automobile Highway over the Picturesque Ute Pass, the Centuries-Old Colorado Indian Trail.

Beaver	6.4	71.6
Grand Junction	4.6	76.2
Jefferson	7.9	84.1
Scranton	10.0	94.1
Ralston	6.7	100.8
Glidden	5.0	105.8
Carroll	7.5	113.3
West Side	12.6	125.9
Vail	5.9	131.8
Denison	9.1	140.9
Arion	8.5	149.4
Dow City	2.5	151.9
Dunlap	8.6	160.5
Woodbine	11.6	172.1
Logan	10.1	182.2
Benton	8.9	78.3
Columbus	7.6	85.9
Duncan	8.7	94.6
Silver Creek	8.3	102.9
Ravens	5.7	108.6
Clarks	5.5	114.1
Central City	12.9	127.0
Chapman	5.8	132.8
Grand Island	17.3	150.1
Alda	8.0	158.1
Wood River	10.0	168.1
Shelton	8.5	176.6
Gibbon	6.2	182.8
Buda	8.5	191.3
Kearney	5.2	196.5

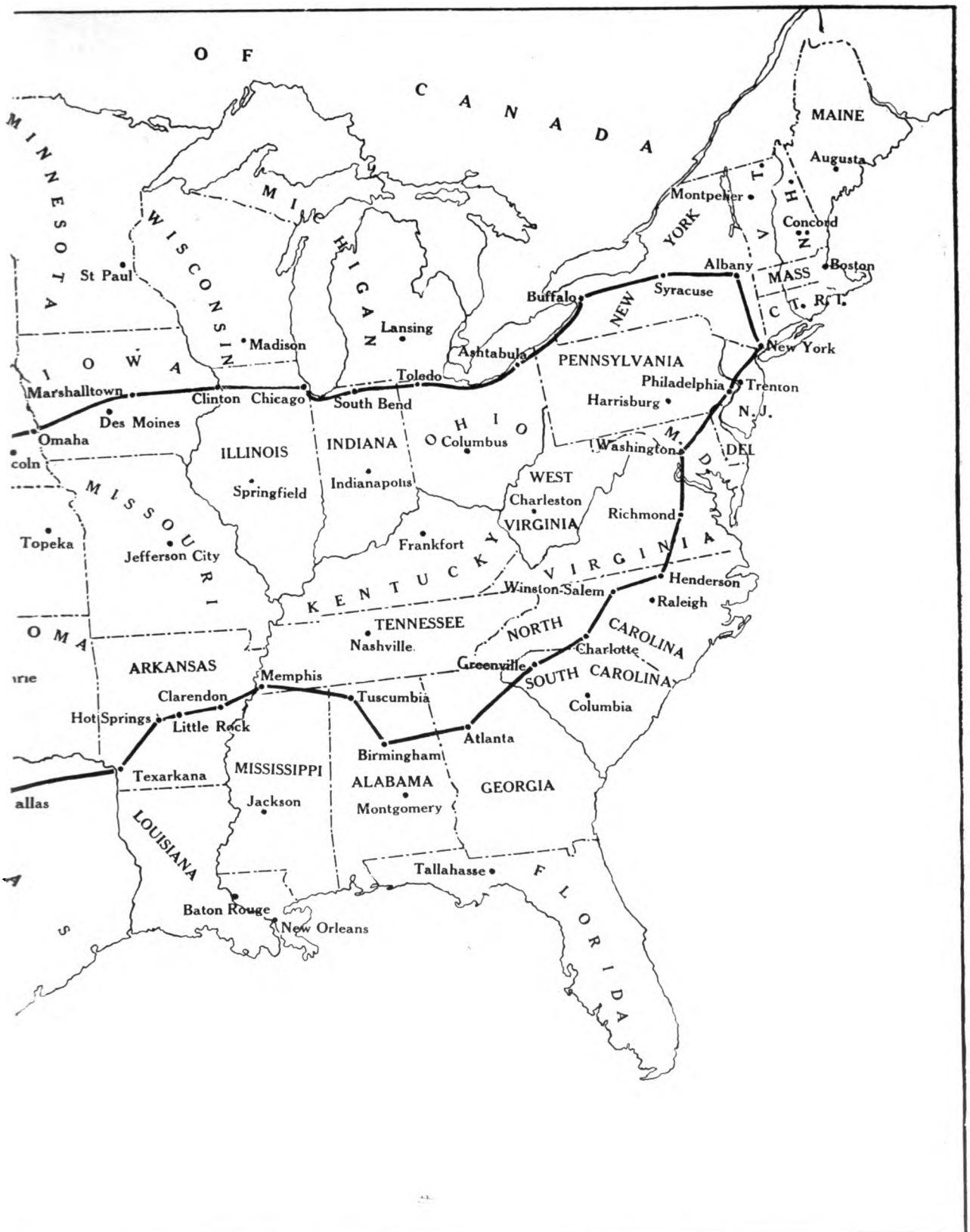
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TRANSCONTINENTAL TOURING MAP

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Twelfth Day, Kearney to Julesburg, Col., 196.5 Miles.

Kearney to	Miles to	Total Miles
Odesa	9.6	9.6
Elm Creek	7.0	16.6
Overton	9.9	26.5
Lexington	10.3	36.8
Cozad	18.3	55.1
Willow Island	5.1	60.2
Gothenburg	7.8	68.0
Brady Island	13.3	81.3
Maxwell	9.4	90.7
North Platte	15.6	106.3
Hershy	13.6	119.9
Sutherland	6.6	126.5
Paxton	12.2	138.7
Korty	6.8	145.5
Roscoe	6.1	151.6
Ogalalla	7.3	158.9
Brule	11.0	169.9
Julesburg	26.6	196.5

Thirteenth Day, Julesburg to Denver, Col., 204.9 Miles.

Julesburg to	Miles to	Total Miles
Ovid	8.3	8.3
Sedgwick	8.2	16.5
Red Lion	10.5	27.0
Crook	6.9	33.9
Proctor	8.3	42.2
Iliff	7.4	49.6
Sterling	12.3	61.9
Atwood	6.5	68.4
Merino	6.0	74.4
Hilrose	19.2	93.6
Brush	9.7	103.3
Fort Morgan	9.5	112.8
Morville	35.5	148.3
Bennett	24.8	173.1
Watkins	9.5	182.6
Sable	12.3	194.9
Denver	10.0	204.9

Fourteenth Day, Denver to Cheyenne, Wyo., 113 Miles.

Denver to	Miles to	Total Miles
Broomfield	16.5	16.5
Lafayette	6.0	22.5
Longmont	12.8	35.3
Berthoud	11.9	47.2
Loveland	7.3	54.5
Fort Collins	13.0	67.5
Wellington	11.7	79.2
Cheyenne, Wyo	33.8	113.0

Fifteenth Day, Cheyenne to Rawlins, Wyo., 195.5 Miles.

Cheyenne to	Miles to	Total Miles
Borie	9.5	9.5
Otto	5.0	14.5
Granite Canyon	4.7	19.2
Buford	8.1	27.3
Laramie	31.3	58.6
Medicine Bow	74.0	132.6
Carbon	9.4	142.0
Hanna	13.0	155.0
Fort Steele	25.6	180.6
Grenville	7.9	188.5
Rawlins	7.0	195.5

Sixteenth Day, Rawlins to Green River, Wyo., 157.5 Miles.

Rawlins to	Miles to	Total Miles
Latham	30.0	30.0
Wamsutter	10.0	40.0
Red Desert	8.5	48.5
Tipton	8.0	56.5
Monell	12.0	68.5
Bitter Creek	25.0	93.5
Black Buttes	10.0	103.5
Mallville	6.0	109.5
Point of Rocks	6.0	115.5
Rock Springs	26.0	141.5
Green River	16.0	157.5

Seventeenth Day, Green River to Salt Lake City, Utah, 190.1 Miles.

Green River to	Miles to	Total Miles
Bryan	13.7	13.7
Granger	20.9	34.6
Liman	29.1	63.7
Fort Bridger	5.7	69.4
Dog Springs	10.4	79.8
Spring Valley	7.1	86.9
Evanston	18.7	105.6
Wabatch, Utah	10.2	115.8
Castle Rock	7.1	122.9
Emery	7.9	130.8
Coalville	14.6	145.4
Wanship	13.2	158.6
Gorgoza	9.1	167.7
Dale	10.3	178.0
Salt Lake City	12.1	190.1

Eighteenth Day, Salt Lake City to Kelton, Utah, 147.8 Miles.

Salt Lake City to	Miles to	Total Miles
Bountiful	9.1	9.1
Centerville	2.2	11.3
Farmington	7.7	19.0
Kaysville	2.1	21.1
Layton	2.5	23.6
Clearfield	4.7	28.3
Ogden	9.1	37.4
North Ogden	8.9	46.3
Willard	5.0	51.3
Brigham	9.4	60.7
Honeyville	9.3	70.0
Deweyville	4.3	74.3
Tremonton	6.3	80.6
Blue Springs	19.8	100.4
Snowville	18.5	118.9
Curlew	7.3	126.2
Kelton	21.6	147.8

Nineteenth Day, Kelton to Elko, Nev., 182.8 Miles.

Kelton to	Miles to	Total Miles
Terrace	23.9	23.9
Lucin	26.7	50.6
Tacoma, Nev.	12.3	62.9
Montella	13.2	76.1
Loray	12.3	88.4
Cobre	5.2	93.6
Fenlon	18.3	111.9
Wells	19.2	131.1
Deeth	21.6	152.7
Hallick	10.7	163.4
Elko	19.4	182.8



On the Denver-Colorado Springs Highway, Where for Forty Miles the Road Parallels the Mountain Range, with Pike's Peak in the Background.

Twentieth Day, Elko to Austin, Nev., 175 Miles.

Elko to	Miles to	Total Miles
Hylton & Hanna Stores	33.0	33.0
Sadler's Ranch	17.0	50.0
Eureka	55.0	105.0
Austin	70.0	175.0

Twenty-First Day, Austin to Reno, Nev., 183.5 Miles.

Austin to	Miles to	Total Miles
Alpine Ranch	47.5	47.5
Eastgate	12.5	60.0
Westgate	20.0	80.0
Sand Springs	10.0	90.0
Fallon	27.0	117.0
Leetville	8.0	125.0
Hazen	8.5	133.5
Fernley	12.5	146.0
Wadsworth	3.5	149.5
Sparks	30.0	179.5

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Reno	4.0	183.5

Twenty-Second Day, Reno to Sacramento, Cal., 152.7 Miles.

Reno to	Miles to	Total Miles
Lawton	6.5	6.5
Verdi	5.5	12.0
Truckee, Cal.	23.0	35.0
Emigrant Gap	32.0	67.0
Alta	12.0	79.0
Gold Run	4.0	83.0
Magra	3.5	86.5
Colfax	7.5	94.0
Weimar	5.2	99.2
Clipper Gap	6.7	105.9
Auburn	6.0	111.9
Folsom	19.0	130.9
Sacramento	21.8	152.7

Twenty-Third Day, Sacramento to San Francisco, Cal., 136.2 Miles.

Sacramento to	Miles to	Total Miles
Elk Grove	14.8	14.8
McConnell	3.1	17.9
Arno	2.2	20.1
Galt	6.2	26.3
Woodbridge	7.3	33.6
Lodi	3.0	36.6
Stockton	15.8	52.4
French Camp	5.0	57.4
Banta	11.9	69.3
Janney	7.0	76.3
Alta Mont	11.6	87.9
Greenville	2.7	90.6
Livermore	4.6	95.2
Dublin	10.3	105.5
East Oakland	22.1	127.6
Oakland	3.1	130.7
San Francisco	5.5	136.2

PACIFIC COAST NORTH.

Sacramento, Cal.—Chico, Cal.—Redding, Cal.—Sisson, Cal.—Medford, Ore.—Riddle, Ore.—Cottage Grove, Ore.—Salem, Ore.—Portland, Ore.—Chehalis, Wash.—Seattle, Wash.

Ten Days, 934.2 Miles.

First Day, Sacramento to Chico, Cal., 114 Miles.

Sacramento to	Miles to	Total Miles
Ben Ali	5.2	5.2
Roseville	16.2	21.4
Lincoln	10.2	31.6
Sheridan	10.6	42.2
Wheatland	4.4	46.6
Maysville	16.9	63.5
Live Oaks	12.8	76.3
Chico	37.7	114.0

Second Day, Chico to Redding, Cal., 76.5 Miles.

Chico to	Miles to	Total Miles
Vina	20.1	20.1
Proberta	15.1	35.2
Red Bluff	7.4	42.6
Cottonwood	16.4	59.0
Anderson	5.7	64.7
Redding	11.8	76.5

Third Day, Redding to Sisson, Cal., 83.9 Miles.

Redding to	Miles to	Total Miles
Buckeye	4.9	4.9
Kennett	10.1	15.0
Southers	43.0	58.0
Castella	6.7	64.7
Castle Brook	1.3	66.0
Dunsmuir	6.0	72.0
Shasta Springs	3.3	75.3
Sisson	8.6	83.9

Fourth Day, Sisson to Medford, Ore., 75.1 Miles.

Sisson to	Miles to	Total Miles
Weed	9.9	9.9
Edgewood	4.1	14.0
Montague	21.5	35.5
Hornbrook	15.1	50.6
Coles	11.9	62.5
Siskiyou Pass	6.0	68.5
Rawhide Toll Gate	2.0	70.5
Ashland, Ore.	1.8	72.3
Medford	2.8	75.1

Fifth Day, Medford to Riddle, Ore., 84 Miles.

Medford to	Miles to	Total Miles
Central Point	6.3	6.3
Tolo	5.2	11.5
Gold Hill	4.7	16.2
Grant's Pass	19.3	35.5
Wolf Creek	20.2	55.7
Riddle	28.3	84.0

Sixth Day, Riddle to Cottage Grove, Ore., 80.2 Miles.

Riddle to	Miles to	Total Miles
Myrtle Creek	7.0	7.0
Dole	5.1	12.1
Noseburg	13.0	25.1
Southerlin	13.9	39.0
Oakland	3.4	42.4
Yoncalles	3.8	46.2
Drain	17.4	63.6
Krewson	1.4	65.0
Cottage Grove	15.2	80.2

Seventh Day, Cottage Grove to Salem, Ore., 99 Miles.

Cottage Grove to	Miles to	Total Miles
Goshen	15.1	15.1
Eugene	6.9	22.0
Junction City	13.5	35.5
Hamsburg	4.7	40.2
Albany	30.8	71.0
Jefferson	9.2	80.2
Salem	18.8	99.0

Eighth Day, Salem to Portland, Ore., 94 Miles.

Salem to	Miles to	Total Miles
Oregon City	75.0	75.0
Portland	19.0	94.0

Ninth Day, Portland to Chehalis, Wash., 100.5 Miles.

Portland to	Miles to	Total Miles
Vancouver, Wash.	7.4	7.4
La Centre	18.4	25.8
Woodlawn Ferry	5.6	31.4
Kalama	10.1	41.5
Carrollton	5.5	47.0
Kelso	7.0	54.0
Lexington	1.5	55.5
Castle Rock	8.9	64.4
Toledo	16.0	80.4
Cowlitz	1.9	82.3
Chehalis	18.2	100.5

Tenth Day, Chehalis to Seattle, Wash., 131 Miles.

Chehalis to	Miles to	Total Miles
Centralia	4.0	4.0
Tenino	16.0	20.0
Olympia	15.0	35.0
Rainier	21.0	56.0
South Tacoma	24.0	80.0
Tacoma	11.0	91.0
Christopher	8.0	99.0
Seattle	32.0	131.0



One of the Typical Automobile Drives in Southern California and Arizona, on Which the Way Is Lined with Trees and the Mountains Appear in the Distance.

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PACIFIC COAST SOUTH.

San Francisco, Cal.—Santa Cruz, Cal.—Paso Robles, Cal.—Santa Barbara, Cal.—Los Angeles, Cal.

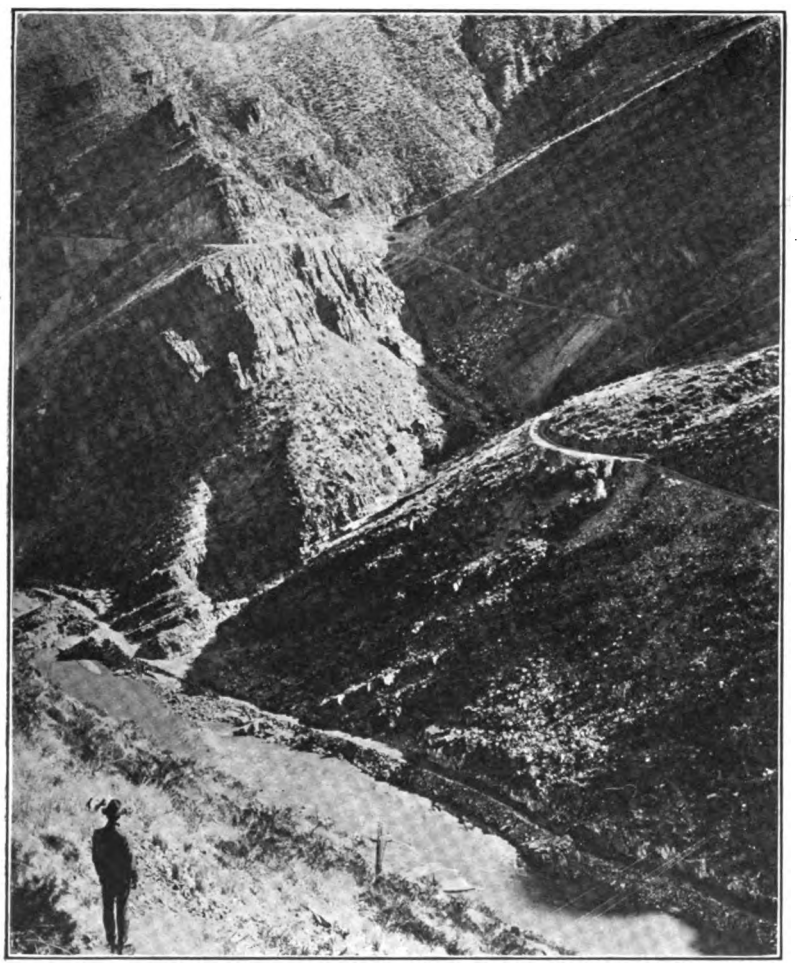
Four Days, 496.1 Miles.

First Day, San Francisco to Santa Cruz, 90.7 Miles.

San Francisco to	Miles to	Total Miles
Colma	8.8	8.8
South San Francisco	4.0	12.8
San Bruno	3.2	16.0
Bolcoff	1.5	17.5
Millbrae	1.1	18.6
Burlingame	2.2	20.8
San Mateo	2.2	23.0
Belmont	4.0	27.0
San Carlos	1.1	28.1
Redwood	1.5	29.6
Palo Alto	5.4	35.0
Mayfield	1.6	36.6
Santa Clara	13.5	50.1
San Jose	3.9	54.0
Buena Vista	1.9	55.9
Moulton	2.5	58.4
Campbell	1.3	59.7
Los Gatos	5.5	65.2
Alma	3.0	68.2
Soquel	18.5	86.7
Santa Cruz	4.0	90.7

Second Day, Santa Cruz to Paso Robles, 149.1 Miles.

Santa Cruz to	Miles to	Total Miles
Soquel	4.0	4.0
Aptos	3.6	7.6
Fredom	9.5	17.1
Watsonville	1.9	19.0
Moss Landing	9.6	28.6
Castroville	2.8	31.4
Salinas	8.7	40.1
Chaullar	10.9	51.0
Gonzales	5.9	56.9
Soledad	8.6	65.5
Greenfield	8.6	74.1
Jolon	21.6	95.7
Bradley	33.4	129.1
San Miguel	10.9	140.0
Paso Robles	9.1	149.1



Government Road through the Superstition Mountains on the Way to the Roosevelt Dam in Arizona.

Third Day, Paso Robles to Santa Barbara, 150.5 Miles.

Paso Robles to	Miles to	Total Miles
Templeton	5.7	5.7
Santa Margarita	14.3	20.0
San Luis Obispo	11.0	31.0
Edna	6.2	37.2
El Pismo	5.3	42.5
Arroyo Grande	3.5	46.0
Berros	4.3	50.3
Nipomo	4.7	55.0
Santa Maria	7.1	62.1
Garley	11.8	73.9
Sisquoc	1.5	75.4
Olivera	1.3	76.7
Foxen	7.6	84.3
Los Olives	12.8	97.1
Santa Inez Mission	5.8	102.9
Los Cruces	11.0	113.9
Gaviota	3.8	117.7
Lento	3.8	121.5
Tajiguas	3.5	125.0
Orella	3.0	128.0
Capitan	1.4	129.4
Naples	5.8	135.2
Goleta	8.4	143.6
Santa Barbara	6.9	150.5

Fourth Day, Santa Barbara to Los Angeles, 105.8 Miles.

Santa Barbara to	Miles to	Total Miles
Summerland	6.8	6.8
Carpenteria	5.0	11.8
Casitas Pass	7.8	19.6
Ventura	14.8	34.4
Montalvo	6.0	40.4
El Rio	2.5	42.9
Camarillo	9.1	52.0
Calabasas	25.0	77.0
Santa Monica	1.5	78.5
Hollywood	19.6	98.1
Los Angeles	7.7	105.8

TRANSCONTINENTAL TOUR B.

Los Angeles, Cal.—San Diego, Cal.—El Centro, Cal.—Yuma, Ariz.—Phoenix, Ariz. — Tucson, Ariz. — Willcox, Ariz.—Deming, Ariz.—El Paso, Tex.—Sierra Blanca, Tex.—Alpine, Tex.—Stockton, Tex.—Big Spring, Tex.—Abilene, Tex.—Dallas, Tex.—Texarkana, Ark.—Hot Springs, Ark.—Clarendon, Ark.—Memphis, Tenn.—Tuscumbia, Ala.—Birmingham, Ala.—Atlanta, Ga.—Greenville, S. C.—Charlotte, N. C.—Winston-Salem, N. C.—Henderson, N. C.—Richmond, Va.—Washington, D. C.—Philadelphia, Penn.—New York City.

Twenty-Nine Days, 3947.1 Miles.

First Day, Los Angeles to San Diego, Cal., 136.1 Miles.

Los Angeles to	Miles to	Total Miles
Montebello	10.0	10.0
Whittier	4.0	14.0
Bethel	3.2	17.2
La Harba	5.7	22.9
Fullerton	5.0	27.9
Anaheim	2.7	30.6
Santa Ana	7.5	38.1
Tustin	3.0	41.1
Irvine	6.0	47.1
San Luis Capistrane	14.2	61.3
Las Flores	23.5	84.8
Stuart	3.0	87.8
Oceanside	4.7	92.5
Carlsbad	3.2	95.7
La Costa	5.2	100.9
Merle	3.5	104.4
Encinitas	0.5	104.9
Del Mar	6.2	111.1
La Jolla	10.5	121.6
San Diego	14.5	136.1

Second Day, San Diego to El Centro, Cal., 124.2 Miles.

San Diego to	Miles to	Total Miles
Spring Valley	12.5	12.5
Oakdale	7.3	19.8

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Typical Mountain Road in the Rockies at Red Hill in Dead Man's Canyon, Near Colorado Springs.

Jamul	1.7	21.5
Dulzura	8.5	30.0
Potrero	13.2	43.2
El Campo	9.5	52.7
Devil's Canyon	25.5	78.2
El Centro	46.0	124.2

Third Day, El Centro to Yuma, Ariz., 102 Miles.

El Centro to	Miles to	Total Miles
Imperial	4.0	4.0
Brawley	9.5	13.5
Mammoth	27.0	40.5
Glamis	13.5	54.0
Drylyn	11.2	65.2
Ogilby	7.3	72.5
Yuma, Ariz.	29.5	102.0

Fourth Day, Yuma to Phoenix, Ariz., 206.9 Miles.

Yuma to	Miles to	Total Miles
Done	18.2	18.2
Gila City	0.5	18.7
Castle Dome	25.5	44.2
Palomas	59.3	103.5
Agua Caliente	10.5	114.0
Arlington	42.7	156.7
Palo Verge	11.0	167.7
Buckeye	6.7	174.4
Liberty	6.0	180.4
Coldwater	12.0	192.4
Cashion	2.5	194.9
Phoenix	12.0	206.9

Fifth Day, Phoenix to Tucson, Ariz., 126.8 Miles.

Phoenix to	Miles to	Total Miles
Tempe	8.8	8.8
Mesa	7.0	15.8
Florence	42.1	57.9
Red Rock	34.5	92.4
Rillito	16.2	108.6
Tucson	18.2	126.8

Sixth Day, Tucson to Willcox, Ariz., 89.2 Miles.

Tucson to	Miles to	Total Miles
Wilmot	7.1	7.1
Esmond	8.5	15.6
Vail	4.5	20.1
Mescal	19.1	39.2
Benson	10.4	49.6
Dragoon	18.7	68.3
Cochise	9.8	78.1
Willcox	11.1	89.2

Seventh Day, Willcox to Deming, N. M., 137.1 Miles.

Willcox to	Miles to	Total Miles
Glade	7.9	7.9
Luzena	9.3	17.2
Cholla	3.4	20.6
Bowie	4.2	24.8
Holt	4.4	29.2
San Simon	12.1	41.3
Vanar	7.9	49.2
Stein's Pass, N. M.	7.5	56.7
Lordsburg	20.3	77.0
Lisbon	10.8	87.8
Separ	9.2	97.0
Ladin	5.8	102.8
Willa	5.7	108.5
Gage	9.0	117.5
Tunis	11.2	128.7
Deming	8.4	137.1

Eighth Day, Deming to El Paso, Tex., 103.2 Miles.

Deming to	Miles to	Total Miles
Cambray	28.6	28.6
Aden	12.9	41.5
Pronto	4.2	45.7
Kenzin	5.2	50.9
Afton	2.8	53.7
San Miguel	14.4	68.1
Mesquite	3.1	71.2
Berino	8.2	79.4
La Tuna	5.3	84.7
Canutillo	5.8	90.5
Montoya	2.8	93.3
El Paso	9.9	103.2

Ninth Day, El Paso to Sierra Blanca, Tex., 92.4 Miles.

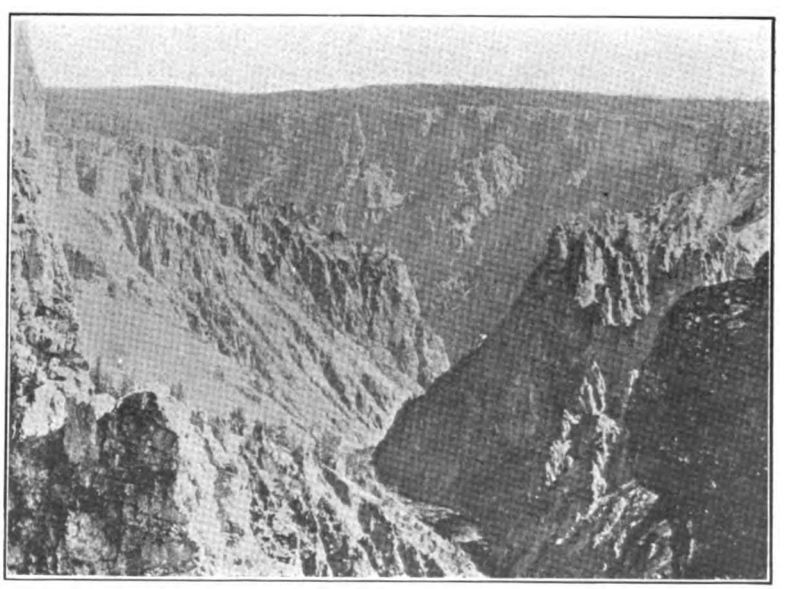
El Paso to	Miles to	Total Miles
Fabans	29.3	29.3
Polvo	10.8	40.1
Fort Hancock	13.8	53.9
Finley	15.7	69.6
Lasca	13.1	82.7
Etholen	5.4	88.1
Sierra Blanca	4.3	92.4

Tenth Day, Sierra Blanca to Alpine, Tex., 131.6 Miles.

Sierra Blanca to	Miles to	Total Miles
Grayton	9.9	9.9
Torbert	9.1	19.0
Chocar	4.4	23.4
Dalberg	4.7	28.1
Lobo	13.5	41.6
Chispa	12.0	53.6
Wendell	7.3	60.9
Valentine	8.7	69.6
Aragon	24.7	94.3
Marfa	10.9	105.2
Alpine	26.4	131.6

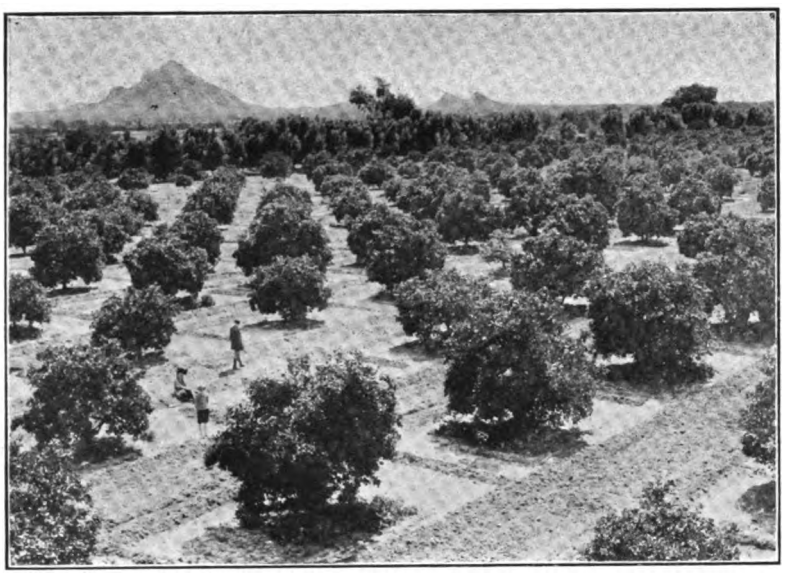
Eleventh Day, Alpine to Fort Stockton, Tex., 90.7 Miles.

Alpine to	Miles to	Total Miles
Marathon	32.4	32.4
Fort Stockton	58.3	90.7



Grand Canyon of the Yellowstone, Ten Miles Long, One-Half Mile Wide and 1200 Feet Deep.

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Orange Groves at the Foot of the Mountain, Typical of Southern California and Arizona.

Twelfth Day, Fort Stockton to Big Spring, Tex., 177.7 Miles.

Fort Stockton to	Miles to	Total Miles
Grand Falls	32.9	32.9
Edwards Ranch	28.0	60.9
Acock Range	7.2	68.1
Y Ranch	12.2	80.3
Odessa	31.4	111.7
Warfield	12.0	123.7
Midland	10.4	134.1
Stanton	19.4	153.5
Big Spring	24.2	177.7

Thirteenth Day, Big Spring to Abilene, Tex., 110.6 Miles.

Big Spring to	Miles to	Total Miles
Coahonia	11.8	11.8
Iatan	8.4	20.2
Westbrook	9.6	29.8
Colorado	10.3	40.1
Loraine	9.4	49.5
Roscoe	10.9	60.4
Sweetwater	8.8	69.2
Trent	18.7	87.9
Merkel	6.5	94.4
Tye Station	8.3	102.7
Abilene	7.9	110.6

Fourteenth Day, Abilene to Dallas, Tex., 207.1 Miles.

Abilene to	Miles to	Total Miles
Hamby	6.8	6.8
Albany	33.3	40.1
Breckenridge	24.9	65.0
Caddo	15.4	80.4
Palo Pinto	26.6	107.0
Mineral Wells	12.1	119.1
Weatherford	22.3	141.4
Annetta	7.6	149.0
Aledo	6.3	155.3
Ben Brook	9.9	165.2
Fort Worth	10.3	175.5
Handley	5.5	181.0
Arlington	6.5	187.5
Grand Prairie	6.5	194.0
Dallas	13.1	207.1

Fifteenth Day, Dallas to Texarkana, Ark., 217 Miles.

Dallas to	Miles to	Total Miles
Vickery	7.1	7.1
Richardson	6.1	13.2
Plano	6.0	19.2
McKinney	14.1	33.3
Melissa	7.7	41.0
Anna	4.7	45.7
Sedalia	7.2	52.9
Pilot Grove	5.8	58.7
Whitewright	6.4	65.1
Bonham	15.4	80.5
Dodd City	6.3	86.8
Windom	4.5	91.3
Honey Grove	5.4	96.7
Petty	6.7	103.4
Hightown	3.6	107.0
Brookston	2.7	109.7
Paris	10.2	119.9
Blossom	9.7	129.6
Detroit	9.0	138.6
Clarksville	13.5	152.1
Annona	9.4	161.5
De Kalb	19.2	180.7
Boston	12.7	193.4
New Boston	1.3	194.7
Hooks	7.3	202.0
Leary	4.6	206.6
Texarkana, Ark.	10.4	217.0

Sixteenth Day, Texarkana to Hot Springs, Ark., 138.3 Miles.

Texarkana to	Miles to	Total Miles
Mandeville	6.4	6.4
Homan	8.3	14.7
Fulton	7.8	22.5
Hope	14.2	36.7
Emmet	9.1	45.8
Prescott	8.5	54.3
Boughton	5.2	59.5
Okolona	12.7	72.2
Dobyville	6.0	78.2
Arkadelphia	15.9	94.1
Friendship	9.3	103.4
Social Hill	9.6	113.0
Lawrence	18.9	131.9
Hot Springs	6.4	138.3

Seventeenth Day, Hot Springs to Clarendon, Ark., 139.6 Miles.

Hot Springs to	Miles to	Total Miles
Lonsdale	15.4	15.4
Fuller Crossing	6.8	22.2
Fairplay Crossing	1.5	23.7
Benton	6.2	29.9
Collegeville	8.2	38.1
Little Rock	15.2	53.3
Argenta	1.1	54.4
Lonoka	23.2	77.6
Carlisle	11.1	88.7
Hazen	9.0	97.7
Stuttgart	20.5	118.2
Roe	21.4	139.6

White river ferry to Clarendon.

Eighteenth Day, Clarendon to Memphis, Tenn., 93.2 Miles.

Clarendon to	Miles to	Total Miles
Brinkley	15.5	15.5
Wheatley	10.0	25.5
Goodwin	5.2	30.7
Beck's Spur	10.5	41.2
Forrest City	4.0	45.2
Madison	4.5	49.7
Marion	37.5	87.2
Mound City	6.0	93.2

Ferry to Memphis.



Picturesque Drive, Built by Convict Labor, Leading into the Royal Gorge, Colorado.

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A Glimpse of the Beautiful Foxtail Grass, Which Blooms on the Ranges in Central Texas.

Nineteenth Day, Memphis to Tuscumbia, Ala., 159.4 Miles.

Memphis to	Miles to	Total Miles
Aulon	5.3	5.3
Whites	4.1	9.4
Germantown	5.2	14.6
Collierville	8.9	23.5
Piperton	2.5	26.0
Rossville	4.2	30.2
Moscow	8.4	38.6
La Grange	9.8	48.4
Grand Junction	3.5	51.9
Saulsbury	6.9	58.8
Rogers Spring	7.5	66.3
Essary Springs	12.8	79.1
Corinth, Miss.	20.5	99.6
Burnsville	15.5	115.1
Iuka	9.6	124.7
Cherokee, Ala.	18.3	143.0
Barton	4.7	147.7
Tuscumbia	11.7	159.4

Twentieth Day, Tuscumbia to Birmingham, Ala., 139 Miles.

Tuscumbia to	Miles to	Total Miles
Leighton	10.9	10.9
Town Creek	7.1	18.0
Courtland	6.1	24.1
Wheeler	3.1	27.2
Hillsboro	3.9	31.1
Trinity	5.8	36.9
Decatur	6.1	43.0
Hartselles	6.9	49.9
Berlin	27.5	77.4
Blountsville	13.7	91.1
Cleveland	8.1	99.2
Tidwell	7.0	106.2
Compton	8.5	114.7
Village Springs	2.5	117.2
Mount Pinson	6.5	123.7
Birmingham	15.3	139.0

Twenty-First Day, Birmingham to Atlanta, Ga., 190.2 Miles.

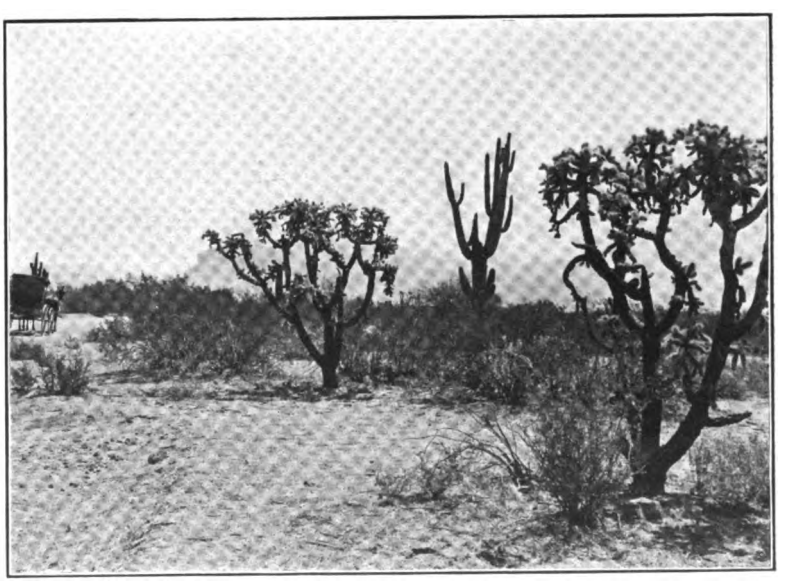
Birmingham to	Miles to	Total Miles
Gate City	5.9	5.9
Trussville	8.9	14.8
Argo	7.9	22.7
Springville	6.4	29.1
St. Claire Springs	4.7	33.8
Ashville	10.6	44.4
Greensport	12.5	56.9
Peeks Hill	7.8	64.7
Anniston	17.5	82.2
Oxanna	1.4	83.6
Oxford	1.8	85.4
De Armanville	2.7	88.1
Choccolocca	6.3	94.4
Iron City	2.4	96.8
Heflin	6.7	103.5
Edwardsville	6.2	109.7
Tallapoosa, Ga.	17.2	126.9
Waco	7.4	134.3
Bremen	2.7	137.0
Temple	7.8	144.8
Vila Rica	8.7	153.5
Winston	5.7	159.2
Douglasville	5.2	164.4
Lithia Springs	6.4	170.8
Austel	2.6	173.4
Mabelton	3.6	177.0
Atlanta	13.2	190.2

Twenty-Second Day, Atlanta to Greenville, S. C., 170.7 Miles.

Atlanta to	Miles to	Total Miles
Kirkwood	4.2	4.2
Decatur	1.9	6.1
Ingleside	1.6	7.7
Scottdale	1.1	8.8
Clarkson	2.1	10.9
Stone Mountain	5.0	15.9
Snellville	10.4	26.3
Lawrenceville	7.4	33.7
Carl	12.3	46.0
Winder	6.0	52.0
Jefferson	3.6	55.6
Apple Valley	4.9	60.5
Commerce	4.5	65.0
Pocataligo	12.5	77.5
Franklin Springs	12.7	90.2
Royston	2.2	92.4
Canon	4.5	96.9
Bowersville	2.4	99.3
Lavonia	5.6	104.9
Fair Play, S. C.	10.2	115.1
Anderson	23.0	138.1
Piedmont	21.0	159.1
Oak Grove	2.2	161.3
Greenville	9.4	170.7

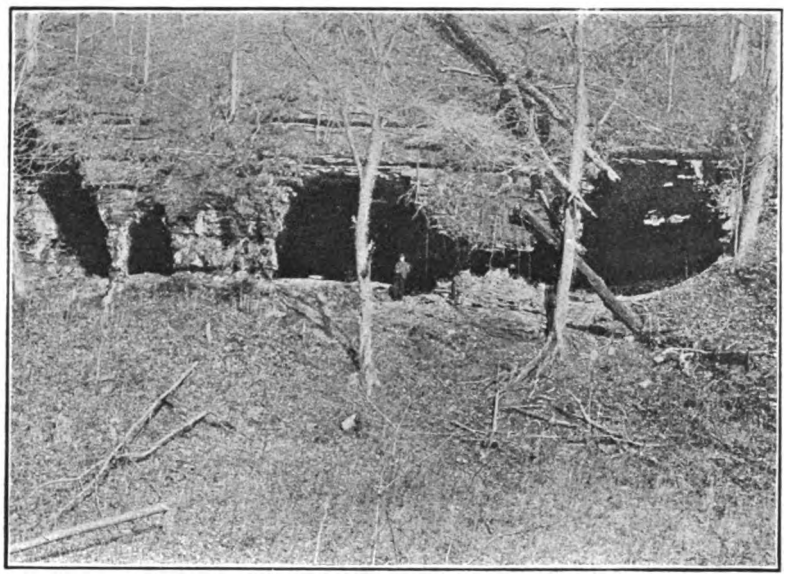
Twenty-Third Day, Greenville to Charlotte, N. C., 117.3 Miles.

Greenville to	Miles to	Total Miles
Taylors	9.7	9.7
Greer	5.6	15.3
Duncan	5.1	20.4
Tucapau	4.6	25.0
Fair Forest	6.5	31.5
Spartanburg	5.3	36.8
Mount Zion	4.7	41.5
Converse	1.7	43.2
Cowpens	3.1	46.3
Gaffney	11.9	58.2
Blacksburg	9.1	67.3
Grover N. C.	6.3	73.6
King's Mountain	8.1	81.7
Bessemer City	6.0	87.7
Gastonia	6.8	94.5
Lowell	5.5	100.0
Belmont	4.7	104.7
Sloane's Ferry	1.7	106.4
Charlotte	10.9	117.3



Desert Vegetation in Arizona—The Scraggly Cholla and the Giant Cactus.

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Rock Houses in Nantahala Gorge, North Carolina, Vie with Mammoth Cave of Kentucky as an Exploration Ground.

Twenty-Fourth Day, Charlotte to Winston-Salem, N. C., 81.5 Miles.

Charlotte to	Miles to	Total Miles
Newell	7.8	7.8
Pharr's Mill	8.4	16.2
Concord	6.2	22.4
Kanapolis	7.9	30.3
Landis	4.7	35.0
China Grove	2.4	37.4
Salisbury	2.8	40.2
Spencer	2.8	43.0
Lexington	14.6	57.6
Brinkleys	7.0	64.6
Midway	3.2	67.8
Winston-Salem	13.7	81.5

Twenty-Fifth Day, Winston-Salem to Henderson, N. C., 148.5 Miles.

Winston-Salem to	Miles to	Total Miles
Centerville	2.3	2.3
Kernersville	9.8	12.1
Summerfield	11.7	23.8
Guildford	6.7	30.5
Greensboro	5.7	36.2
Whitsett Cross Roads	13.6	49.8
Gibsonville	2.7	52.5
Burlington	6.7	59.2
Graham	2.9	62.1
Saxapahaw	12.1	74.2
White Cross	9.7	83.9
Chapel Hill	9.0	92.9
Durham	12.1	105.0
Bragtown	3.3	108.3
Knapp of Reeds	11.6	119.9
Stem	4.7	124.6
Tallyho	1.3	125.9
Providence	5.2	131.1
Oxford	5.7	136.8
Henderson	11.7	148.5

Twenty-Sixth Day, Henderson to Richmond, Va., 145.9 Miles.

Henderson to	Miles to	Total Miles
Afton	13.7	13.7
Warrenton	4.8	18.5
Macon	5.7	24.2
Vaughan	5.4	29.6
Littleton	5.8	35.4
Sunlight	5.3	40.7
King's Cross Roads	1.3	42.0
Thelma	1.1	43.1
Holden	6.7	49.8
Roanoke Rapids	2.4	52.2
Barley, Va	11.8	64.0
Brink	6.9	70.9
Emporia	7.7	78.6
Jarratt	9.9	88.5
Loco	5.8	94.3
Stony Creek	6.6	100.9
Carson	7.4	108.3
Petersburg	14.9	123.2
Richmond	12.7	145.9

Twenty-Seventh Day, Richmond to Washington, D. C., 121.6 Miles.

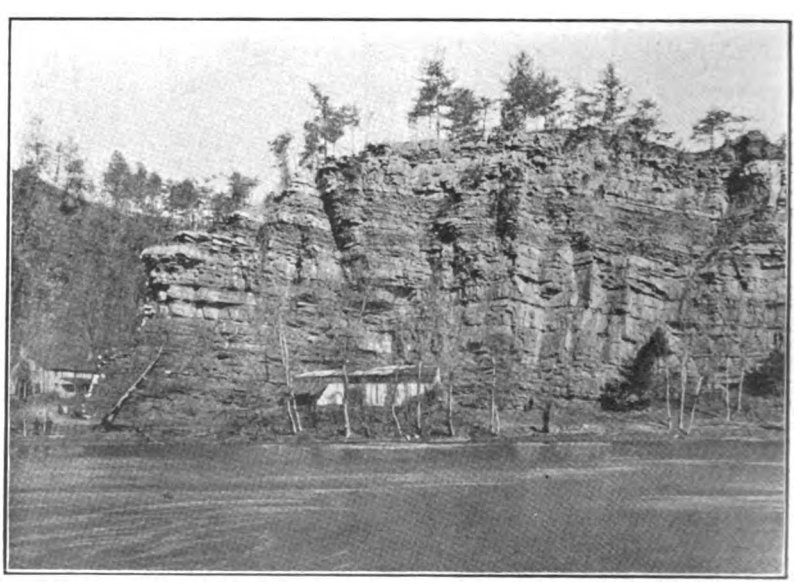
Richmond to	Miles to	Total Miles
Ashland	17.3	17.3
Golansville	16.4	33.7
Castelman's Mill	13.2	46.9
Massaponax	5.9	52.8
Fredericksburg	9.4	62.2
Stafford	9.4	71.6
Dumfries	16.4	88.0
Occoquan	10.7	98.7
Lorton	3.5	102.2
Alexandria	12.2	114.4
Washington, D. C.	7.2	121.6

Twenty-Eighth Day, Washington to Philadelphia, Penn., 152.4 Miles.

Washington to	Miles to	Total Miles
Blagdensburg, Md.	6.9	6.9
Beltsville	7.2	14.1
Laurel	6.0	20.1
Elkbridge Station	10.7	30.8
Relay	1.3	32.1
Cantonsville	3.7	35.8
Baltimore	8.2	44.0
Towson	8.8	52.8
Lock Raven	4.2	57.0
Glenarm	3.7	60.7
Bel Air	10.4	71.1
Churchville	5.5	76.6
Havre de Grace	9.9	86.5
Perryville	1.5	88.0
Northeast	7.4	95.4
Elkton	6.2	101.6
Newark, Del.	7.1	108.7
Marshallton Station	7.9	116.6
Elsmere Junction	2.6	119.2
Wilmington	2.7	121.9
Chelsea, Penn	9.7	131.6
Darby	14.1	145.7
Philadelphia	6.7	152.4

Twenty-Ninth Day, Philadelphia to New York City, 96.9 Miles.

Philadelphia to	Miles to	Total Miles
Agontz	8.9	8.9
Bustleton	7.3	16.2
La Trappe	5.1	21.3
Langhorne	4.4	25.7
Glen Lake	1.3	27.0
Trenton, N. J.	8.1	35 1
Lawrenceville	5.9	41.0
Princeton	5.1	46.1
Kingston	3.0	49.1
Franklin Park	6.8	55.9
New Brunswick	6.2	62.1
Metuchen	5.5	67.6
Iselin	2.1	69.7
Elizabeth	10.9	80.6
Newark	6.2	86.8
Jersey City	10.1	96.9



Paint Rocks, French Broad River, North Carolina, One of the Most Interesting Monuments on the American Continent.

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THREE SPLENDID VACATION TOURS.

The First Itinerary Covers the New England States, Including the White Mountains, the Maine Woods and Numerous Seaside Resorts.

Vacation Tour No. 1 contemplates that the tourist start from New York City and be gone 10 days. It covers almost the whole of New England, visiting the beautiful Litchfield hills, as well as the Housatonic and Naugatuck valleys the first day; spends the second in the Connecticut valley; the third in the Green mountains and around Lake Champlain; the fourth in northern Vermont and the upper Connecticut; the fifth in the White mountains; the sixth in the Rangeley lake section of Maine; the seventh in the Maine woods; the eighth along the North Shore; the ninth in Rhode Island, and the tenth on Long Island.



The Litchfield Foothills of Southern Connecticut Furnish Mild Climbing Tests as a Foretaste of the Mountains.

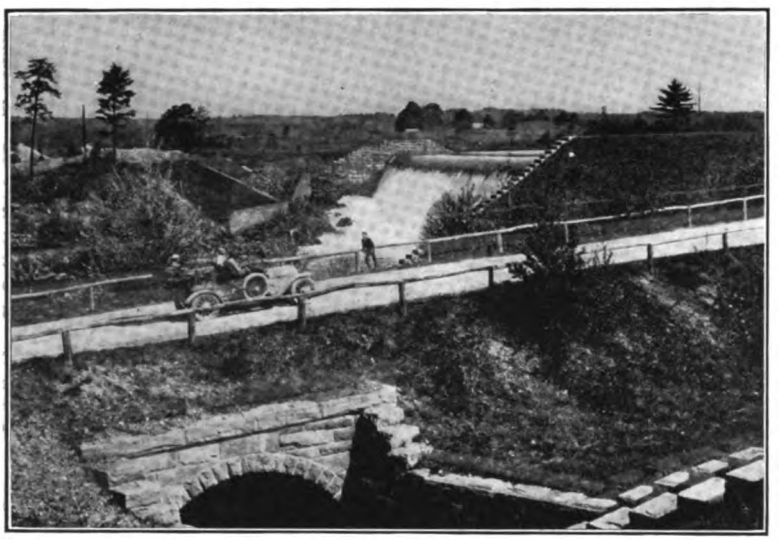
Leaving New York the first day, the route lies through the metropolitan residential suburbs of New Rochelle, Larchmont, Mamaroneck, Rye and Portchester to Greenwich, Conn., which with its many splendid homes, is also a suburb of New York. At Stamford, a pretty little city with handsome drives, the tourist turns northward into the Litchfield foothills. Ridgefield is well known to New York people as a summer place. It gains its name because of a lofty ridge, called by the Indians Caudatowa. In May, 1777, a little band of militiamen here cost Gen. Tryon 170 men before he was able to capture the defense. On the way to Danbury, is to be seen the monument raised to Gen. Wooster, the commander of the Continental forces, by the Masons, who have a particular regard for his memory, because of the fact that he instituted the first lodge in the state, Hiram of New Haven.

Danbury is the home of the hat industry, the first American hat factory being located here in 1780, when Zadoc Benedict, with three men, was able to produce three hats a day. The town was destroyed by Gen. Tryon in his memorable raid of May, 1777, and with it a large quantity of army supplies stored there by the colonists. The road now descends into the Housatonic valley and then, up the hill to Newton, where Beecher said "the hills first begin to show mountainous symptoms." There is a good deal of up-hill and down-dale between this point and Middlebury, which is a quiet little town among the hills and the seat of Westover School for girls.

Waterbury is in the Naugatuck valley, and is the seat of the brass industry. The tourist will do well to forget his "Waterbury watch" jokes, because the people of the Brass city do not take at all kindly thereto, although watches and clocks still continue to form a large portion of its manufacturing life. Shortly after leaving West Cheshire the route lies over the famous Southington mountain, which is no longer formidable, owing to the system of road grading which has been carried out at this point. Lake Compounce is near the foot of the mountain.

Plainville was once a large carriage manufacturing centre, but the growth of the automobile industry has affected it very materially. Splendid macadam roads take the tourist through New Britain, where Elihu Burritt, the learned blacksmith, was born in 1811. The water supply is furnished from a large reservoir, located 200 feet above and in the heart of the city. Hartford, the night stop, is the capital of the state and has a number of very pretty parks. The view from the capitol dome is a particularly pleasing one.

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Where the Chicopee River Empties Into the Connecticut.

The entire second day is spent in the valley of the Connecticut river, with its system of splendid roads. Crossing the new stone bridge into East Hartford the tourist enters the tobacco country just north of that town. For miles, on either side of the river fields of this crop will be found, studded with numerous tobacco barns. At Warehouse Point will be noted a steel truss railroad bridge, which is considered a noble piece of engineering, made in Manchester, England, and set up here in 1866. Enfield was settled by Salem men in 1681, but the town itself has almost lost its identity because of the carpet making establishment at Thompsonville.

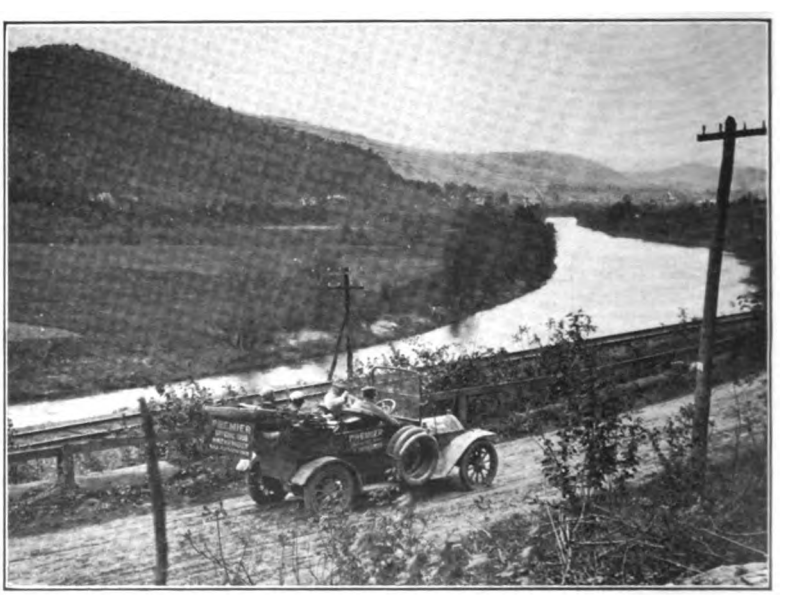
Longmeadow is the first Massachusetts town entered, and its wide streets with excellent macadam surface once made the motorist unhappy because of the very efficient speed trap located there and presided over by one Hanratte. A little later, as the tourist descends Pecusic hill at Forest Park, a splendid view of Springfield, the City of Homes, is seen, spread out like a panorama before him. Time may be spent profitably in a visit to the Springfield Arsenal, the subject of Longfellow's poem by that name, concerning which it is said no better view in the wide world can be secured than from its roof.

Chicopee, at the confluence of the Chicopee and Connecticut rivers, is the home of the Ames foundry, in which the superb bronze doors of the United States Senate chamber were cast during the Civil War. The doors of the House of Representatives were made in Munich, and the Senate doors were to have been cast in the same place. The over-prudent Bavarians demanded their money in advance, and the Government decided to try home production. The work of the Chicopee foundry, while little was hoped or expected from it, challenges comparison with the best from the Munich concerns.

The South Hadley Falls at Holyoke present a pretty scene as the route turns over the hills for a brief period, long enough to visit Mt. Holyoke College, for girls, at South Hadley. At Amherst, is Amherst College, with a handsome campus, though in many respects it by no means compares with that of Mt. Holyoke. Amherst was the home of Eugene Field, and many of his richest poems were written under these trees. The Massachusetts Agricultural College is located at North Amherst. Some mention also should be made of Mt. Holyoke and Mt. Tom, one on either side of the river, and both of which are seen from a number of points on the tour.

Crossing the river at Sunderland, under the sheltering shadow of Mt. Toby, the way leads along the foot of Sugar Loaf mountain, the scene of some of the bloodiest tragedies of the King Philip and later Indian wars. King Philip is said to have directed the movements of the western Indians from his headquarters on this mountain, and Table rock, a beetling cliff on the east side, has a seat cut in the side, which is called King Philip's chair.

In the northern part of South Deerfield is a monument on the Blood Brook battlefield. Sept. 18, 1675, Capt. Lathrop and 84 men were conveying a train of grain wagons from ruined Deerfield to Hadley, and as they passed this brook they halted to rest and pick some luscious wild grapes which hung in clusters over its waters.



Connecticut Valley Supplies Beautiful Mountain and River Scenery.

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While they were thus engaged 700 Indians fell upon them, and but seven men escaped.

Deerfield was sacked and burned and then abandoned shortly before this battle. Later it was settled again by a number of younger men, and in 1694 it was again attacked, although ably defended by the settlers, headed by their pastor, Rev. John Williams. Feb. 29, 1704, a third attack was made, and this time the village was destroyed again, only one house remaining. One hundred and twelve captives were taken to Canada, where they were held for ransom. Memorial Hall contains an excellent collection of historical relics.

Soon after passing Greenfield, the route crosses the river again into East Northfield, the seat of the Moody School for girls, and of other institutions organized and perpetuated by Dwight L. Moody. Mt. Herman School for boys is only a short distance away.

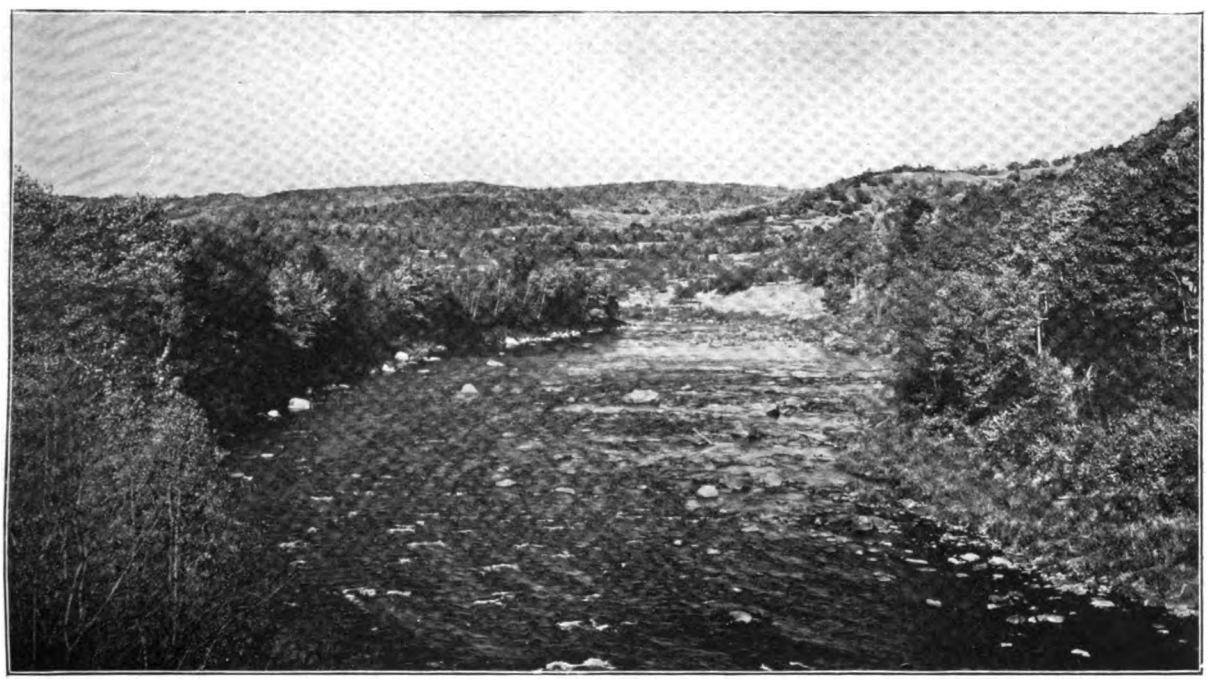
Entering Vermont at Vernon is noted the magnificent dam across the river, which furnishes Brattleboro with a splendid lake front. The electricity generated at this dam furnishes light and power for numerous towns in northern Massachusetts, as far distant as Worcester. Brattleboro is naturally very beautifully situated and is the business centre for a large area in both Vermont and New Hampshire. The Estey organ works here are of especial interest.

In Putney are long strata of roofing slate, and the rare mineral, fluor spar, of a rich emerald green. In 1775, a strong timber fort was erected, which protected the settlement until the conquest of Canada made it unnecessary.

Bellows Falls was a favorite Indian resort, because of the large number of salmon and shad near its rapids. A short distance above the old bridge at this point are a number of hieroglyphics, which Schoolcraft decided were the records of an ancient battle. The river falls 42 feet within half a mile of the village, forming a white and impetuous rapids.

Charlestown, N. H., was settled by Massachusetts people and was originally named Number Four. Between 1746 and 1760, it was repeatedly attacked and conducted a defense so admirable that the enemy decided at last to abandon the conquest. During the later French and Indian wars it was a military station. It is situated between two broad, rich meadows, and has a long, wide, well shaded street.

Ascutney mountain comes into view just above Claremont, and the river is recrossed into Vermont at Ascutneyville. At Windsor, during a heavy thunderstorm and with the news of the fall of Fort Ticonderoga ringing in their ears, the deputies of the Vermont towns adopted the state constitution, July 2, 1777. Ascutney, the name of the mountain, which is easily reached from Windsor, was Indian for Three Brothers, and is supposed to refer to the three singular valleys which run down its western slope. Early settlers claimed they often saw a curious light overhanging the peak at night. White River Junction is the night stop, at the union of the White and Connecticut rivers.



The Deerfield River Rushes on Its Way to Join the Connecticut from the Berkshire Hills.

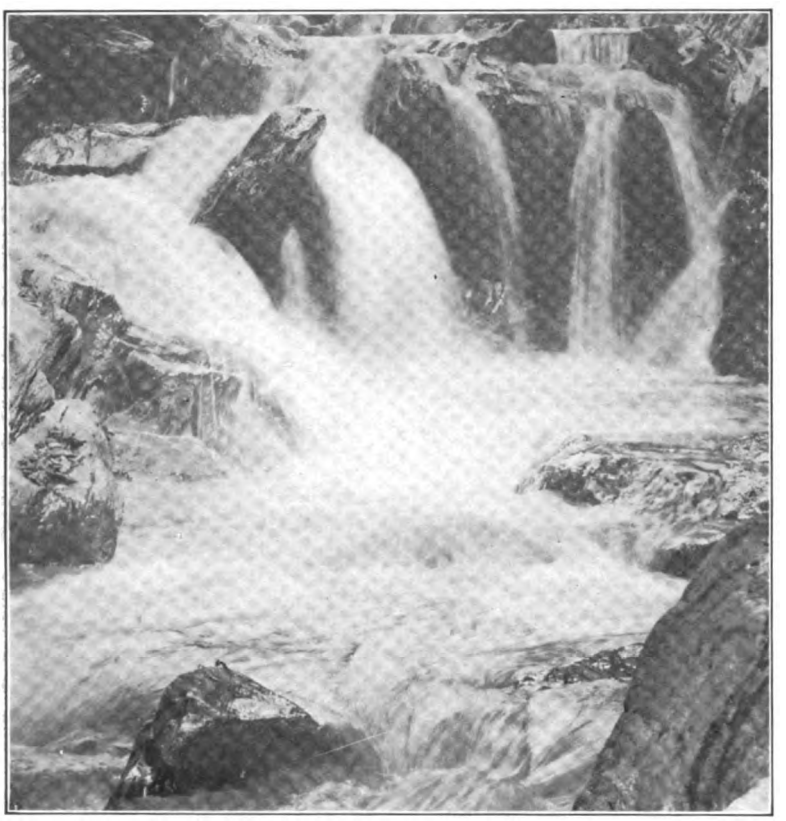
The third day, the route follows the picturesque White river for a time, branching off to climb the Green mountains toward Montpelier. Joseph Smith, founder of Mormonism, was born in Sharon. At Royalton, occurred the last attack by the Indians on New England in October, 1780. Two hundred redskins plundered and burned the village, as well as Sharon, and captured 27 of the people.

Bethel is a busy manufacturing village among high hills. A little further along is the famous Williamstown gulf, through which it is seldom indeed that cool breezes

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do not blow. The view from this point to Barre and Montpelier is most superb. Montpelier, the capital of the state, is situated on a plain near the Winooski river, and is surrounded by fertile hill farms. Under the portico of the State House are two cannon taken from the Hessians in the battle of Bennington in 1777, after a desperate struggle. The British got them back, but they were retaken by the Americans during the Canadian campaign, and were presented to the state by Congress.

Near Middlesex, the river passes through a gorge 30 feet deep, 60 wide and 1300 long, which has been worn by the action of the water. Waterbury abounds with pleasant rambles and drives, with frequent glimpses of Camel's Hump and Mt. Washington. Bolton Falls are also near by. The road now descends toward Lake Champlain, along the valley of the Winooski, the Adirondacks coming into view now and then.



View of Little River as It Tumbles Over Bolton Falls, Vermont.

Burlington, the Queen City of Vermont, has several fine buildings, among them St. Paul's Episcopal Church of blue limestone and with beautiful stained glass windows. The University of Vermont occupies a commanding position on a high hill, and near this is Green Mountain Cemetery, in which lies the body of Ethan Allen, under a Tuscan column 42 feet high.

Near Winooski is the romantic canyon on the river, and at High Bridge, the impetuous stream has cut a gorge through the solid rock 90 feet deep and 70 feet wide. St. Albans is the night stop, located on an elevated plain, three miles from Lake Champlain. A neat park of four acres in the centre of the city, is surrounded by hotels and numerous public buildings. A Norman-towered Episcopal church of red sandstone is most noteworthy. A magnificent view may be had from Aldis hill, about a mile to the northeast.

The fourth day takes the tourist first to Sheldon, near which are located the famous mineral springs. That near the Missisquoi Falls has had an enviable reputation. From Dunton's hill, a vast panoramic view of the Green mountains is obtained, while the silver waters of Lake Champlain, the Adirondacks and the spires of Montreal are to be included in the scene. At Richford, Jay peak rises to an altitude of over 4000 feet.

Newport is located at the upper end of Lake Memphremagog, and from the edge of the town rises Prospect hill, from which excellent lake views may be obtained. The lake is 30 miles long, and two-thirds of it lies in Canada. Barton Landing was the scene of much smuggling during 1810-15. At Barton, may be seen Crystal lake and the Flume, where a brook flows through a natural passage in the granite rock, 170 feet long, 10 wide and between 20 and 30 deep. The granite walls are smooth and perpendicular. In 1810, the people of Barton determined to widen Barton river by turning Long pond into it. They barely had completed a channel, when the waters burst through with tremendous force and swept down to Lake Memphremagog, wrecking everything in their path and causing immense damage. The bed of Long pond is now dry and is called Runaway pond.

Numerous rare plants are to be found along the sides of Lake Willoughby, a magnificent sheet of water on the way to Lyndon and St. Johnsbury. At the latter place considerable interest attaches to the works of the Fairbanks scales concern, particularly those which are made for use in oriental countries, with their Chinese and Turkish numerals marked thereon. The Passumpsic river and its black, rock banks is crossed at this point.

From the hills in the vicinity of Littleton, N. H., may be had a fine panorama of the White mountains, and a little later the tourist enters the White mountain region at Bethlehem. No more beautiful view of the entire range can be secured from any other point. To the north and west are the mountains of Lancaster, the Percy peaks, the Pilot mountains and the great Presidential range. The night stop is at Bretton Woods, the very centre of the entire district.

The fifth day gives ample opportunity to test the car on mountain roads, but if additional trials are desired it is possible to connect

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One of the Many Gorges Worn by the Winooski River in Vermont.

with the road to the summit of Mt. Washington at Cherry Mountain or Gorham. For river scenery, combined with the impressive mountain forms, the vicinity of Gorham surpasses all the other districts from which the highest peaks are visible.

The drive to Gilead, Me., is along the river, with ever changing hill scenery on either hand. This continues through Mayville, North Bethel and Newry to Rumford Falls. Here the descent of the Androscoggin is over 150 feet in three or four plunges over ragged granite ledges. The third fall has a nearly perpendicular drop of over 70 feet, and its roaring is heard at a great distance.

From this point the route enters the Maine woods on the way to Rangeley lakes, passing through Mexico, Dixfield, Weld, Webb and Madrid. Many summer camps and once in a while a farm house serve to break up the monotony of the continual forest, of which there are nearly 100 square miles in this region. The trip is by no means uninteresting, however, for something new in the way of scenery is being spread out before the tourist all of the time. The elevation of the lakes is about 2000 feet, and the pure air and sparkling water make it a most desirable spot in which to spend a summer's vacation.

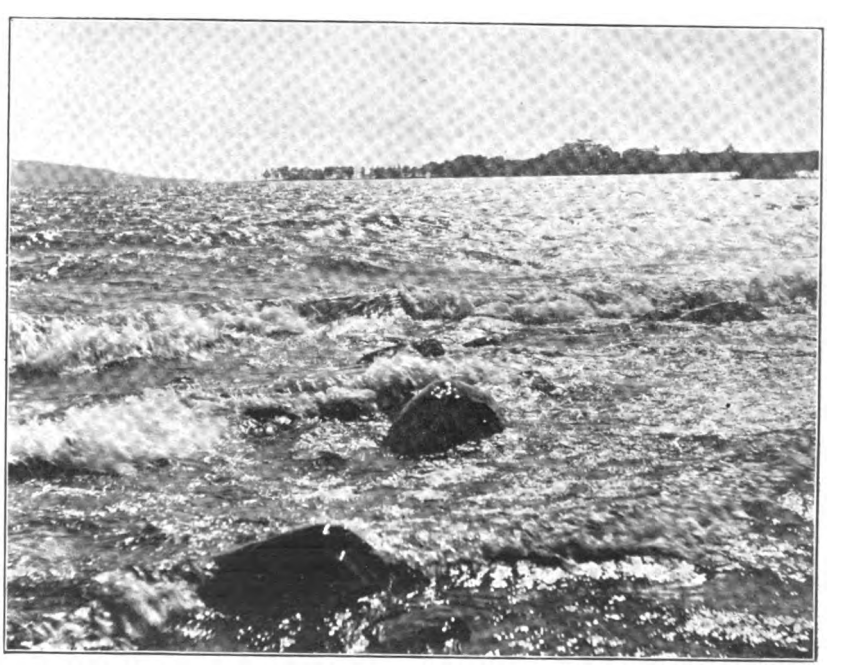
During the sixth day, the tourist has many more miles of Maine woods before him. The route from Rangeley lakes to Skowhegan, by way of Dead River, Green Farm, Stratton, Flagstaff, North New Portland and North Anson, is somewhat better known by automobilists than that over which the tour reached Rangeley. The scenery, still that of the woods, interspread with numerous ponds and lakes is fully as inspiring as any in New England.

After leaving Skowhegan, fine fishing country is visited on the way to Pittsfield and Newport, the latter town being located on the shores of East Pond, which is 15 miles in circumference and affords most excellent fishing. The night stop is at Bangor, in size the second city of the state, and the second lumber mart in the world. The approach to the city, by way of Etna, Carmel and Hermon, gives commanding views of the hills at head of navigation on the Penobscot. The tributaries of of this river penetrate the great Maine forest in every direction, and bear downward to this city immense quantities of lumber, work on which may be seen at numerous places en route.

The river is quite as picturesque below Bangor. During the war of 1812, the British attacked Hampden, plundered and overran the town for three days. Between Winterport and Frankfort may be seen the granite quarries around the base of Mt. Waldo. Belfast is a handsome little city built on a declivity which slopes to the water, with wide shady streets.

The route now passes along the Penobscot bay, with its views of Mt. Desert in the distance. Camden is a pretty little town, with the two Megunticook peaks and a number of other smaller mountains to complete a picturesque group. Hills continue to furnish the change of scenery through Rockport and Rockland, the latter situated on Owl's Head bay. Here ship building is carried on, but the chief industry is lime burning. The kilns should be seen at night, and make a splendid addition to the hill and marine scenery about the city.

Thomaston is located on a deep,



When a Summer Breeze Stirs Up the Waters in St. Albans Bay, Vt.

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narrow harbor, and is the site of the Maine state prison, established in 1824. This was the scene of a sharp naval battle in 1724, when a fleet of 24 vessels, composed for the most part of captured fishing boats, engaged the colonial relief ships, which were forced to retire, greatly damaged by the Indian artillery. The fort which was built in 1720 withstood all attacks and was still standing during the Revolution.

Warren, another ship building town, was settled by Scotch and Irish in 1736. Waldoboro was settled by 1500 Germans in 1753, and some of their descendants still remain. Woolwich was founded in 1638, its Indian name being Naquasset, but was depopulated by an attack in 1696. It was rebuilt in 1759. William Phips was born in this town in 1651, and was a shepherd on its rocky hills. Later he learned the art of ship carpentry and in 1687, he succeeded in locating a Spanish treasure ship near the Bahamas, recovering something like $1,500,000 worth of jewels and bars of gold and silver. For this he was knighted by the king and received $80,000 of the treasure.

Bath was once a wealthy city, until the decline in American commerce seriously affected its ship building industry. It has a fine harbor, rarely bothered with ice, and the Kennebec at this point is very beautiful. The river is half a mile wide, and is rapid and deep. Some of the best shipbuilding lumber is floated down from its head waters.

Brunswick is a prosperous town at the falls and the head of the tidewater on the Androscoggin. The river falls 41 feet in three pitches and furnishes power for numerous factories. The city is also the seat of Bowdoin College. The pine groves in the rear of the college buildings are widely known for their sombre beauty.

Portland is the night stop. The city is situated on a high peninsula at the southwest end of Casco bay. Its harbor is deep, well sheltered, and is defended by powerful forts, while its numerous islands afford favorite resorts during the summer season. Portland has been devastated by fire several times. It was burned by the Indians and British, and several large fires have destroyed portions of it since.

Near Biddeford, may be seen the ruins of Fort Mary, built in 1708. A quaint old house of the 17th century is also of interest. Between Saco and Kennebunk the tour crosses the Saco river, and at Biddeford may be seen the falls, which furnish power for a number of towns in that vicinity. Several of the famed Maine beaches are passed as the tourist proceeds on his way to Portsmouth, N. H.

This is a quaint and pleasant old city, with some very remarkable examples of colonial architecture. The old Church of St. John is worthy of a visit, as well as the Gov. Wentworth mansion at Little Harbor. This latter is a large, irregular building, dating from 1750, and contains the old provincial council chamber and many quaint relics of the past.

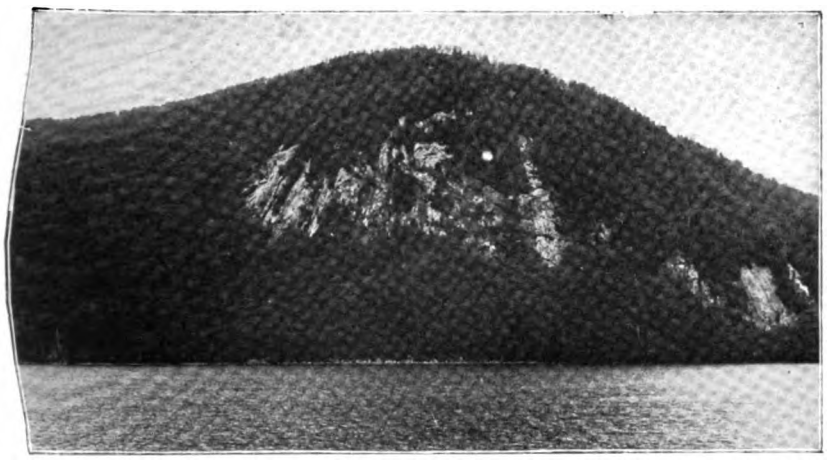
The tour is arranged to visit the beaches in this immediate vicinity, all of which are famed for their beauties. The old chain bridge, three miles west of Newburyport, is the second suspension bridge in the world and the first in America. The Newburyport silver mines, which were opened in 1875 and for a time yielded richer ore than those of Nevada, are also near the city. Newbury was settled in 1635, and for many years was noted for its wealth and aristocracy.

Rowley is a town composed largely of salt marsh. It was settled in 1638 by a nomadic church, led by Ezekiel Rogers. In 1650, he died, leaving his library to Harvard College. The first cloth made in America was turned out by these early settlers. Ipswich was the home of Cotton Mather. The town was purchased from the Sagamore Masconmet for $100 in 1633 by John Winthrop,



One of the Views of the White Mountains from Bethlehem, N. H.—Mt. Washington in the Distance.

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Where Mt. Hor Raises Its Head Above Willoughby Lake at West Burke.

the first governor of Connecticut.

Wenham lake has a world-wide reputation for its ice, which is shipped to remote parts. This ice is kept entirely free from snow and is harvested when about a foot thick, yielding about 1000 tons to the acre. Beverly is now known as the summer capital, it being the vacation home of President Taft. Other North Shore towns passed on the way to Boston, are Salem, home of Salem witchcraft, with its witch's hill, the East India Marine Hall, Plumber Hall and other historic associations; Lynn, with its first shoe factory in America, its Dungeon rock, where pirates are said to have held sway and the home of Molly Pitcher; Revere Beach, a favorite summer amusement park; Somerville, one of the richest suburbs of Boston; and Cambridge with its Harvard University, Washington elm and Longfellow's home.

Boston is filled with points of interest, but a bare mention of some of them will suffice. These would include the Old South church, Paul Revere's home, the old State House, Faneuil Hall, the Public Gardens, the library, the Christian Science church, the Museum of Fine Arts, and other equally famous buildings and places. From this city to Providence the way is over macadam for its entire distance.

The wide streets of Dedham are over-arched with handsome elms, and the sidewalks are fringed with arbor-vitae. Among the points of interest may be mentioned St. Paul's church, a handsome Gothic structure, and the ancient cemetery alongside it. The town has many old mansions in wide and pleasant grounds, and is considered by many to be the most beautiful town in eastern Massachusetts.

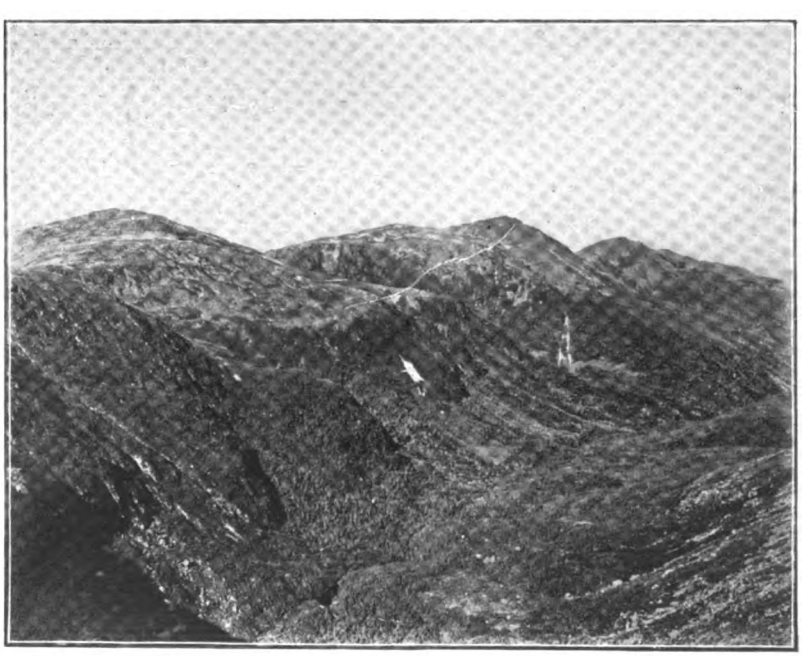
Pawtucket, R. I., was the scene of the total destruction of Capt. Pierce and his 70 men in 1676. Surprised by the Indians he was driven back to the river by a shower of arrows, and when help came not one man was left. It is the home of the first cotton mill in the country, a building which is still standing and may be seen above the falls of the Blackstone river in the centre of the city.

Providence was settled by Roger Williams, after being driven out of Salem. The city abounds with memorials to him, and his body rests in North cemetery. There are many places of interest, includ the state house, with its handsome portrait of Washington; the ancient First Baptist church, founded by Roger Williams; the Athenaeum, with its wealth of fine paintings; and the buildings of Brown University.

On the way to Apponaug, the tour passes Roger Williams park, given to the city by Betsy Williams, great-great-granddaughter of the man whose name it bears. It includes 100 acres of beautifully diversified land and the venerable gambrel roofed home of the donor. At Wickford may be seen the curious old square Episcopal church built in 1707, the block house erected for defense in 1641, and the rolling rock, where Roger Williams and Canonicus signed their compact.

This is all historic country, and recent discoveries in the hieroglyphics on some of the rocks proclaim that it was at this point Norsemen first landed to communicate with the Indians hundreds of years before the discovery of America by Columbus. On the way to Saunderstown are the ruins of the old Narragansett fort on the edge of the pine and cedar swamp.

Narragansett Pier is one of the best known shore resorts in the



View of Franconia Notch and Bald Peak in the White Mountain Region.

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Loon Lake, One of the Small Bodies of Water in Rangeley Lake Region.

country. It is at the height of its glory during the touring season, when its many large hotels are filled with prominent people. Then comes Wakefield, Charlestown and Westerly, the latter the home of the Seventh Day Adventists. If the tourist happens to reach this town on Saturday, he will find little business going on and the church bells ringing.

Of Stonington it was once written that it "suffers in religion because of its nearness to Rhode Island." However true that may have been at that time, it certainly suffers nothing because of being pleasantly situated with a fine outlook upon Long Island sound. Its quiet streets are embellished here and there by iron relics of 1814.

Near Mystic, is Pequot hill, the scene of the battle between the allied English and Indian forces against the Pequots. Upon arriving at the Indian fort the allies of the English at first declined to aid in the attack and the colonists decided to make the attempt alone. As they were kneeling in prayer, the sachem Wequash was so impressed with the sight that he became converted and preached Christianity throughout New England until he suffered martyrdom.

New London is the night stop, and as it is impossible to take the ferry to the eastern end of Long Island until 10 in the morning, some time is to be found for exploration. There are several points of interest in and about the city, among which may be mentioned the only house still standing, which was left by Benedict Arnold when he burned the town during the Revolution; the building in which Nathan Hale taught school, now standing near "Ye Anctient-ist Burying Ground," and others.

Reaching Sag Harbor about noon, the return to New York is made across Long Island; for a time along the south shore and later changing to the sound side. This will be found a pleasanter trip than along the Connecticut shore line, because of less traffic, and the roads are equally as good. Even those who are familiar with Long Island scenery will always find new views to enjoy, and while these may not be as impressive in their grandeur as the mountains and woods encountered earlier on the route, they will leave many pleasant memories and offer suggestions for further short trips.

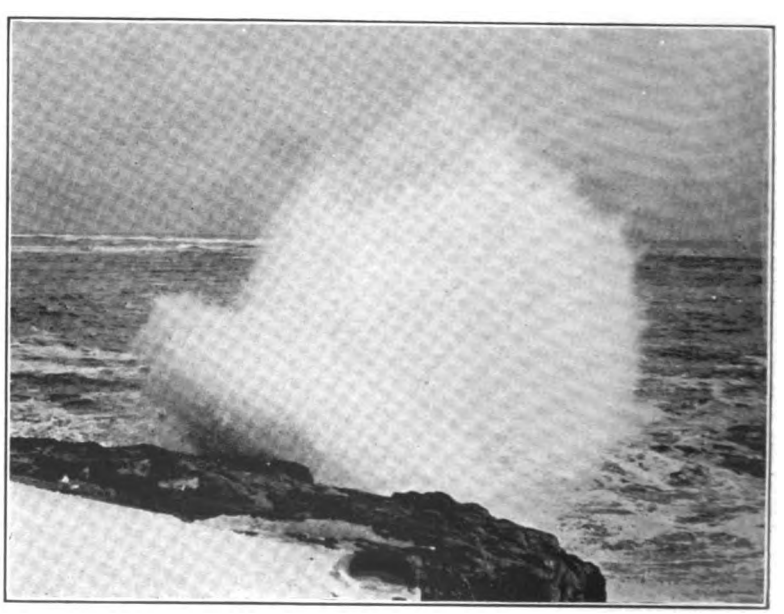
VACATION TOUR NO. 1.

New York City—Hartford, Conn.—White River Junction, Vt.—St. Albans, Vt.—Bretton Woods, N. H.—Rangeley Lakes, Me.—Bangor, Me.—Portland, Me.—Boston, Mass.—New London, Conn.—New York City.

Ten Days, 1313.1 Miles.

First Day, New York to Hartford, Conn., 130.6 Miles.

New York to	Miles to	Total Miles
New Rochelle	16.7	16.7
Larchmont	1.8	18.5
Mamaroneck	1.6	20.1
Rye	3.7	23.8
Portchester	1.7	25.5
Greenwich, Conn.	3.1	28.6
Mianus	2.4	31.0
Stamford	2.7	33.7
Springdale	3.6	37.3
New Canaan	4.2	41.5
Ridgefield	10.7	52.2
Danbury	9.6	61.8
Bethel	2.7	64.5
Dodgingtown	3.3	67.8
Newtown	4.4	72.2



Where the Surf Beats High at Popham Beach, Near Bath, Me.

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Sandy Hook	1.3	73.5
Southbury	6.0	79.5
Middlebury	8.7	88.2
Waterbury	5.6	93.8
West Cheshire	9.2	103.0
Plantsville	6.0	109.0
Southington	1.1	110.1
Plainville	4.9	115.0
New Britain	4.7	119.7
Elmwood	6.7	126.4
Hartford	4.2	130.6

Second Day, Hartford to White River Junction, Vt., 160.8 Miles.

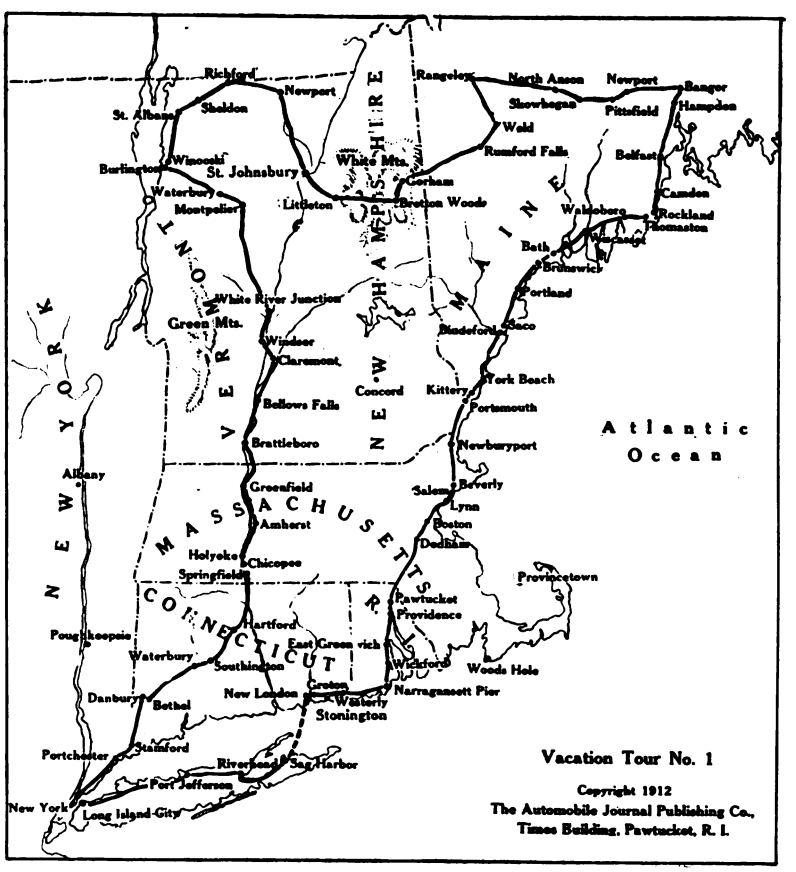
Hartford to	Miles to	Total Miles
East Hartford	1.6	1.6
South Windsor	4.1	5.7
East Windsor Hill	3.5	9.2
Warehouse Point	5.1	14.3
Thompsonville	5.6	19.9
Longmeadow, Mass	3.8	23.7
Springfield	4.1	27.8
Chicopee	3.9	31.7
Holyoke	5.2	36.9
South Hadley Falls	0.7	37.6
Amherst	12.2	49.8
North Amherst	2.5	52.3
Sunderland	4.5	56.8
South Deerfield	3.0	59.8
Deerfield	4.6	64.4
Greenfield	3.4	67.8
Bernardston	6.8	74.6
East Northfield	7.3	81.9
South Vernon	1.9	83.8
Vernon, Vt.	3.6	87.4
Brattleboro	7.4	94.8
Putney	9.5	104.3
Westminster	8.3	112.6
Bellows Falls	5.1	117.7
North Walpole, N. H.	0.6	118.3
South Charlestown	2.9	121.2
Charlestown	4.8	126 0
North Charlestown	5.8	131.8
Claremont	5.0	136.8
Ascutneyville, Vt.	4.5	141.3
Windsor	4.8	146.1
Hartland	4.7	150.8
North Hartland	4.5	155.3
White River Junction	5.5	160.8

Third Day, White River Junction to St. Albans, 125.5 Miles.

White River Junc. to	Miles to	Total Miles
Hartford	1.6	1.6
West Hartford	5.5	7.1
Sharon	6.2	13.3
South Royalton	4.0	17.3
Royalton Station	3.0	20.3
East Bethel	5.3	25.6
South Randolph	1.9	27.5
East Randolph	3.1	30.6
North Randolph	2.8	33.4
North Brookfield	3.9	37.3
Williamstown	7.8	45.1
Barre	6.2	51.3
Montpelier	7.1	58.4
Middlesex Station	6.4	64.8
Waterbury	5.4	70.2
Bolton	7.7	77.9
West Bolton	1.9	79.8
Richmond	4.6	84.4
Williston	5.2	89.6
Burlington	8.0	97.6
Winooski	2.8	100.4
Colchester Center	5.0	105.4
Milton	7.3	112.7
Georgia	6.7	119.4
St. Albans	6.1	125.5

Fourth Day, St. Albans to Bretton Woods, N. H., 139.7 Miles.

St. Albans to	Miles to	Total Miles
Sheldon	9.8	9.8
North Sheldon	3.3	13.1
Enosburg Falls	5.4	18.5
North Enosburg	4.1	22.6
East Berkshire	1.4	24.0
Richford	4.8	28.8
East Richford	5.5	34.3
North Troy	11.5	45.8
Newport Center	6.5	52.3
Newport	6.0	58.3
East Coventry	5.0	63.3
Coventry Depot	1.5	64.8
Barton Landing	4.5	69.3
Barton	5.0	74.3
Glover	3.5	77.8
Sheffield	9.0	86.8
Wheelock	1.5	88.3
Lyndon Center	5.0	93.3
St. Johnsbury Center	6.0	99.3
St. Johnsbury	3.0	102.3
Gaskill	6.0	108.3



Lower Waterford	4.0	112.3
Waterford	3.0	115.3
Littleton, N. H.	5.0	120.3
Bethlehem	5.0	125.3
Twin Mountain House	8.3	133.6
Bretton Woods	6.1	139.7

Fifth Day, Bretton Woods to Rangeley Lakes, Me., 129.3 Miles.

Bretton Woods to	Miles to	Total Miles
Carroll	7.4	7.4
Cherry Mountain	6.8	14.2
Highlands Station	3.3	17.5
Randolph	7.3	24.8
Gorham	6.6	31.4
Shelburne	6.0	37.4
Gilead, Me.	6.0	43.4
Mayville	9.5	52.9
North Bethel	1.5	54.4
Newry	4.0	58.4
Rumford Point	7.5	65.9
Rumford Falls	10.5	76.4
Mexico	1.2	77.6
Dixfield	4.8	82.4
Weld	13.4	95.8
Webb	3.0	98.8
Madrid	14.6	113.4
Rangeley	15.9	129.3

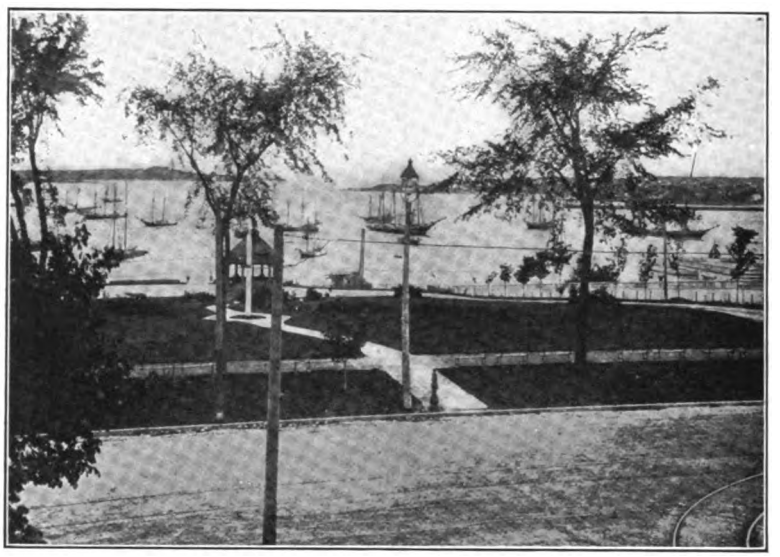
Sixth Day, Rangeley Lakes to Bangor, Me., 129.4 Miles.

Rangeley to	Miles to	Total Miles
Dead River	7.6	7.6
Green Farm	9.7	17.3
Stratton	2.3	19.6
Flagstaff	10.2	29.8
North New Portland	27.2	57.0
North Anson	8.3	65.3
Skowhegan	10.7	76.0
Canaan	7.9	83.9
West Pittsfield	5.0	88.9
Pittsfield	6.0	94.9
Detroit Station	4.5	99.4
Newport	3.0	102.4
East Newport	3.2	105.6
Etna	5.3	110.9
Carmel	3.5	114.4
Hermon	7.0	121.4
Hermon Center	1.5	122.9
Bangor	6.5	129.4

Seventh Day, Bangor to Portland, Me., 141 Miles.

Bangor to	Miles to	Total Miles
East Hampden	3.0	3.0
Hampden	2.5	5.5
North Winterport	4.0	9.5

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Pleasing View of Casco Bay as Seen from the Harbor Drive in Portland.

Winterport	3.5	13.0
Frankfort	3.0	16.0
North Searsport	7.2	23.2
Swanville	3.3	26.5
Belfast	8.0	34.5
East Northport	3.0	37.5
Northport	4.1	41.6
Lincolnville	4.4	46.0
Camden	6.0	52.0
Rockport	2.0	54.0
Rockland	6.0	60.0
Thomaston	4.8	64.8
Warren	4.6	69.4
Waldoboro	6.1	75.5
Glendon	3.5	79.0
Nobleboro	1.4	80.4
Damariscotta	5.6	86.0
Newcastle	0.6	86.6
North Edgecomb	6.9	93.5
Wiscasset	1.5	95.0
Montsweag	3.9	98.9
Nequasset	3.6	102.5
Woolwich	1.5	104.0
Bath	1.0	105.0
Cook's Corner	6.0	111.0
Brunswick	3.1	114.1
Hillside	4.4	118.5
Freeport	5.1	123.6
Yarmouth	5.4	129.0
Cumberland	2.8	131.8
Falmouth Foreside	2.7	134.5
East Deering	4.5	139.0
Portland	2.0	141.0

Eighth Day, Portland to Boston, Mass., 126.8 Miles.

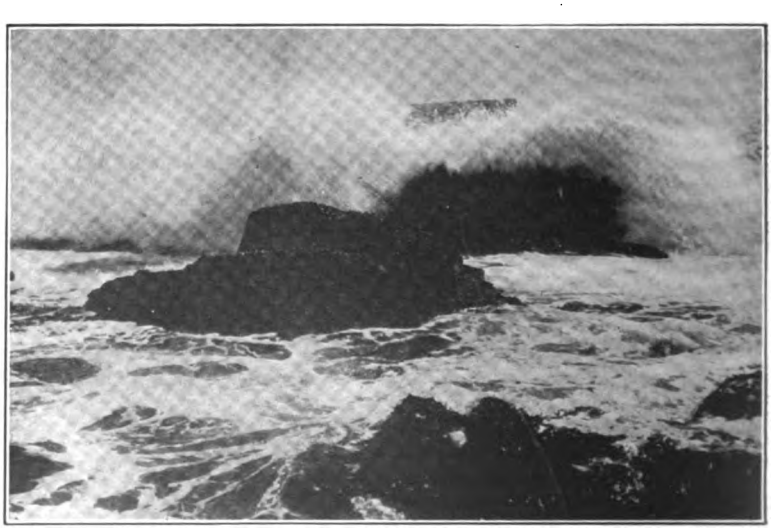
Portland to	Miles to	Total Miles
Oak Hill	5.9	5.9
Dunstan's	3.0	8.9
West Scarboro	1.8	10.7
Saco	3.6	14.3
Biddeford	0.8	15.1
Kennebunk	8.1	23.2
Elms	4.3	27.5
Wells	2.0	29.5
Ogunquit	3.5	33.0
Cape Neddick	4.8	37.8
York Beach	1.7	39.5
York Harbor	3.0	42.5
York Village	0.5	43.0
York Corners	0.8	43.8
Kittery	7.1	50.9
Portsmouth, N. H.	0.9	51.8
Rye Beach	9.3	61.1
Hampton Beach	7.5	68.6
Hampton Harbor	0.8	69.4
South Seabrook	3.4	72.8
Salisbury	2.2	75.0
Newburyport, Mass.	2.6	77.6
Newbury	1.0	78.6
Newbury Old Town	2.7	81.3
Rowley	4.4	85.7
Ipswich	3.6	89.3
Wenham Lake	7.5	96.8
North Beverly	0.7	97.5
Beverly	3.3	100.8
Salem	1.7	102.5
Lynn	7.3	109.8
Revere Beach	5.6	115.4
Somerville	6.2	121.6
Cambridge	2.4	124.0
Boston	2.8	126.8

Ninth Day, Boston to New London, Conn., 119.3 Miles.

Boston to	Miles to	Total Miles
Dedham	10.9	10.9
Ellis	2.5	13.4
Norwood	1.7	15.1
Walpole	4.1	19.2
Wrentham	6.9	26.1
Plainville	4.8	30.9
North Attleboro	1.5	32.4
Pawtucket, R. I.	8.0	40.4
Providence	5.1	45.5
Apponaug	9.7	55.2
East Greenwich	2.8	58.0
Wickford	7.2	65.2
Hamilton	1.8	67.0
Saunderstown	3.3	70.3
Narragansett Pier	6.8	77.1
Wakefield	2.6	79.7
Charlestown	9.8	89.5
Westerly	11.2	100.7
Wequetequock	2.7	103.4
Stonington, Conn.	2.5	105.9
Mystic	4.5	110.4
Poquonnock Bridge	4.0	114.4
Groton	3.9	118.3
New London	1.0	119.3

Tenth Day, New London to New York City, 110.7 Miles.

New London to	Miles to	Total Miles
Ferry to Sag Harbor, L.I.		
Bridgehampton	5.3	5.3
Southampton	6.2	11.5
East Quogue	11.5	23.0
Quoque	2.0	25.0
Riverhead	5.4	30.4
Wading River	11.0	41.4
Shoreham	2.9	44.3
Miller's Place	5.7	50.0
Port Jefferson	4.7	54.7
East Setauket	1.8	56.5
Stony Brook	3.5	60.0
St. James	2.3	62.3
Commack	8.3	70.6
Northport	3.9	74.5
Centerport	3.2	77.7
Huntington	3.2	80.9
East Norwich	6.4	87.3
Roslyn	6.8	94.1
Manhasset Hills	2.9	97.0
Manhasset	0.5	97.5
Little Neck	2.2	99.7
Bayside	1.9	101.6
Flushing	2.5	104.1
Corona	1.9	106.0
Winfield	2.0	108.0
Long Island City	2.7	110.7



When the Storm Makes Merry with the Surf at Cape Elizabeth, Me.

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VACATION TOUR NO. 2 VISITS CANADIAN POINTS.

As with the preceding, Vacation Tour No. 2 is outlined to start from New York City. The first day crosses Westchester county and visits the Litchfield and Berkshire hills; the second is spent in the Green mountains and ends on the banks of Lake Champlain; the third, fourth, fifth, sixth and seventh find the tourist in Canada; the eighth covers western New York; the ninth is in northwestern Pennsylvania, and the last day in northern Jersey. This last state now grants reciprocity and is, in many respects, ideal touring country.

Those who have visited England and have enjoyed the English custom of sipping tea in the quaint little tea rooms located at numerous points along the many drives, will recall these experiences upon catching glimpses of the tea houses scattered throughout the district between New York City and Briarcliff Manor, and beyond that point for some distance. This section is familiar touring ground for metropolitan motorists, who often find it pleasant to drive out to Lake Mahopac and spend the afternoon amid quiet surroundings.

It is the lake country of the beautiful Croton district, and beside Mahopac, Lakes Waccabuc, Oscawana and Peach each have their own peculiar charm. Lake Titicus is on the way to Pawling, near which is Quaker hill, 1300 feet above sea level and commanding a view of the Hudson and the lake country, considered one of the finest in the North. It was at this point that Gen. Washington maintained his headquarters for a time during the Revolution, and the house occupied jointly by Washington and Lafayette remains with but slight alterations. The old Quaker Meeting House, erected in 1764, is another attraction of interest.

One of the distinctive features in the vicinity of Dover Plains is Chestnut ridge, which extends north and south for about three miles and forms part of the water shed between the Hudson and Housatonic rivers. The small streams from the western hills have worn deep ravines and in several places have formed beautiful cascades. A few miles from the village, one of these streams flows down the mountains in a succession of rapids, and at the foot of each fall smooth rounded holes, called wells, have been worn in the rocks to a considerable depth. Near this, and a little higher up in the mountains, is a stream which has worn a remarkable channel in the rocks, forming a cavern with a gigantic Gothic arch, known locally as "the old stone church."

Sharon, Conn., is noted for its rural loveliness. Several splendid views of the Berkshires are to be had from its long, shady street, 200 feet wide and two miles in length. Lakeville is a quiet little place situated on the shores of Lake Wononskopomuc, on the banks of which may be seen the Hotchkiss School for boys. The town apparently is almost under the shadow of Mt. Everett, which is passed on the way to South Egremont, Mass. It is possible to make the ascent to the summit, a feat for which there is considerable rivalry each year.

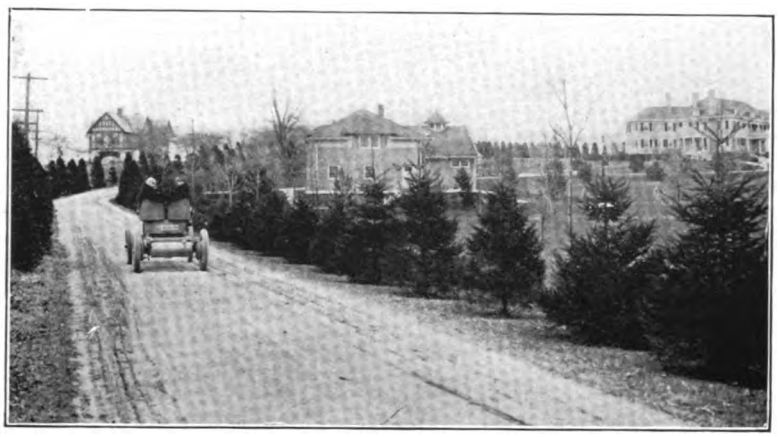
At Great Barrington, a side trip may be taken to Purgatory, a curious rock formation. Monument mountain is on the way to Stockbridge. On the east side is a white quartz cliff of considerable depth, detached from which is Pulpit rock. On the north side of the mountain is the Profile. A short distance beyond Stockbridge is Lake Mahkeenac, a beautiful calm sheet of water, surrounded by hills, with the village and spires of Curtisville peering over the trees toward the south.

Stockbridge and Lenox are known for the singular purity of their air. Many summer homes of wealthy people are located in this immediate vicinity, and add their beauty to that of nature. From Bald Head is gained a splendid view of the Berkshires and the



Prospect Lake, One of the Pretty Little Sheets of Water That Dot the Berkshire Hills.

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Westchester County's Splendid Roads at Briarcliff Manor, N. Y.

well-known Housatonic valley.

Pittsfield, the Heart of the Berkshires, is the first night stop. It commands a view of the Lebanon valley which is unsurpassed. Balanced rock, near by, is one of the Berkshires' greatest natural curiosities. Its height is 18 feet and its estimated weight 150 tons. Resting upon one square foot of surface, this immense boulder is so evenly balanced that it may be swayed readily with a lever or by a man's weight. A number of interesting lakes are in this vicinity, including Pontoosuc, Ashley, Silver and Morewood.

Pontoosuc lake is near Lanesboro, which is reached early on the second day. This town possesses beds of snow white granular quartz, used in the manufacture of superior cylinder glass. Variegated marble also is obtained here. Savage mountain and Constitution hill are picturesque heights a short distance away. Lanesboro was the birthplace of H. W. Shaw, known throughout the world as Josh Billings.

Midway between Mt. Greylock and Berlin mountain, is a pretty rural hamlet, South Williamstown, seat of the Greylock Institute for boys. Five miles further along is Williamstown, the reason for the existence of which is Williams College. The tour enters Vermont at Pownal, and approaches Bennington by way of the famous battlefield.

Beyond Arlington, the highway passes through the Sandgate notch, a remarkable cut in solid rock, 30 feet high, 800 long and 12 wide. Manchester is a quiet town at the base of Mt. Equinox. The sidewalks are of marble from the inexhaustible quarries on the mountains nearby. The route now enters a valley between the Green mountains on one side and the marble hills on the other, and slowly climbs up into the former. At Danby and beyond at Wallingford the lofty ridge of White Rocks is reached. Clarendon is passed on the way to Rutland.

The principal marble quarries and sawmills are at West Rutland, whence immense quantities of white marble is shipped to all parts of the world. Large gangs of saws, without teeth and cutting by means of sand poured in from above, are constantly running. A little further along the tourist reaches Castleton, where there are extensive marble and slate quarries, and at which point an excellent imitation of marble is produced by coating the slate with marble deposit. Much of this stone is taken from quarries on the banks of Lake Bomoseen, a sheet of water eight miles long and from one to 2.5 in width.

At Hubbardton, an obelisk, near the Baptist church, marks the battlefield of July 7, 1777, soon after the evacuation of Fort Ticonderoga. Rich lake views are obtained from many points, on the way to Lake Champlain and the New York state line, which are crossed by ferry at Addison Junction. The ruins of Fort Ticonderoga crown a high hill near the steamboat landing. An interesting drive along the lake shore takes the tourist to Ticonderoga itself and northward to Westport, the night stop. At Port Henry a detour may be made to Crown Point, where are to be seen the ruins of the French Fort Frederick, the ramparts of which are brilliant with blood red thorn apples, in their season, a tree which is found nowhere else in the state and is said



Lake Pontoosuc, Favorite Berkshire Picnic Resort at Pittsfield, Mass.

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to have been brought here from France.

The tourist is now in the Adirondack foothills, and may visit the famous Ausable Chasm, with its grand succession of cascades and gorges early the third day. Keeseville, on the lake near the Chasm, is the turning point toward Canada, which is entered by way of Plattsburg and Chazy, at Rouse's Point. Here the customs regulations will have to be observed, licenses, customs bond and numbers being secured at a reasonable fee, as well as the necessary papers for readmission to the United States.

At St. Johns, Que., a chain of forts existed for years, extending along the Richelieu river from Sorel to Lake Champlain. It was the scene of a 45 days' siege by the Americans in 1775, at the end of which it fell and was destroyed. The St. Johns of today boasts of some excellent hotels and fine shops, as stores are termed on that side of the line, and also possesses a large barracks and military school. Across the river is Iberville, in which there is a curiously constructed church tower, reminding the tourist of the Turkish mosques, from the turrets of which the Moslems call the people to prayer.

Montreal is replete with the historic and the interesting, both as the result of nature and man's handiwork. It has been successively under French and English rule, and was for a time in the hands of the Americans. In 1776, the commissioners of the Continental Congress, Benjamin Franklin, Samuel Chase and Charles Carroll, held council in the Chateau de Ramezay. The city was the scene of many battles between the Indians and white men, French, English and Americans and is filled with historic tablets and monuments.

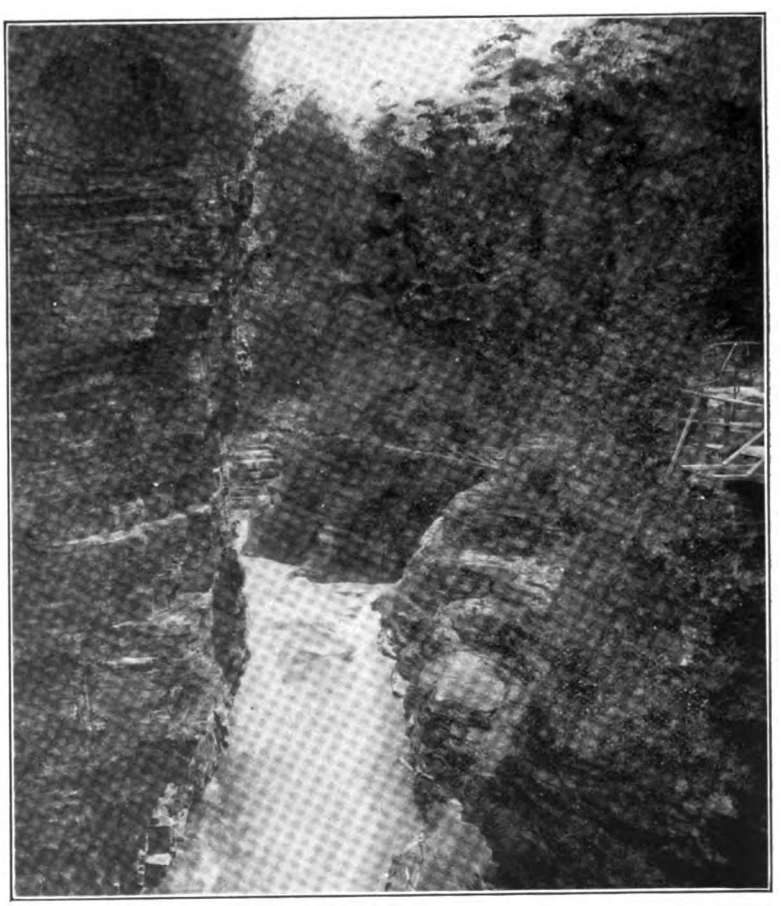
The fourth day takes the tourist from Montreal to Ottawa. The road is of clay and in wet weather is practically impassable. Should the tourist happen to reach this point under such circumstances, he is earnestly advised to ship his car by way of boat to Kingston, and rejoin the route at that point. A somewhat better road lies along the shores of the St. Lawrence river joining this route at Prescott, but if conditions are favorable it will pay the tourist to make the trip to Ottawa, as originally planned.

The way leads across Montreal Island, thence across the Isle of Jesus and along the shores of the Lake of Two Mountains to St. Andrews East on the River du Nord. It then lies to Carillon and across the Ottawa river to Point Fortune, following the south shore of this river to Little Rideau and L'Original. At this point it turns away from the river to Alfred and Plantagenet, and back again to the Ottawa at Wendover, skirting the river again to Clarence, Rockland, Cumberland and Orleans.

Ottawa is of interest because of its being the seat of the Canadian government, the buildings of which are situated on a picturesque bluff 150 feet high, overlooking the Ottawa river. They comprise three blocks of departmental buildings, the House of Parliament occupying the fourth side of the square. The famous Chaudiere Falls, where the river dashes over a ledge of rock 1260 feet high, are located in the west end of the city and furnish power for extensive lumber operations as well as lighting and street railway plants.

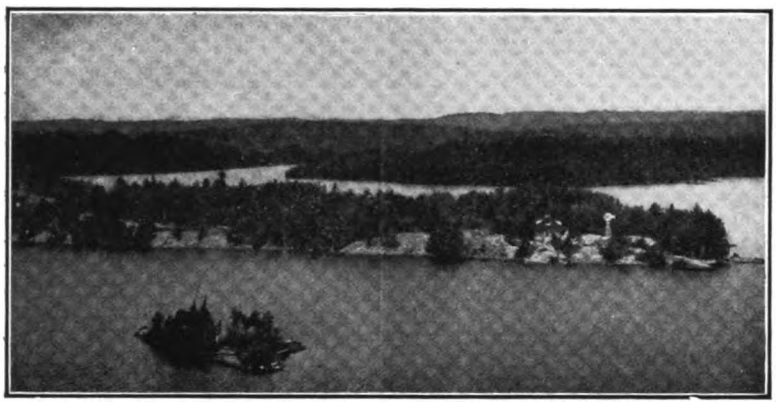
The fifth day finds the tourist on good roads once more, turning back toward the States. The St. Lawrence is reached at Prescott, opposite Ogdensburg, N. Y., where connection may be made with Vacation Tour No. 3 and followed to Niagara Falls and Buffalo if preferred, or the boat may be taken to Niagara-on-the-Lake. Just below Prescott is the famous Patriot's Windmill, the scene of a bloody conflict in the uprising of 1837. The old mill is now a lighthouse. In making the water trip from the Thousand Islands to Montreal, passengers change at Prescott for smaller boats, more suitable for shooting the rapids.

The route follows the north shore of the river to Brockville,



Where the River Has Made Its Mark in the Ausable Chasm, N. Y.

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The Beautiful Muskoka Lake Country, North of Ottawa, Canada.

from which point there is a ferry to Morristown, N. Y. The road now turns away from the St. Lawrence for a time, though within sight of the beautiful Thousand Islands, which are seen still better at Gananoque. The Rideau river is crossed at Kingston, the night stop.

Kingston is a quaint, attractive city and will reward amply a few hours' sight-seeing. The fine business blocks and public buildings offer a pleasing contrast to the old forts and other evidences of early occupation. Among the interesting places to visit are Fort Henry, the Royal Military College (Canada's West Point), Queen's University and St. George's Cathedral.

The sixth day's route skirts the north shore of Lake Ontario all the way into Toronto. Many splendid views of this immense inland lake are afforded, as the road follows the shore line for many miles. None of the towns en route are large, but offer sufficient opportunity to study the people and furnish a safe source of fuel supply at all times.

Toronto is a beautiful modern city, rich in architectural attractions and containing many eminent institutions of learning. Its extensive parks, broad avenues and pleasant environs make it exceedingly interesting to tourists. Located on the lake for some distance on either side of the city are numerous summer resorts, and Toronto is the centre from which these may be reached. If visited in the first week of September, the annual fair is worthy of a couple of days' stop.

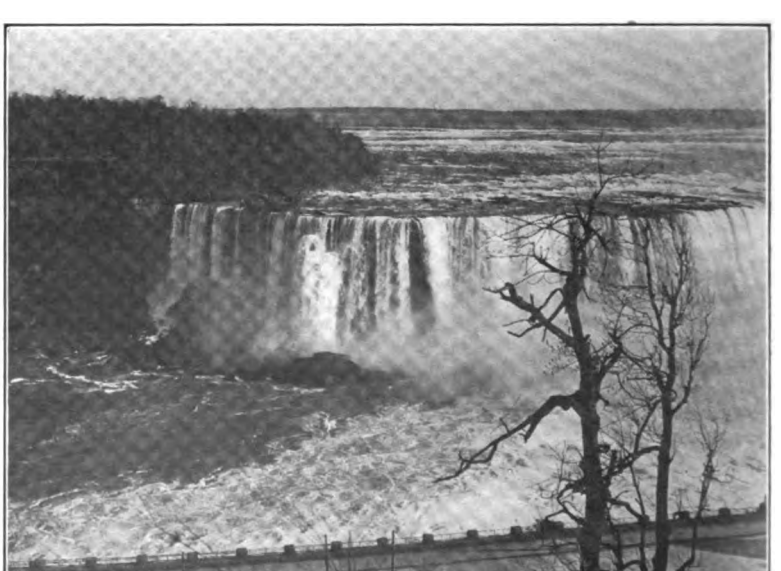
The seventh day ends at Niagara Falls, one of the greatest wonders of the American continent. The tip of Lake Ontario is rounded at Hamilton, and from that point the roaring of the mighty cataract begins to penetrate above the humming of the motor. The approach to the falls from the Canadian side is perhaps a little less beautiful than from the American, still, there is so much that is grand and awe inspiring concerning the spectacle that comparisons seem out of place.

The customs regulations will have to be arranged at the Falls. Naturally, the tourist will desire some little time for exploration, and fortunately, the roads throughout the day's trip are such that the whole afternoon ought easily to be available. The trip to Queenstown Heights and Brock's monument is advised, especially. The short 20-mile drive to Buffalo can be made comfortably in the cool of the evening.

Buffalo may be considered the gateway to the immense touring country from the West. Similarly, it might be added, that the tourist could so plan an extension of his vacation to include portions of the Middle West before returning to New York City. Vacation Tour No. 3 touches this point, the outline for both being identical from Niagara Falls to Buffalo. If preferred, the other route may be followed to New York, by the way of Washington, D. C. This route contemplates, however, that the tourist will have only about 10 days at his disposal and the eighth day crosses western New York to Elmira.

Delightful scenery marks the entire way. Several hills are encountered, though nothing like the mountains of western New England which were crossed earlier on the tour. Silver Springs is near Silver lake, practically the most western of the chain of central New York lakes. Here the scenery is particularly delightful, and gives a foretaste of what is to be seen further to the east.

Portage has a history dating back to Indian days. The settlement was so named because of the fact that the Indians were compelled to carry their canoes around the falls of the Genesee river. At this point the river makes three separate falls, at some little distance apart, and offers a pleasing sight. A splendid railroad bridge



Niagara Falls, as Seen from the Canadian Side.

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now replaces the portage at a considerable height, giving a view of all three.

Dansville is in the centre of the hop growing country, and for miles the fields appear on either side of the road. A little later the tour enters the grape country, in the valley of the Canisteo river, and during the remainder of the distance into Elmira luscious fruit tempts the tourist on every hand. Incidentally, this country is somewhat noted for its wine cellars.

Beyond Bath is Corning, with its cut glass factories. Then comes an excellent macadam road, along the Chemung river into Elmira. This night stop first became a permanent settlement in 1788, and was incorporated as the village of Newton in 1815. The name was changed to Elmira in 1828. It is now the seat of Elmira College and other institutions of learning. Perhaps it is best known as the site of the state reformatory. Its chief industries are rolling mills, railroad car shops, steel bridge works, etc.

For the first 20 miles of the ninth day, the tour lies along the Pennsylvania line, before it finally crosses it at Athens. From this point, mountains begin to make their appearance. The route is along the Susquehanna river and affords some excellent scenery all of the way.

The Lehigh Valley railroad here winds its way among the peaks in a manner almost miraculous, and adds its share to the general picturesqueness. Perhaps the view is at its best at Tunkhannock, but the tourist will find sufficient cause for rejoicing all of the way.

The night stop is at Wilkesbarre, located in the Wyoming valley. This is the shipping point for the rich and extensive anthracite coal beds of this valley. Other industries include lace factories, silk mills, automobiles and parts, adding machines, locomotive works and cutlery shops. It was founded in 1769, and occupies a commanding position in upper Pennsylvania.

More mountains are encountered the 10th day. At Fairview the route leaves the railroad and passes Crystal lake on the way to Glen Summit springs and Bear Creek. The view still continues to hold the attention past Pocono lake and Naomi Plains to Mt. Pocono, one of the most interesting summer resorts in eastern Pennsylvania.

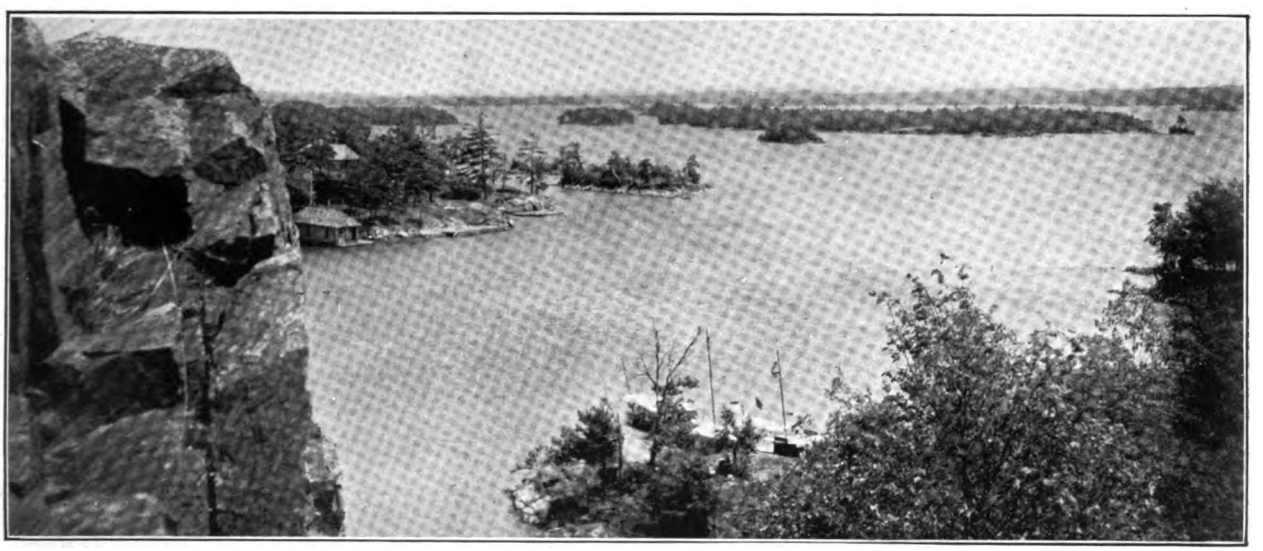
One of the groups which go to make up the Blue Ridge, the Poconos share with the Catskills and the mountains of West Virginia and North Carolina, an average altitude of 2000 feet, with heavily wooded slopes, through which brightly rushing streams leap from crag to crag. While much of this section is wild and uninhabited, many camps and hotels are to be found here and there.

At Stroudsburg, the tour enters the world famed Delaware Water Gap, although the gap itself is practically four miles distant. At Marshall's falls the waters of Marshall's creek plunge 100 feet downward into Sylva lake. Beyond is Oak Grove where there is a pleasing combination of mountain run and the placid Lily lake.

At Delaware Water Gap, the Delaware river flows between two high mountains. That on the Pennsylvania side is named Minsi, but that on the Jersey shore bears the more commanding cognomen of Tammany, although it goes without saying that such has not always been the case. The tops of these peaks are each over 1600 feet from the bed of the river.

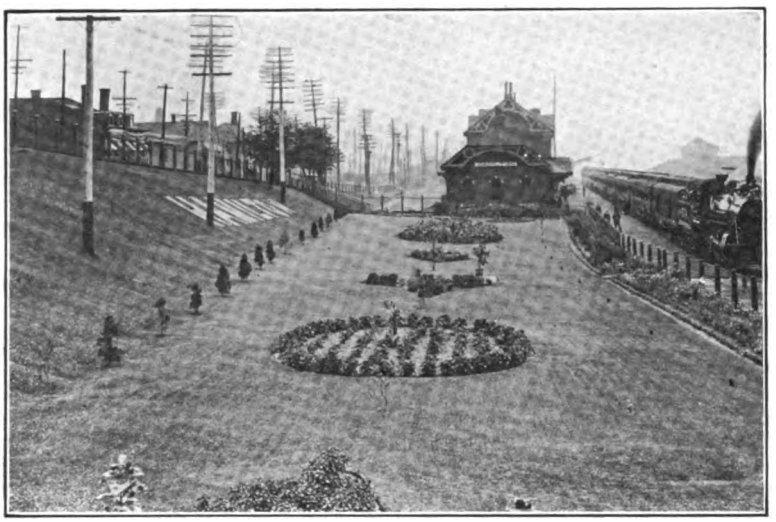
On this tour, the Delaware river is crossed at Meyers Ferry, where an old-fashioned flat boat attached to a cable performs the needed service. At Hackettstown, the Musconetcong river is crossed, and very soon the tourist finds himself climbing Schooleys mountain, a former well known summer resort, commanding an excellent view of the Musconetcong and German river valleys. The remainder of the distance, beyond Morristown, is over fine new macadam, and New York City is reached by way of Weehawken.

It is anticipated that tourists will welcome the opportunity to visit Jersey points this year without being compelled to take out a special license, and in consequence the last portion of this itinerary will provide new touring ground.



The Thousand Islands of the St. Lawrence River, Viewed from Owl's Point, Near Kingston, Ont.

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Hamilton, Ont., Believes Much Depends Upon First Impressions.

VACATION TOUR NO. 2.

New York City—Pittsfield, Mass.—Westport, N. Y.—Montreal, Que.—Ottawa, Ont.—Kingston, Ont.—Toronto, Ont.—Buffalo, N. Y.—Elmira, N. Y.—Wilkesbarre, Penn.—New York City.

Ten Days, 1381.6 Miles.

First Day, New York to Pittsfield, Mass., 146.4 Miles.

New York to	Miles to	Total Miles
Central Bridge	5.2	5.2
Greenville	14.1	19.3
Hart's Corners	1.5	20.8
Elmsford	3.0	23.8
Briarcliff Manor	8.5	32.3
Yorktown Heights	11.2	43.5
Amawalk	1.6	45.1
Baldwin Place	5.1	50.2
Lake Mahopac	3.8	54.0
Carmel	5.5	59.5
Pawling	13.4	72.9
Hurds Corners	2.3	75.2
South Dover	4.4	79.6
Dover Plains	7.8	87.4
Sharon, Conn.	13.0	100.4
Lakeville	7.1	107.5
So. Egremont, Mass.	14.9	122.4
Great Barrington	4.0	126.4
Stockbridge	7.5	133.9
Lenox	6.0	139.9
Pittsfield	6.5	146.4

Second Day, Pittsfield to Westport, N. Y., 158.2 Miles.

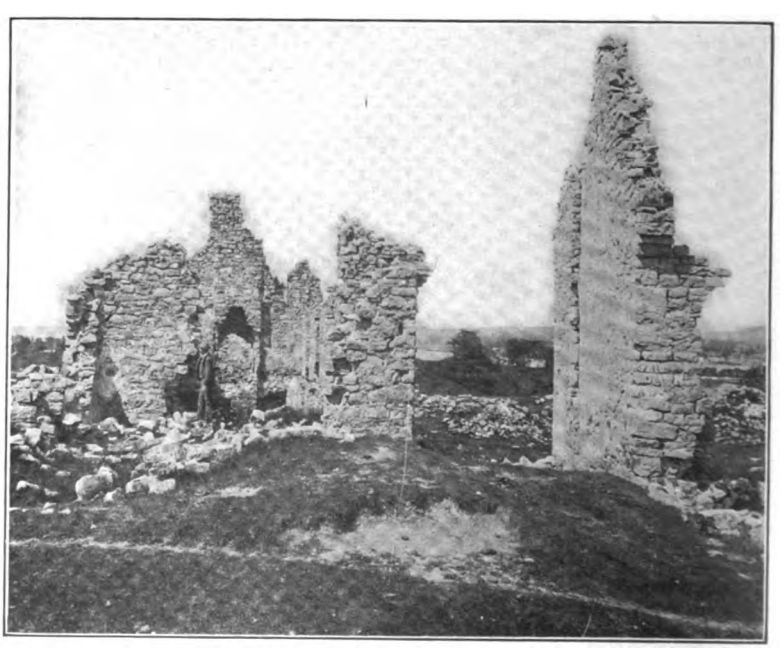
Pittsfield to	Miles to	Total Miles
Lanesboro	5.2	5.2
South Williamstown	11.3	16.5
Williamstown	5.0	21.5
Pownall, Vt.	4.4	25.9
Bennington	9.4	35.3
South Shaftsbury	5.3	40.6
Arlington	9.9	50.5
Manchester	8.0	58.5
East Dorset	6.5	65.0
Danby	7.4	72.4
Wallingford	9.4	81.8
Clarendon	3.4	85.2
Rutland	6.6	91.8
West Rutland	4.0	95.8
Castleton	7.4	103.2
Castleton Corners	1.7	104.9
Bomoseen	2.5	107.4
Hubbardton	5.0	112.4
Hyde Manor	5.2	117.6
Sudbury	1.2	118.8
Orwell	4.7	123.5
Ticonderoga Ferry	6.1	129.6
Addison Junction, N. Y.	0.2	129.8
Ticonderoga	2.0	131.8
Crown Point	8.7	140.5
Port Henry	7.4	147.9
Westport	10.3	158.2

Third Day, Westport to Montreal, Que., 130.7 Miles.

Westport to	Miles to	Total Miles
Essex	10.8	10.8
Willsborough	4.9	15.7
Ausable Chasm	14.7	30.4
Keeseville Station	1.8	32.2
Keeseville	0.5	32.7
Valcour	10.1	42.8
Plattsburgh	6.7	49.5
Halsey Corner	1.5	51.0
East Beekmantown	3.1	54.1
Beekmantown	2.0	56.1
West Chazy	3.7	59.8
Chazy	6.4	66.2
Champlain	7.0	73.2
Rouse's Point	5.1	78.3
Ferry to Alburg		
La Colle Junction, Que.	5.3	83.6
St. Pauls	6.4	90.0
St. Johns	12.4	102.4
Chambly	11.4	113.8
St. Hubert	8.9	122.7
Longueuil	5.0	127.7
Montreal Ferry	0.8	128.5
Montreal	2.2	130.7

Fourth Day, Montreal to Ottawa, Ont., 121 Miles.

Montreal to	Miles to	Total Miles
St. Laurent	6.9	6.9
Borde a Plouffe	4.1	11.0
St. Martin	1.6	12.6
St. Eustace	7.9	20.5
St. Benoit	11.3	31.8
St. Placide	6.4	38.2
St. Andrews East	8.4	46.6
Carrillon	2.2	48.8
Ferry to Point Fortune.	0.2	49.0
Little Rideau	5.2	54.2
Hawkesbury	7.7	61.9
L'Original	3.1	65.0
Cassburn	2.5	67.5
Alfred	10.0	77.5
Plantagenet	7.0	84.5
Wendover	6.0	90.5
Clarence	5.5	96.0
Rockland	2.5	98.5
Cumberland	5.0	103.5
Orleans	7.0	110.5
Ottawa	10.5	121.0



Ruins of Fort Ticonderoga on the New York Shore of Lake Champlain.

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Fifth Day, Ottawa to Kingston, Ont., 132.5 Miles.

Ottawa to	Miles to	Total Miles
South Gloucester	13.0	13.0
Metcalf	4.0	17.0
Ormond	8.0	25.0
Winchester	4.0	29.0
Cass Bridge	3.5	32.5
Williamsburg	8.5	41.0
Morrisburg	6.0	47.0
Iroquois	6.0	53.0
Cardinal	5.5	58.5
Prescott	9.6	68.1
Brockville	12.2	80.3
Lyn Village	6.3	86.6
Gananoque	27.3	113.9
Kingston	18.6	132.5

Sixth Day, Kingston to Toronto, Ont., 165 Miles.

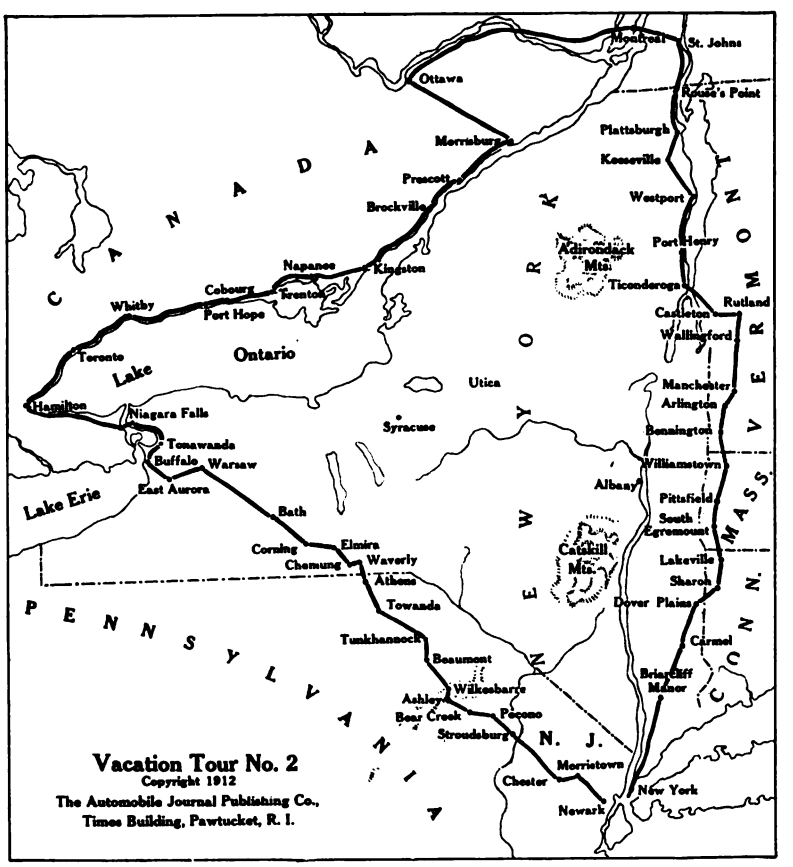
Kingston to	Miles to	Total Miles
Catoraqui	3.6	3.6
Napance	21.9	25.5
Maryville	8.4	33.9
Shannonville	6.7	40.6
Belleville	8.8	49.4
Trenton	11.3	60.7
Brighton	9.4	70.1
Colborne	8.3	78.4
Grafton	7.8	86.2
Cobourg	7.6	93.8
Port Hope	7.4	101.2
Welcome	3.1	104.3
Newcastle	13.3	117.6
Boumanville	5.2	122.8
Oshawa	9.4	132.2
Whitby	4.2	136.4
Pickering	6.1	142.5
Liverpool	2.2	144.7
Riverdale	18.5	163.2
Toronto	1.8	165.0

Seventh Day, Toronto to Buffalo, N. Y., 120.1 Miles.

Toronto to	Miles to	Total Miles
Cooksville	16.3	16.3
Erindale	3.3	19.6
Trafalgar Village	5.1	24.7
Appleby	10.3	35.0
Freeman	3.8	38.8
Aldershot	2.8	41.6
Hamilton	5.4	47.0
Stony Creek	6.7	53.7
Winona	5.6	59.3
Grimsby	5.1	64.4
Beamsville	4.9	69.3
Vineland	4.2	73.5
Jordan	1.8	75.3
St. Catherines	7.1	82.4
Homer	3.3	85.7
St. Davids	4.9	90.6
Stamford	2.1	92.7
Niagara Falls, Ont.	4.8	97.5
Niagara Falls, N. Y.	1.0	98.5
Echota Station	2.5	101.0
La Salle	3.0	104.0
North Tonawanda	6.2	110.2
Tonawanda	0.4	110.6
Buffalo	9.5	120.1

Eighth Day, Buffalo to Elmira, N. Y., 154.6 Miles.

Buffalo to	Miles to	Total Miles
Ebenezer	8.0	8.0
East Aurora	9.6	17.6
Wales Center	4.2	21.8
Harris	4.4	26.2
North Sheldon	2.8	29.0
Varysburg	4.2	33.2
Orangeville	3.4	36.6
Halls Corners	2.7	39.3
Warsaw	3.3	42.6
South Warsaw	3.0	45.6
Rock Glen	1.0	46.6
Silver Springs	2.8	49.4
Chace	1.3	50.7
Castile	2.6	53.3
Portageville	6.5	59.8
Hunts	4.3	64.1
Dalton	2.0	66.1
Swains	7.6	73.7
Garwoods	1.8	75.5
Canaseraga	2.3	77.8
Dansville	7.7	85.5
Perkinsville	4.3	89.8
Cohocton	8.8	98.6
Avoca	7.6	106.2
Kanona	4.2	110.4
Bath	3.8	114.2
Savona	6.5	120.7
Campbell	4.5	125.2
Coopers	5.2	130.4
Painted Post	3.0	133.4



Corning	2.6	136.0
Big Flats	7.1	143.1
Elmira Heights	8.3	151.4
Elmira	3.2	154.6

Ninth Day, Elmira to Wilkesbarre, Penn., 108.6 Miles.

Elmira to	Miles to	Total Miles
Wellsburg	6.9	6.9
Lowman	1.1	8.0
Chemung	6.1	14.1
Waverly	4.5	18.6
Athens, Penn.	3.6	22.2
Ulster	8.1	30.3
Towanda	8.1	38.4
Wysox	2.6	41.0
Standing Stone	4.2	45.2
Rummerfield	2.9	48.1
Wyalusing	7.1	55.2
Laceyville	8.4	63.6
Skinner's Ferry	1.8	65.4
Meshoppen	5.6	71.0
Russell Hill	3.7	74.7
Tunkhannock	5.3	80.0
Peterboro	8.5	88.5
Bowman Creek	2.9	91.4
Beaumont	2.1	93.5
Kunkle	2.4	95.9
Dallas Station	3.2	99.1
Luzerne	6.4	105.5
Wilkesbarre	3.1	108.6

Tenth Day, Wilkesbarre to New York, 144.5 Miles.

Wilkesbarre to	Miles to	Total Miles
Ashley	3.8	3.8
Ashley Plains	3.0	6.8
Fairview	1.2	8.0
Glen Summit	2.3	10.3
Bear Creek	8.8	19.1
Stoddartsville	8.5	27.6
Blakeslee	2.0	29.6
Pocono Lake	6.8	36.4
Naomi Pines	2.4	38.8
Pocono Summit	4.5	43.3
Swiftwater	4.2	47.5
Scott's Run	2.3	49.8
Bartonville	4.9	54.7
Stroudsburg	5.2	59.9
Delaware Water Gap	3.7	63.6
Portland	5.3	68.9
Myers Ferry	2.9	71.8
Delaware, N. J.	0.4	72.2
Bridgeville	5.6	77.8
Buttzville	1.2	79.0
Pequest Furnace	1.6	80.6
Danville	4.7	85.3
Great Meadow	0.5	85.8
Vienna	1.0	86.8
Hackettstown	3.9	90.7

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Schooley Mountain	3.6	94.3	Morristown	6.9	114.3	Irvington	4.5	129.9
German Valley	2.7	97.0	Madison	4.6	118.9	Newark	4.0	133.9
Chester	4.8	101.8	Chatham	2.1	121.0	Weehawken	10.6	144.5
Mendham	5.6	107.4	Springfield	4.4	125.4			

VACATION TOUR NO. 3 ENCIRCLES ATLANTIC STATES.

Ten days are also devoted to Vacation Tour No. 3, which, like the others, begins in New York City. The first day is spent in the Catskills and along the Hudson river; the second and third in the Adirondack region; the fourth about the Thousand Islands; the fifth at Niagara Falls and in western New York; the sixth among the Alleghenies; the seventh in Maryland; the eighth in Virginia; the ninth from Washington to Philadelphia, and the 10th in New Jersey.

Leaving New York the first day, the route lies along the east bank of the Hudson to Tarrytown, passing through Yonkers on the way. Tarrytown has many revolutionary relics, but undoubtedly is best known as the home of John D. Rockefeller. The ferry across the Hudson is at Tappan Zee, the widest point of the river, and the first city on the opposite bank is Nyack, near which is Rockland lake, a picturesque sheet of water.

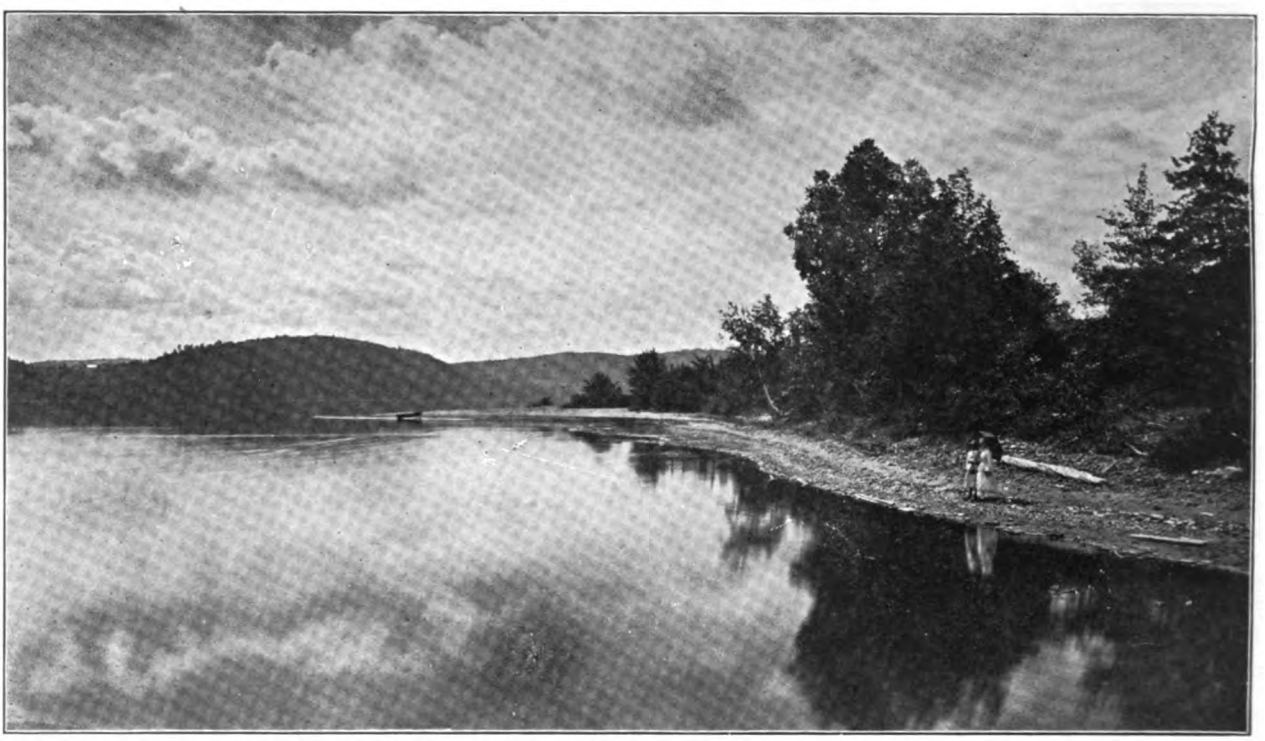
Suffern, N. Y., is a small village, but its location among the Suffern hills, on the border line between New York and New Jersey, makes it of considerable importance to automobile tourists. Good roads verge from this point in nearly every direction. Tuxedo Park, the entrance to which is passed on the way to Tuxedo, is a private preserve surrounding Tuxedo lake.

Newburgh is one of the most historic cities of the Hudson valley, and is perhaps best known as the headquarters of Gen. Washington in 1783. The house occupied by him is now a museum of Revolutionary relics. At New Platz, connections may be made for Lakes Mohonk and Minnewaska, two beautiful sheets of water in the Shawangunk mountains.

Kingston is at the foot of the Catskills, and from this point some hill climbing is in order, although the route skirts the river at the base of the mountains themselves. Some excellent views, both of the mountains and the famed Hudson river, are obtained throughout the remainder of the drive into Albany, the night stop. The handsome State House, recently damaged by fire, has an added interest.

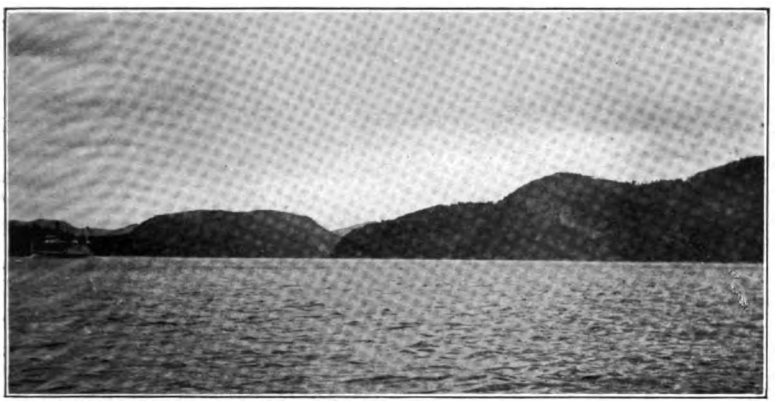
The route the second day is still along the Hudson for a time. Just north of Cohoes are the Falls of the Mohawk, which offer a pleasing sight, and from this point to Saratoga the road lies away from the river. While Saratoga Springs is not the resort it once was, the mineral springs have lost none of their interest. There are still many handsome buildings, and the city is by no means deserted. A short distance further along is Glens Falls, intimately associated with recollections of Uncas, the last of the Mohicans, so graphically portrayed in Cooper's romance. It was also the scene of a decisive battle between the French and English in 1755.

For years, Lake George has



Beautiful Schroon Lake in the Foothills of the Adirondacks and Surrounded by New York's Historic Ground.

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Brant Lake Vies with the Mountains in Tempting the Tourist.

been a favored resort by those who love the beautiful in nature. The lake itself is 35 miles long and in some places four miles wide. The hills and vales of the neighborhood, as well as the waters themselves, witnessed many fierce engagements during the French and Indian, and Revolutionary wars. A few miles distant is Loon lake, one of several by that name in this region, although not so well known as that other in the extreme northern part of the state.

Schroon lake is indeed a pretty sheet of water, 10 miles long and at an elevation of 807 feet. The whole is encompassed by a number of interesting hills. The valley of the Schroon river is next followed until the low divide is crossed, and the route then lies along the Pleasant valley to Elizabethtown. The way becomes rough and more mountainous at this point, albeit the views are among the best of the entire Adirondack region.

Considerable road work has been accomplished in the Keene valley during the past year and the motorists should have little difficulty in making Lake Placid for the night stop. On the way he will pass the picturesque Cascade lakes, two in number, concerning which it may be said that the beauty of the scenery about them is unsurpassed.

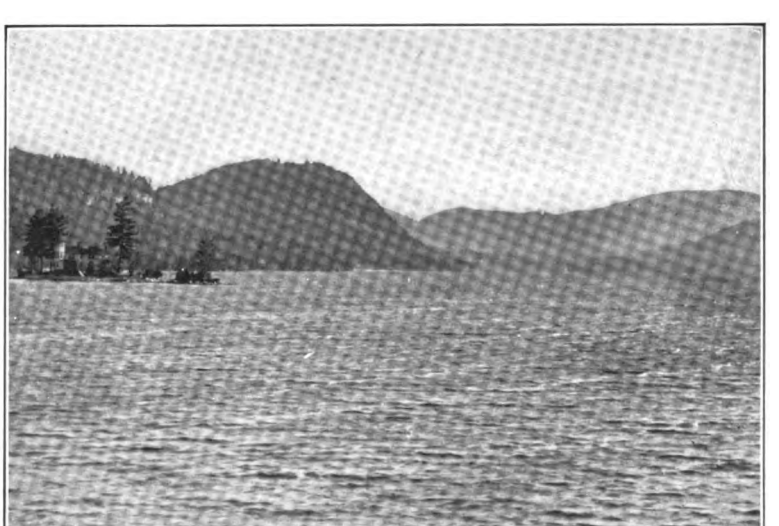
Lake Placid is perhaps the best known of all the Adirondack resorts, and is surrounded by high mountains. At the northern end the scenery becomes bold and imposing. Hoary old Mt. Whiteface raises its head 4780 feet, high above the rest, cleaving the clouds in solitary grandeur. All of the Adirondack's gaunt peaks are in sight, the distant ones being veiled in an exquisite violet hue. Rivers winding in and out among the green forests look like ribbons of silver, while amidst it all lies the peaceful Lake Placid, and separated from it by only a wooded eminence, Mirror lake.

The third day, finds the tourist approaching Lake Saranac. This region lies within the heart of the Clinton range, the highest and most impressive of the entire chain. The route leaves this beautiful region, to find another soon after reaching Malone, very near to the Canada line. Crossing the Raquette river near Massena Springs, and the St. Lawrence Power Company's canal at Massena, the shores of the St. Lawrence river are gained nearly opposite the Rapids du Plats. Here the dark swirling waters make a beautiful sight as they dash and tumble over each other in their haste. Further along are the Galops, a little less violent, but still sufficiently turbulent to afford abundant interest while the tourist is approaching Ogdensburg.

This is a pretty little city, located at the confluence of the Oswegatchie and the St. Lawrence, the former of which affords abundant power for various manufacturing establishments. It is known as the Maple City, because of the magnificent maple trees which line the principal streets. Connection may be made by ferry with Prescott, Ont., on Vacation Tour No. 2, which may be traversed in either direction.

A steamer runs between this point and the Thousand Islands, which are seen at their best at Alexandria Bay, the night stop. If possible the tourist should arrange to stop over for a whole day at this point, as there is so much of interest that it cannot well be covered even in much longer time. A steamer ride among the islands gives some idea of the distinctive beauties of the region, but subsequent trips to other islands will indicate that each has features which are possessed by none of the others, giving it a charm peculiar to itself.

If preferred, the tourist may continue the journey over Vacation Tour No. 2, connecting at Kingston, Ont., after a sail around the islands. This tour turns inland for a short run across country to Watertown, one of the principal western gateways to the Adirondack region. Thence, the



Anthony's Nose and Rogers' Rock on the Banks of Lake George, N. Y.

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southern shore of Lake Ontario is skirted through Oswego to Rochester, the night stop. Some excellent lake views are witnessed during the day's run.

Rochester is one of the most important industrial centres in the Empire State. The Genesee river makes three distinct falls within the city limits, affording a large and valuable water power. Among the points of interest are the plant of the Eastman Kodak Company; the aqueduct, 850 feet long, by which the Erie canal is carried over the river, and the statue of Frederick Douglass, the famous negro statesman.

Continuing along the south shore of Lake Ontario, the fifth day, the tourist reaches Niagara Falls. The scene from the American side is held by many to be far superior to that offered from the Canadian shore. To those for whom this is the first visit, it undoubtedly would be wise to make this a night stop, or at least so arrange matters that some little time may be devoted to exploring the many wonders here presented. Much has been written about the Falls, and it is only necessary to recall the Cave of the Winds, the Burning Spring, the Whirlpool Rapids and the famous Gorge of the Niagara as indicating the possibilities for extended exploration.

Buffalo, the sixth city in the world in commercial importance, offers many pleasing drives, and its many parks make up a pretty combination for the sightseer, the recently completed McKinley monument being of particular interest. The route skirts Lake Erie to Westfield, and is that taken by most transcontinental parties, passing through to Chicago. Those who desire may continue the journey to the West by connecting with Transcontinental Tour A at this point. At Westfield, also, the tour intersects the old Portage road constructed by the French in 1763.

Here, the way turns inland to Mayville, on Lake Chautauqua, one of the most remarkable sheets of water in western New York. The lake is nearly 20 miles long, and although but seven miles from Lake Erie, is 700 feet above its level and its waters flow into the far-away Gulf of Mexico.

Several well known resorts are located on this lake, but perhaps the best known is that of Chautauqua, the night stop. This is the home of the world renowned Chautauqua literary and scientific circle, where summer after summer, students from all over the world assemble, in the midst of surroundings which cannot help but stimulate, and pursue their studies of the languages and scientific subjects.

Jamestown, at the eastern extremity of the lake is the first important city of the next day's run. A short distance away is Celoron, which resembles very much a seacoast resort. Excellent opportunity is offered for fresh water bathing, boating and fishing. All the various resorts on the lake are connected by steamboats.

At Warren, Penn., the route enters the oil fields. Warren is located at the intersection of the Allegheny and Conewango rivers and is an important railroad centre. Between Warren and Butler the tourist will find plenty of interest in studying the oil wells, while some excellent views of the Alleghenies are also obtained.

Pittsburg is best known as the Smoky City, and is famous for its steel works. It was settled in 1753 by the French, who built a line of forts along the Ohio and Allegheny rivers, that at this point being named Fort Duquesne. This was destroyed in 1758, and later was succeeded by Fort Pitt. The history of Pittsburg, as such, dates from 1765. Its commercial advantage is gained through the fact that it is in the centre of the richest coal district in the world.



Thousand Islands, as Seen from Alexandria Bay, One of the Prettiest Playgrounds in Northern New York.

Across the river is Allegheny, formerly a separate municipality, but incorporated with Pittsburg in 1897. Here may be seen Phipps Conservatory, ranking among the finest in America; the Carnegie Institute, and the Carnegie Library. In Pittsburg, itself, is located the Allegheny County Courthouse, the main tower of which is 420 feet high and commands a splendid view of the valley.

Leaving Pittsburg the route passes through Carnegie, the site of the Homestead mills, and Canonsburg into Washington, the home of Washington and Jefferson

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College. The road is somewhat hilly and bumpy, but connection is made at this point with the national highway, which, while it has not been kept in very good condition, has been replaced in spots with macadam. In places the ascents and descents are very steep.

At Scenery Hill is an old tavern built in 1794. At Brownsville, the highway forms a horseshoe curve, one end being at the bridge over the Monongahela river and the other at the summit of a hill. The grades are not bad until Uniontown is reached, but beyond that point there is one steep ascent for nearly three miles. A little further along the old Braddock road, cut through by Washington, is followed into Grantsville. Washington is said to have camped at the foot of Mt. Washington, near Farmington. The old earthworks of Fort Necessity are still discernible, and Braddock's grave is in a small enclosure near the roadway.

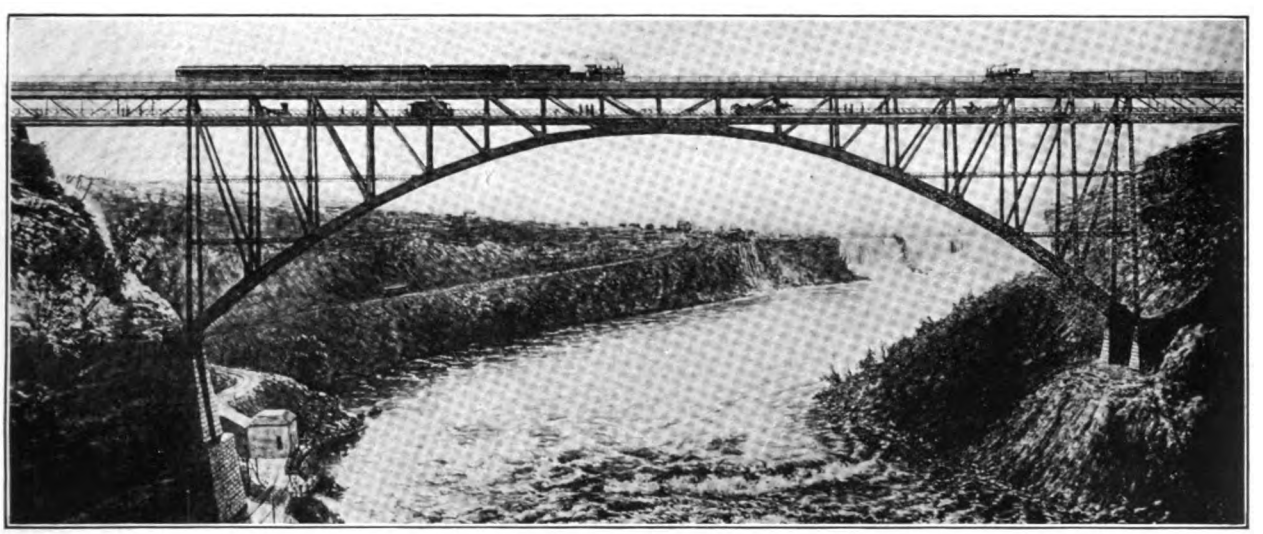
Beyond Farmington, the road goes over Briery mountain. The Youghiogheny river is crossed at Somerfield. Shortly after passing Addison, the West Virginia state line is crossed, and then comes a climb to the top of Negro mountain, 2906 feet above sea level. Little and Big Savage mountains are descended into Grantsville, Md. Near the foot of Mt. Warrior is an old Indian trail, followed by Gist on his trip of exploration for the Ohio Company. From Frostburg to Cumberland, is a fine stretch of macadam to end the day's drive.

Cumberland was the centre in the military operations during the Civil War, and is now a manufacturing city of the upper Potomac. Nearby are the Wills, Dans and Knoby mountains, and the deep gorge of the Narrows. The national road continues to Hagerstown, still more noted in Civil War history.

The eighth day the route leaves Cumberland toward the south, again entering West Virginia for a time. Leaving the Potomac valley, the road ascends more of the Alleghenies, of which some excellent views repay for the hard climbing, and descends into the Shenandoah valley to Winchester, Va. Soon afterward, the climbing begins once more, for it is necessary to cross the Blue Ridge before regaining the Potomac and the final dash into Washington. At Berryville, connection may be made for Harper's Ferry.

Washington offers much for the tourist. Aside from being the capital of the nation, and as such the public buildings are of more than ordinary interest, it is the centre of a historical country with which every American is more or less familiar. If possible to spend a day in pleasant rambles about the city and to some of the historical spots nearby, the tourist will be well repaid. By all means, he should find time to visit Alexandria, Va., a drive of only 10 miles.

Mt. Vernon, the handsome estate of Gen. Washington, is still further away, and the roads leading thereto are decidedly poor. In Alexandria, however, are to be found numerous memories of the "Father of His Country." Chief among these may be mentioned: Christ Church, in which his pew remains as when occupied by him; engine house of the old Friendship Fire Company, organized in 1774, of which he was a member; the old City Hotel, from the steps of which he delivered his farewell address; the Masonic lodge room, where he presided as worshipful master; the Carlyle House, built in 1752, where he received his first command, and numerous other places of interest associated with other historic figures. The return trip to Washington may be made via Arlington and the national cemetery with profit.



Gorge of Niagara River and Grand Trunk Railway Bridge, With Falls in the Distance.

The route of the ninth day is over the main trunk line from Washington to Philadelphia, passing through Baltimore, Md., and Wilmington, Del. Good macadam marks a major portion of the way. Baltimore is one of the chief oyster packing centres of the world. It is a manufacturing city of importance, and has a number of fine public buildings. Druid Park, a 700-acre plot with varied native forests, is beautifully laid out and contains a number of fine drives.

Between Havre de Grace and Newark, Del., road improvement is going on and a detour may be necessary. In any event, the old road was very bad in all conditions of weather, and the new way will

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Colonnade and Pergola at Point Chautauqua, N. Y.

be much appreciated by tourists over this line. At Havre de Grace, the Susquehanna river is a full mile wide. At Perryville the road crosses a long railroad span, which has been transformed into a highway bridge.

Wilmington is noted for its parks, one of which is located in the Glen of the Brandywine, a name which is familiar to students of the Revolution, and another is Rockford Park, where a handsome statue of Thomas F. Bayard is to be seen. Here also is to be found the famous Dupont powder works. The old Swedes Church was built in 1698.

Philadelphia is an important touring centre, many of the interesting places in both Pennsylvania and New Jersey being reached from this point. It has numerous historic places, including, of course, Independence Hall. Fairmount Park, with its miles of excellent roadways, is the scene of the annual Fairmount Park road race for automobiles. One of the features of interest is the United States Mint.

Crossing the state of New Jersey, from Camden, to within 10 miles of the Atlantic ocean, the tour reaches Lakewood, among the pines. The booming of the surf can be heard faintly above the murmuring of the wind in the pines, and the air is all that could be wished. The superb polo grounds of Georgian Court, by courtesy of George Gould, are open to visitors, with very slight restrictions. Here also is Lake Carasaljo, named, as the guide will explain, by the father of three daughters, who combined the first syllables of their names into a harmonious designation for the lake.

From Lakewood the route turns northward, visiting a number of seashore resorts, before reaching Asbury Park and Long Branch, two names inseparable with the history of watering places in America. The return to New York is along the Jersey coast for the entire distance, crossing to Staten Island, and entering the big city by way of the Manhattan ferry.

VACATION TOUR NO. 3.

New York City—Albany, N. Y.—Lake Placid, N. Y.—Alexandria Bay, N. Y.—Rochester, N. Y.—Chautauqua, N. Y.—Pittsburg, Penn.—Cumberland, Md.—Washington, D. C.—Philadelphia, Penn.—New York City.

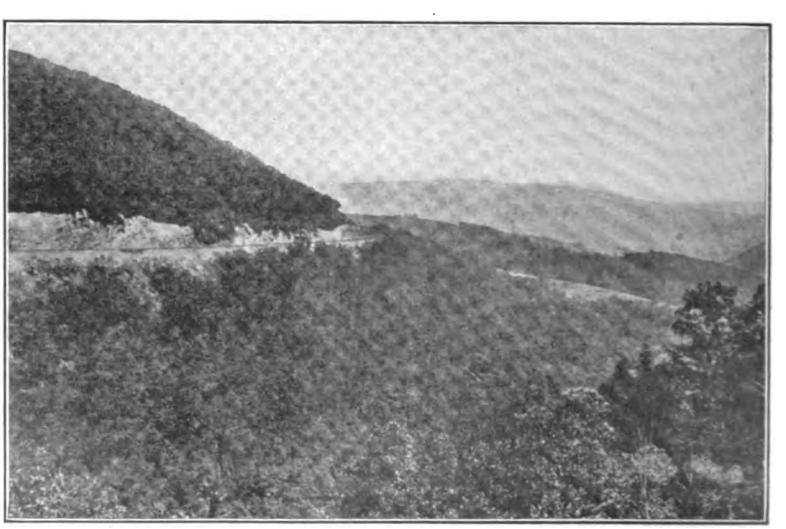
Ten Days, 1612.7 Miles.

First Day, New York to Albany, N. Y., 167.4 Miles.

New York to	Miles to	Total Miles
Yonkers	13.2	13.2
Irvington	7.8	21.0
Tarrytown	1.8	22.8
Ferry to Nyack	0.7	23.5
Nanuet	5.3	28.8
Spring Valley	2.4	31.2
Suffern	5.9	37.1
Ramapo	1.8	38.9
Tuxedo	4.7	43.6
Southfield	3.9	47.5
Highland Mills	9.0	56.5
Vails Gate	8.8	65.3
Newburgh	4.7	70.0
Savilton	7.3	77.3
Plattekill	2.4	79.7
Modena	4.7	84.4
New Platz	6.2	90.6
Rifton	7.7	98.3
Esopus	3.1	101.4
Eddyville	1.2	102.6
Wilbur	1.5	104.1
Kingston	2.1	106.2
Glenerie Falls	8.9	115.1
Saugerties	2.8	117.9
Evesport	3.2	121.1
Cementon	1.6	122.7
Alsen Station	4.0	126.7
Catskill	4.8	131.5
Athens	4.8	136.3
Coxsackie	6.5	142.8
Ravenna	10.3	153.1
Coeymans	0.9	154.0
Cedar Hill	5.5	159.5
Albany	7.9	167.4

Second Day, Albany to Lake Placid, N. Y., 162.9 Miles.

Albany to	Miles to	Total Miles
Loudenville	4.5	4.5
Newtonville	1.4	5.9
Lathams Corners	1.7	7.6
Cohoes	4.5	12.1
Waterford	1.9	14.0
Mechanicville	8.6	22.6
Maltaville	6.1	28.7
Malta	2.2	30.9
Saratoga	8.1	39.0
Wilton	7.8	46.8



The Allegheny Mountains of Pennsylvania Present Magnificent Views.

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Glens Falls	11.3	58.1
Frenchmont	4.3	62.4
Lake George	3.8	66.2
Warrensburg	6.5	72.7
Chestertown	12.5	85.2
Loon Lake	4.0	89.2
Pottersville	4.9	94.1
Taylors-on-Schroon	3.8	97.9
Schroon Lake	5.7	103.6
Schroon River	9.1	112.7
Elizabethtown	22.6	135.3
Keene	12.4	147.7
Cascade Lake	4.7	152.4
Lake Placid	10.5	162.9

Third Day, Lake Placid to Alexandria Bay, 172.7 Miles.

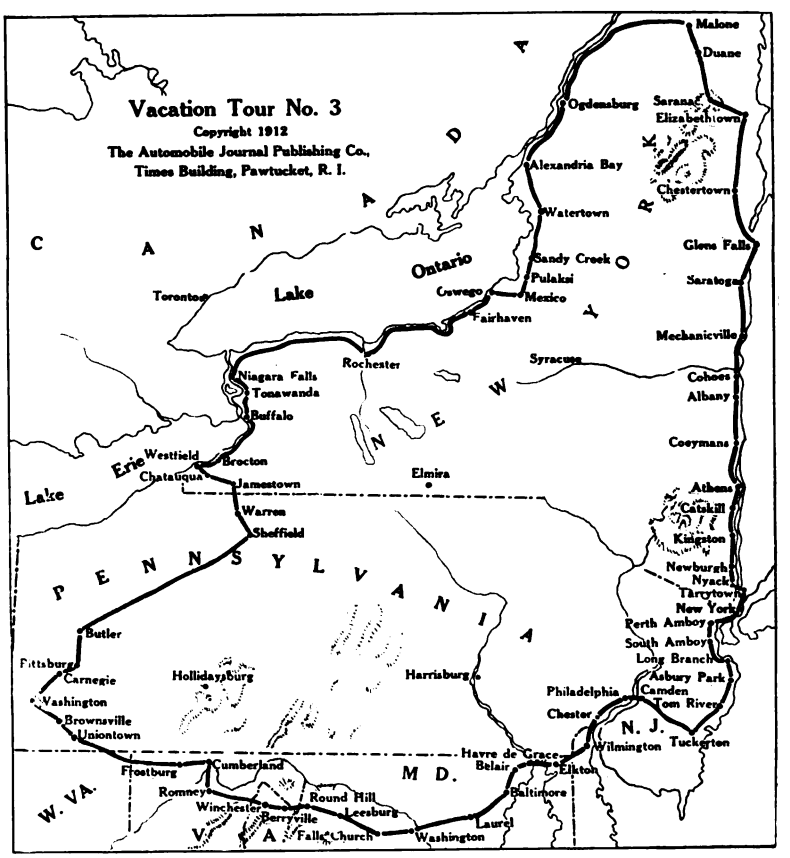
Lake Placid to	Miles to	Total Miles
Saranac Lake	9.8	9.8
Gabriel Station	8.8	18.6
Duane Center	22.2	40.8
Studley Hill	9.2	50.0
Whippleville	5.5	55.5
Malone	2.4	57.9
Westcott Center	10.0	67.9
Fort Covington	6.2	74.1
Hogansburg	8.9	83.0
Raquette River	7.0	90.0
Massena	6.4	96.4
Waddington Station	17.0	113.4
Ogdensburg	19.9	133.3
Morristown	10.8	144.1
Briar Hill	4.0	148.1
Hammond	6.0	154.1
Redmond	11.9	166.0
Alexandria Bay	6.7	172.7

Fourth Day, Alexandria Bay to Rochester, N. Y., 160.2 Miles.

Alexandria Bay to	Miles to	Total Miles
Omar	7.5	7.5
Lefargeville	4.8	12.3
Stone Mills	5.7	18.0
Gunn's Corners	1.9	19.9
Perch River	2.0	21.9
Brownville	5.8	27.7
Watertown	4.2	31.9
Adams Center	10.0	41.9
Adams	3.7	45.6
Pierrepont Manor	6.1	51.7
Mannsville	1.7	53.4
Lacona	4.7	58.1
Sandy Creek	0.9	59.0
Pulaski	5.8	64.8
Mexico	10.0	74.8
New Haven	4.6	79.4
Scriba	6.0	85.4
Oswego	4.2	89.6
Crockett Station	10.2	99.8
Sterling Center	2.5	102.3
Fairhaven	3.2	105.5
Red Creek	5.2	110.7
Wolcott	6.1	116.8
Alton	8.5	125.3
Wallington Station	1.7	127.0
Sodus	2.7	129.7
Williamson	6.8	136.5
Ontario	5.1	141.6
Fruitland	2.7	144.3
Union Hill	1.9	146.2
Webster	2.9	149.1
West Webster	3.3	152.4
Irondequoit Bay	2.5	154.9
Rochester	5.3	160.2

Fifth Day, Rochester to Chautauqua, N. Y., 177 Miles.

Rochester to	Miles to	Total Miles
Greece	5.7	5.7
West Greece	3.3	9.0
Parma	2.2	11.2
Garland	4.9	16.1
Clarkson	2.1	18.2
Sandy Creek	6.4	24.6
Chiles	7.6	32.2
Gaines	1.5	33.7
Oak Orchard	6.2	39.9
Ridgeway	3.1	43.0
West Ridgeway	1.7	44.7
Jeddo	1.8	46.5
Johnson Creek	3.2	49.7
Hartland	3.0	52.7
Ridgeroad	3.9	56.6
Wrights Corners	3.2	59.8
Wrights	1.2	61.0
Warrens Corners	3.0	64.0
Molyneaux Corners	4.2	68.2
Cambria	1.5	69.7
Dickersonville	4.3	74.0
Model City	3.9	77.9
Lewiston	2.7	80.6
Suspension Bridge	4.5	85.1
Niagara Falls	1.7	86.8
La Salle	5.5	92.3
North Tonawanda	6.2	98.5
Tonawanda	0.4	98.9
Buffalo	9.5	108.4
Evans	21.2	129.6
Irving	7.6	137.2
Silver Creek	3.4	140.6
Sheridan	5.9	146.5
Fredonia	6.0	152.5
Brocton	6.8	159.3
Portland	1.4	160.7
Westfield	6.9	167.6
Mayville	5.4	173.0
Chautauqua	4.0	177.0



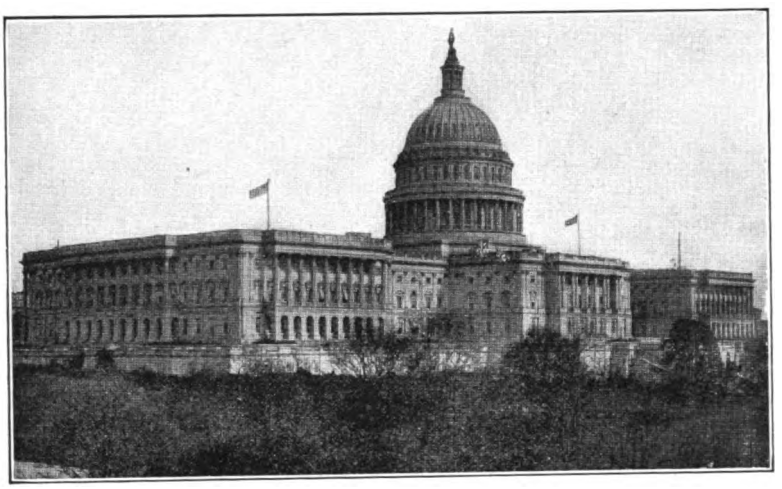
Sixth Day, Chautauqua to Pittsburg, Penn., 183.7 Miles.

Chautauqua to	Miles to	Total Miles
Stow	5.2	5.2
Jamestown	11.4	16.6
Russell	13.4	30.0
North Warren, Penn	5.1	35.1
Warren	2.2	37.3
Sheffield	12.6	49.9
Marienville	20.4	70.3
McDonald's	7.0	77.3
Leeper	4.9	82.2
Snydersburg	3.8	86.0
Lucinda	1.8	87.8
Clarion	9.5	97.3
Reedsburg	5.2	102.5
Curllsville	4.9	107.4
Rimersburg	5.2	112.6
East Brady	8.2	120.8
Kaylor	4.5	125.3
Chicora	5.2	130.5
Butler	11.3	141.8
Harmaston	9.1	150.9
Saxonburg	2.1	153.0
Connersville	7.4	160.4
Undercliff	12.6	173.0
Pittsburg	10.7	183.7

Seventh Day, Pittsburg to Cumberland, Md., 129.6 Miles.

Pittsburg to	Miles to	Total Miles
Carnegie	6.9	6.9
Bridgeville	4.5	11.4
Cannonsburg	9.0	20.4
Washington	9.3	29.7
Scenery Hill	12.5	42.2
Beallsville	3.4	45.6
Centerville	2.9	48.5
Brownsville	5.5	54.0
Davidson	3.4	57.4
Haddonfield	5.7	63.1
Uniontown	3.4	66.5
Hopwood	2.6	69.1
Fayette Springs	5.1	74.2
Farmington	3.7	77.9
Somerfield	10.8	88.7
Addison	5.4	94.1
Oakton, W. Va.	1.1	95.2
Keyser	3.4	98.6

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The National Capitol Building at Washington, D. C.

Grantsville, Md.	5.3	103.9
Frostburg	14.1	118.0
Elkhart Mines	1.8	119.8
Cumberland	9.8	129.6

Eighth Day, Cumberland to Washington, D. C., 141.1 Miles.

Cumberland to	Miles to	Total Miles
South Cumberland	2.0	2.0
Frankford, W. Va.	11.1	13.1
Springfield	5.8	18.9
Wappocoma	2.0	20.9
Romney	7.1	28.0
Frenchburg	7.2	35.2
Augusta	2.0	37.2
Hanging Rock	7.0	44.2
Capon Bridge	6.9	51.1
Parishville	5.3	56.4
Gore	1.8	58.2
Hayfield	4.4	62.6
Chambersville	4.1	66.7
Winchester, Va.	4.3	71.0
Berryville	11.1	82.1
Round Hill	11.8	93.9
Purcellville	3.6	97.5
Hamilton	2.8	100.3
Leesburg	6.4	106.7
Falls Church	26.7	133.4
Ballston Spa	4.8	138.2
Washington, D. C.	2.9	141.1

Ninth Day, Washington to Philadelphia, Penn, 152.4 Miles.

Washington to	Miles to	Total Miles
Blagdensburg, Md.	6.9	6.9
Hyattsville	0.9	7.8
Beltsville	6.3	14.1
Laurel	6.0	20.1
Elkbridge Station	10.7	30.8
Relay	1.3	32.1
Cantonsville	3.7	35.8
Baltimore	8.2	44.0
Towson	8.8	52.8
Lock Raven	4.2	57.0
Glenarm	3.7	60.7
Bel Air	10.4	71.1
Churchville	5.5	76.6
Havre de Grace	9.9	86.5
Perryville	1.5	88.0
Northeast	7.4	95.4
Elkton	6.2	101.6
Newark, Del.	7.1	108.7
Marshallton Station	7.9	116.6
Elsmere Junction	2.6	119.2
Wilmington	2.7	121.9
Chelsea, Penn.	9.7	131.6
Darby	14.1	145.7
Philadelphia	6.7	152.4

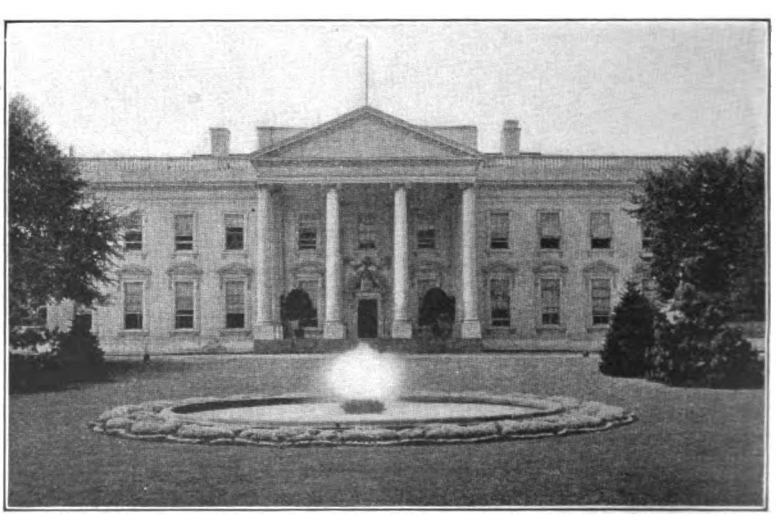
Tenth Day, Philadelphia to New York, 165.7 Miles.

Philadelphia to	Miles to	Total Miles
Camden, N. J.	1.2	1.2
Haddon Heights	5.9	7.1
Magnolia	2.9	10.0
Overbrook	3.0	13.0
Berlin	4.1	17.1
Nesco	18.2	35.3
Batsto	2.7	38.0
Greenbank	4.5	42.5
New Gretna	8.5	51.0
Tuckerton	6.1	57.1
Parkerton	2.2	59.3
Manahawken	5.6	64.9
Barnegat	4.3	69.2
Waretown	2.8	72.0
Forked River	3.9	75.9
Tom River	9.2	85.1
Lakewood, N. J.	9.8	94.9
Burrsville	5.4	100.3
Point Pleasant	4.6	104.9
Manasquan	3.3	107.2
Spring Lake	2.1	110.5
Belmar	2.2	112.7
Asbury Park	2.2	114.9
Deal	2.4	117.3
Long Branch	2.4	119.7
Seabright	4.5	124.2
Highlands	2.2	126.4
New Monmouth	7.3	133.7
Keyport	6.3	140.0
Morgan Station	3.9	143.9
South Amboy	2.5	146.4
Perth Amboy	3.3	149.7
Tottenville, N. Y.	0.6	150.3
Huguenot	3.4	153.7
New Dorp	5.4	159.1
Tompkinsville	5.5	164.6
Manhattan Ferry	1.1	165.7

TOUR NO. 11.

Tour No. 11 has Boston for its starting point, and is suggested to cover three days, with night stops at Keene and Plymouth, N. H. It is so laid out as to connect with Tour No. 15 at Keene, by reversing which to Brattleboro, Vt., Vacation Tour No. 1 may be followed, giving opportunity for extending the vacation to at least seven days. By reversing Tour No. 21, from Brattleboro to Manchester, Vt., connection is made with Vacation Tour No. 2, opening up still other possibilities. Other combinations will be suggested herewith, and still others will suggest themselves.

Leaving Boston by way of Cambridge, Arlington and Lexington, the motorist follows closely the road covered by Paul Revere on his famous midnight ride. At numerous points on the way monuments have been erected setting forth the progress of that trip as well as other interesting historical data connected with the Revolutionary period. In Lexing-



The White House, Official Home of the President of the United States.

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ton and Concord, there is much to stir the patriotism of the tourist.

Groton was visited in 1646 by Sachem Monoco at the head of 400 Indians, and the town was burned, with the exception of four garrison houses, in which the people successfully defended themselves. Monoco boasted that he was on his way to Concord and Lexington to reduce these towns, and later would march upon Boston. The following year saw him in Boston, but with a rope around his neck, marching toward the Common, where he was hanged.

The reverse of Tour No. 23 is met at Ashby and followed into Keene, N. H., through the pretty little New Hampshire towns of East and West Rindge, East Jaffrey, Jaffrey and Marlboro. In the northwestern part of Jaffrey is Monadnock mountain, with its high and rugged top rising 3186 feet above the sea. In this town, also, may be seen the ancient church, now secularized, which was erected on the day of the battle of Bunker Hill. Workmen thereon are said to have heard the cannonading. Numerous drives about the lakes in this region are worth taking, if time be available.

Keene is a pleasant city in the valley of the Ashuelot river. Its original name was Upper Ashuelot, and signified "the collection of many waters." Two miles north of the city are the Beaver Brook falls, where the brook flows over a stair-like succession of ledges 40 feet into a deep pool, the haunt of large trout. Lake Spofford is also nearby.

The second day finds the tourist approaching Lake Sunapee, 1104 feet above sea level, and nestling among the hills of Sullivan and Merrimac counties. The lake is about 10 miles long, indented with enticing bays and coves, and ranges from one-half to three miles in width. A short distance from its shores is the majestic Mt. Sunapee, which adds not a little to beauties of the scenery. Connections may be made here with Tour No. 16, rejoining this tour at Concord, or returning to Boston by way of Portsmouth.

Skirting this body of water by way of Newport, Guild, Sunapee and New London, the route lies toward the White mountains, with ever changing glimpses of the peaks in the distance. Entering the Pemigewasset valley, and passing Bristol, two miles further along, is Newfound lake, with Sugar Loaf mountain on the west shore and Crosby mountain on the east.

Plymouth, the night stop, is within easy view of the Franconia and White mountains to the north. Mt. Prospect, 2072 feet high, is a little to the northeast. It possesses a number of interesting features, notably the Miser's cave, the Avalanche, the Cold and the Boiling springs. Oscela and White Face are toward the northeast, and just below Squam range to the east, is Squam lake, island dotted and very pretty. This is only a partial list of the lake and mountains to be seen from Plymouth, most of which are located within a few miles' drive.

Connection may be made here with Tour No. 12, which may be followed in the reverse direction to Vacation Tour No. 1 and the Bretton Woods, or as planned, reaching the White mountain region at Conway and visiting the Maine woods, returning to Boston by way of Portland.

The third day visits Meredith on the way to Lake Winnipesaukee and The Weirs. Near the latter, on the banks of the lake is Endicott rock, which is about 20 feet around, and on which are carved the initials of the chiefs of the Colonial survey of 1652, and with the words, "John Endicut, Gov." The waters of the lake reflect the shadows of several bold mountains and surround nearly 300 islands, large and small.

The Weirs is best known as a summering place, but at this point is located a large flood gate, so arranged that the flow of the waters from the lake into the Merrimac river, is controlled for manufacturing purposes throughout the entire Merrimac valley to Newburyport, Mass. The return to Boston is through this valley as far as Lowell.

Franklin was the birthplace of Daniel Webster. Concord is the capital of the state, and an abundance of shade trees gives it a pleasant embowered appearance. A

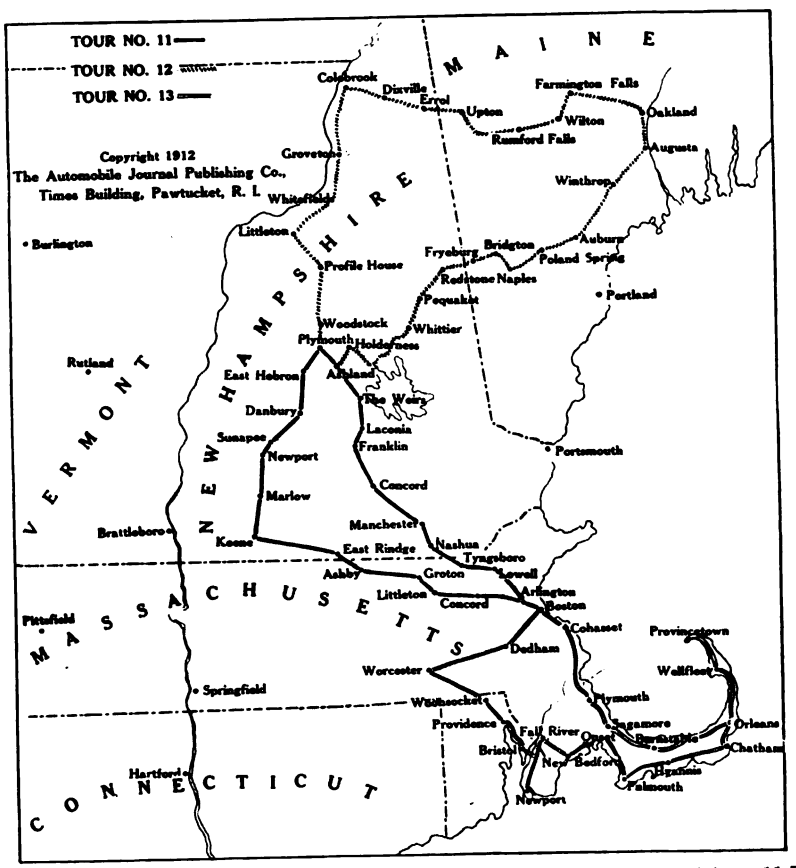


Lake Sunapee, N. H., in the Midst of Romantic Scenery and the Home of Gamy Bass.

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splendid view may be obtained from the dome of the State House, and a number of the public buildings are worthy of attention.

At Manchester, the Amoskeag Falls on the Merrimac river have a descent of 47 feet, with rapids above, and afford a fine sight. A short distance from this city is Lake Massabesic, which has 31 miles of shore with some beaches of remarkably white sand. The Fairy Cave and a curious sulphur cave, Devil's Den, are often visited by tourists, while in this vicinity.



Nashua is the last New Hampshire town to be visited, and at this point connection may be made with Tour No. 15 for Lawrence and Salem, if it is preferred to return to Boston by that route. The Pawtucket falls at Lowell, were a favorite fishing grounds of the Indians. The Pawtucket canal extends from the head of the falls to the Concord river, below the city, and affords excellent water power, having a fall of 30 feet.

The outward route is rejoined at Arlington, after passing through Billerica and Burlington, although there are numerous methods of reaching the centre of the city from this point, practically all of them over excellent macadam roads.

TOUR NO. 11.

Boston, Mass.—Keene, N. H.—Plymouth, N. H.—Boston.
Three Days, 307.7 Miles.

First Day, Boston to Keene, N. H., 83 Miles.

Boston to	Miles to	Total Miles
Cambridge	3.6	3.6
Arlington	3.5	7.1
Lexington	4.4	11.5
Concord	7.0	18.5
North Acton	6.9	25.4
Littleton Common	2.8	28.2
North Littleton	1.5	29.7
Groton	6.1	35.8
Townsend Harbor	6.0	41.8
Townsend	1.2	43.0
West Townsend	2.0	45.0
Ashby	4.8	49.8
East Rindge, N. H.	7.2	57.0
West Rindge	5.1	62.1
East Jaffrey	3.7	65.8
Jaffrey	1.7	67.5
Marlboro	10.9	78.4
Keene	4.6	83.0

Second Day, Keene to Plymouth, N. H., 90 Miles.

Keene to	Miles to	Total Miles
Gilsum	8.7	8.7
Marlow	7.1	15.8
East Lempster	9.0	24.8
Mill Village	6.1	30.9
Newport	4.7	35.6
Guild	2.4	38.0
Sunapee	3.2	41.2
George's Mills	3.6	44.8
New London	4.9	49.7
Elkins	3.1	52.8
Wilmot	2.8	55.6
Danbury	6.8	62.4
Elmwood Village	1.3	63.7
Bristol	8.7	72.4
Bridgewater	3.9	76.3
East Hebron	4.9	81.2
Plymouth	8.8	90.0

Third Day, Plymouth, N. H., to Boston, 134.7 Miles.

Plymouth to	Miles to	Total Miles
Ashland	5.9	5.9
Holderness	3.9	9.8
Meredith	7.9	17.7
The Weirs	4.7	22.4
Lakeport	4.6	27.0
Laconia	1.7	28.7
Winnisquam	3.0	31.7
Tilton	6.4	38.1
Franklin Falls	3.0	41.1
Franklin	0.8	41.9
Franklin Junction	1.6	43.5
North Boscawen	2.2	45.7
Boscawen	3.2	48.9
Penacook	3.4	52.3
West Concord	4.2	56.5
Concord	1.9	58.4
Pembroke	5.9	64.3
Suncook	1.4	65.7
Manchester	11.2	76.9
Merrimac	8.6	85.5
Thornton's Ferry	3.6	89.1
Nashua	5.9	95.0
Tyngsboro, Mass.	6.6	101.6
Lowell	7.9	109.5
Billerica	6.2	115.7
Burlington	5.5	120.2
Arlington	7.4	127.6
Cambridge	3.5	131.1
Boston	3.6	134.7

TOUR NO. 12.

Tour No. 12 is planned to start from Augusta, Me., and visits the White mountains. It is suggested as another three-day vacation, but can be continued indefinitely, by combination with other tours at various points on the way. The night stops are at Dixville Notch and Center Harbor, N. H. While it is possible to go direct to Boston, Mass., for instance, by reversing Tour No. 31 to Portland, continuing Vacation Tour No. 1 from that point, a very pleasing alternative may be obtained by joining Tour No. 11 at Plymouth, N. H. The entire journey from Augusta to Boston by both of these outlines used in combination could be made to occupy not more than five days, if desired, and would afford a fine vacation.

Leaving Augusta on the first day, the tour visits the Belgrade

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View in the Flume at Dixville Notch in New Hampshire.

lakes, without doubt the finest bass fishing grounds in the country. The water of the lakes is very clear and the bottom decidedly rocky, making an ideal haunt for bass. The shores of both lakes are well wooded and some excellent views are to be obtained along the roads skirting their edges.

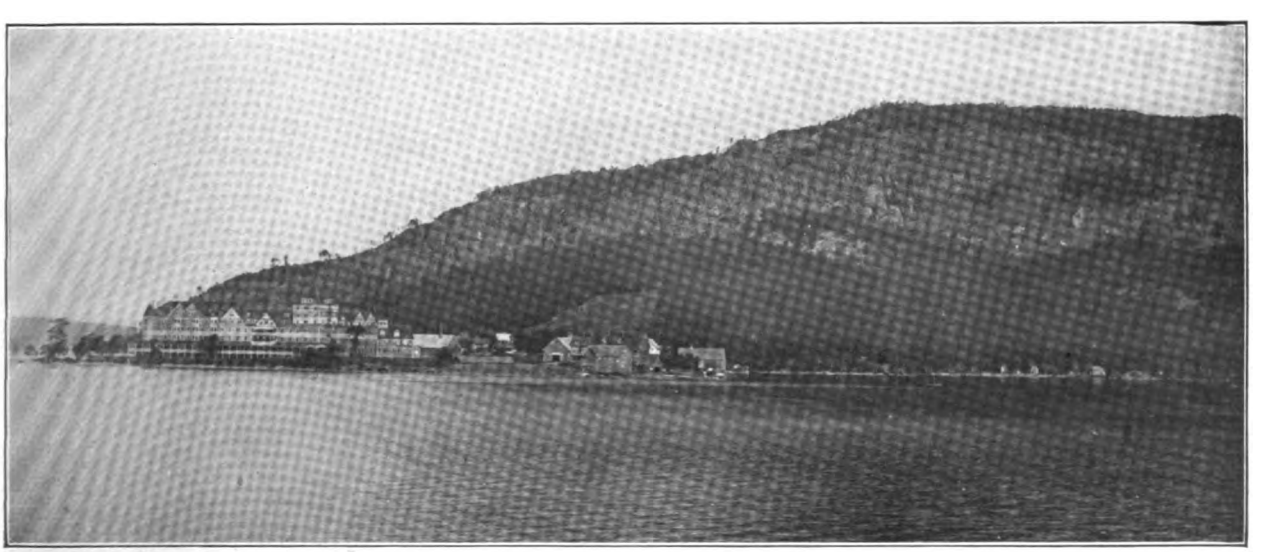
At Farmington, connection may be had with Tour No. 31, returning from Moosehead lake to Rangeley lakes. This tour crosses Tour No. 31 again at Dixfield and joins Vacation Tour No. 1 at Rumford Point. The way then leads into the Maine woods in the vicinity of the Rangeley lakes, through Hanover, Newry, Grafton Notch and Upton, into New Hampshire at Errol. On the way several lakes are passed, included among which are: Mollychunkamunk, Allegundabagog, Welocksebacook and Umbagog, the latter at Upton.

At Errol, the tourist finds himself in the heart of the White mountains. On every side, there are to be found signs of nature's handiwork on the way to Dixville Notch. Among these may be mentioned Table Rock, reached from the road by a rude stairway of stone blocks known as Jacob's Ladder. The view is very extensive from this point, and amply repays for the strenuous climb. The rock is 561 feet above the road, 2450 above the sea and is a narrow pinnacle only about eight feet wide at the top, with sharp, precipitous sides.

The notch itself, has high columnar sides, frowning at each other across the narrow chasm. These cliffs of decaying mica slate present a scene of ruin, transition and shattered strength, that is mournful and almost repulsive. The Notch is not a mountain pass, but a wonderful ravine among high hills. It has its flume, its cascades, its profiles, its snow cave, and its cold springs of the purest water known to science. Altogether it is a sight not to be missed, and well worth the climbing to which the car is subjected in reaching it.

The second day, the tourist again passes through this two miles of palisades on his way to Colebrook, where a detour may be made to Connecticut lake, at the head of the Connecticut river, down the valley which he will drive through for a time. At Littleton, connection may be made with Vacation Tour No. 1, which may be taken in either direction.

This tour now enters the Franconia range, scarcely less grand than that which was left behind so recently, and divided from it by the Twin mountain and Field Willing ranges. The Franconia region has two great natural wonders, either of which would make any other section famous. Twelve



Mt. Kineo Blends Its Wooded Slopes Into Maine Forests at Head of Moosehead Lake.

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Canoeists Enjoying One of the Lakes in Central Maine.

hundred feet above the lake, starting out from the blue crest of the mountain, stands a sculptured likeness of a giant Titan; the profile of the Old Man of the Mountain. The Flume, located some miles below, is a rock fissure 700 feet long and 60 deep, with fern decked granite walls from 10 to 20 feet apart; in reality a miniature canyon.

Continuing to Plymouth, where connection may be made with Tour No. 11 for Boston, or Tour No. 12 for Rutland, Vt., at which point Vacation Tour No. 2 may be followed either way, this tour turns eastward to Center Harbor, on Lake Winnipesaukee, for the night stop. The next morning, the journey will take the tourist up the eastern side of the White mountains, affording still more wonderful views.

At Conway, the route crosses Tour No. 16 from Portsmouth, N. H., and re-enters Maine at Fryeburg. A little later it visits the region of Lake Sebago and crosses Tour No. 31 at Poland Spring. Auburn and Lewiston, separated only by the Androscoggin river, are the last cities of importance passed on the way to Augusta. Lewiston falls, where the river breaks over a ledge of blackened gneiss, is worthy of note at this point. Lewiston is also the seat of Bates College, with its commodious buildings.

Near Winthrop is Lake Maranocook, the chief picnic ground of central Maine, It is a lovely winding lake, nine miles long, and about one mile wide, dotted with picturesque islands. West of the village is Mt. Pisgah, from which views of the White mountains are obtained.

At Augusta is located the recently rebuilt Capitol, and also the State Hospital for the Insane.

TOUR NO. 12.

Augusta, Me.—Dixville, N. H.—Center Harbor, N. H.—Augusta, Me. Three Days, 391.3 Miles.

First Day, Augusta to Dixville, N. H., 135.4 Miles.

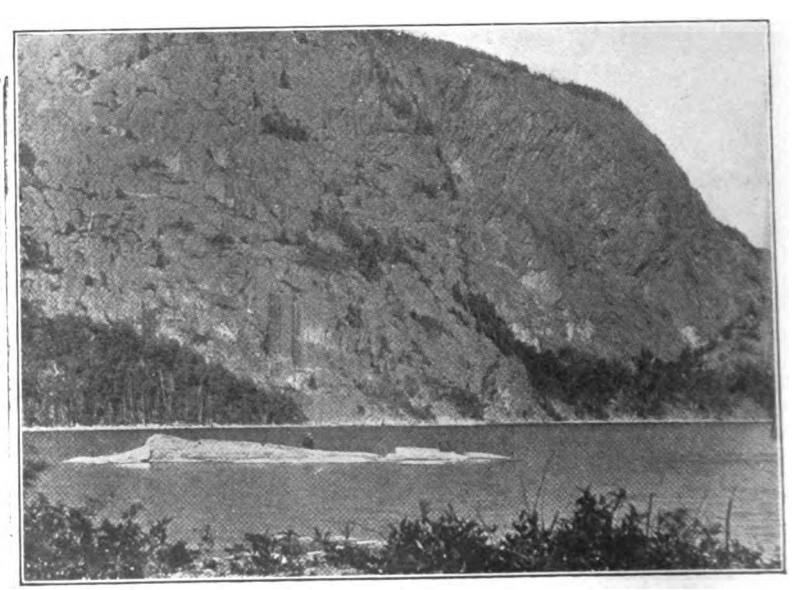
Augusta to	Miles to	Total Miles
West Sidney	6.5	6.5
Oakland	1.5	8.0
Belgrade Station	2.5	10.5
Belgrade Lakes	6.5	17.0
Rome	3.0	20.0
Mercer	8.0	28.0
New Sharon	7.6	35.6
Farmington Falls	4.1	39.7
Farmington	4.7	44.4
East Wilton	4.8	49.2
Wilton	2.9	52.1
East Dixfield	4.5	56.6
South Carthage	3.1	59.7
Dixfield	8.4	68.1
Ridlonville	4.5	72.6
Rumford	1.8	74.4
Rumford Center	6.0	80.4
Rumford Point	3.9	84.3
Hanover	1.7	86.0
Newry	5.4	91.4
North Newry	5.1	96.5
Grafton Notch	11.9	108.4
Upton	4.1	112.5
Errol, N. H.	9.8	122.3
Dixville Notch	12.1	134.4
Dixville	1.0	135.4

Second Day, Dixville to Center Harbor, N. H., 129.2 Miles.

Dixville to	Miles to	Total Miles
Kidderville	3.7	3.7
Colebrook	6.7	10.4
Columbia Bridge	4.1	14.5
North Stratford	9.0	23.5
Stratford Hollow	8.6	32.1
Groveton	5.1	37.2
Northumberland	3.6	40.8
Coos Junction	4.9	45.7
Lancaster	1.5	47.2
Whitefield	8.6	55.8
Littleton	11.1	66.9
Glessner's Corners	2.6	69.5
Franconia	4.3	73.8
Profile House	5.5	79.3
Flume House	5.1	84.4
North Woodstock	5.1	89.5
Woodstock	4.1	93.6
West Thornton	4.4	98.0
West Campton	5.8	103.8
Plymouth	7.2	111.0
Ashland	5.9	116.9
Holderness	3.9	120.8
Center Harbor	8.4	129.2

Third Day, Center Harbor to Augusta, Me., 126.7 Miles.

Center Harbor to	Miles to	Total Miles
Moultonboro	4.9	4.9
South Tamworth	8.1	13.0
Whittier	1.9	14.9
Tamworth	2.1	17.0
Chocorua	3.4	20.4
Pequaket	3.5	23.9



Mountain and Lake Scenery Are Combined in the Maine Woods.

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Iona	3.0	26.9
Conway Station	4.4	31.3
Conway	1.1	32.4
Redstone	3.4	35.8
Center Conway	1.7	37.5
Fryeburg, Me.	5.7	43.2
East Fryeburg	5.9	49.1
Bridgton	9.1	58.2
Naples	9.2	67.4
Cook's Mills	3.2	70.6
Webb's Mills	4.6	75.2
Poland Spring	8.8	84.0
Danville Junction	5.5	89.5
Auburn	6.2	95.7
Lewiston	0.4	96.1
Greene Corners	6.1	102.2
Greene Station	2.1	104.3
Winthrop	11.7	116.0
East Winthrop	4.2	120.2
Manchester	2.1	122.3
Augusta	4.4	126.7

TOUR NO. 13.

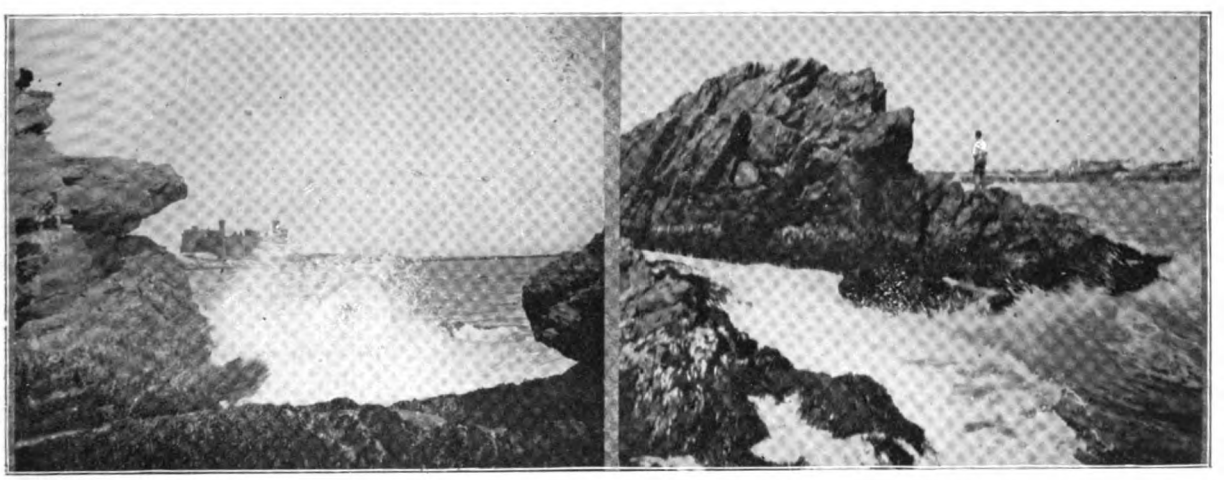
Tour No. 13 offers a decided change from those heretofore outlined. Like them it is planned to occupy three days, and is so arranged that it may be utilized in combination with any of the others presented herewith. It starts from Boston, and Provincetown, Mass., and Newport, R. I., are the night stops. The tourist returning from the Maine woods by Vacation Tour No. 1 may enter upon this tour at Boston, rejoining his original schedule at Narragansett Pier, R. I., by ferrying across the lower end of Narragansett bay from Newport. It will add at least two days more to the trip, but it will be found to be time very well spent.

The route lies along the south shore from Boston, through Quincy, Hingham, Cohasset and Kingston, all filled with summer homes of Boston people, to historic Plymouth. In fact the entire trip during the first day from this point is over historic ground. At Plymouth, the tourist will wish to see Forefathers Rock, on which it is said that the Pilgrims first set foot in making their landing in America; Burying Hill, with its graves of Miles Standish, John and Priscilla Alden, and others only a little less known; Pilgrim Hall, with its museum of Pilgrim relics; the plot of ground where the dead were buried during that first winter, and their graves sown with grain the next spring to keep the Indians in ignorance of their death, and many other noted scenes. The sites of interest to the tourist are clearly marked, and it is possible to determine with a fair degree of accuracy just where each of the central figures lived and moved during those early days following closely upon 1620.

The route lies along the north shore of Cape Cod, through a number of small towns, distinctive in their original quaintness, to Provincetown, in the harbor of which the Mayflower was brought to anchor, while the members of the little band drew up their compact and signed it with their life's blood. The tourist goes over the route in the reverse direction from that in which the Mayflower sailed from Provincetown to Plymouth, but after a night on the tip end of Cape Cod he returns over a portion of the trip, before shifting to the south shore.

From Chatham to Onset, the tour visits a number of towns, which have furnished numerous sailors for America's merchant marine, as well as the navy. Cape Cod has an individuality, unlike that of any other section of the country. Connection may be made for Wood's Hole and Martha's Vineyard at West Falmouth. Buzzards Bay is well known as the summer home of the late Grover Cleveland, while President.

Fairhaven was the home of the late H. H. Rogers, and the very excellent highways of the town practically were a gift from him. For years he was superintendent of streets in Fairhaven, but many times the salary voted by the town was expended by Mr. Rogers in giving to that section permanent highways, which will serve long as a memorial to him.



Two Views of Surf from Cliff Walk at Newport, R. I.: Ochre Point at Left; Brenton Point at Right.

New Bedford and Fall River are large commercial centres in southeastern Massachusetts, the former having been for a number of years the home port of an extensive whaling fleet. The latter has an excellent harbor, and the numerous streams emptying into it afford abundant water power for numerous manufacturing enterprises.

Newport is reached by the way of Tiverton and along the island of Rhode Island. It is famed the world over for its magnificent summer homes of wealthy people. Opportunity should be taken to visit a number of these. The cliff walk, leading for several miles along the shore and through many of the estates, is also of interest. Aside from the summer

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One of the Pleasant Summer Villas at Newport.



Cliff Walk Bridge on Vanderbilt Estate.

homes, Newport has much of historical value, and among these features may be mentioned the Old Stone Mill, found standing on the highest point in the city when the settlers first cleared away the underbrush, and supposed to have been erected by the Norsemen, hundreds of years before the visit of Columbus to America. The United States naval training station, navy yard and torpedo station also are located at Newport.

The third day finds the tourist skirting the east shore of Narragansett bay, after crossing from the island of Rhode Island to Bristol by ferry. From Bristol may be seen Mt. Hope, where King Philip congregated his anti-English allies for the attack upon the Narragansett fort in 1675.

Vacation Tour No. 1 is reached at Providence, over which the return to Boston may be made, if desired. This tour follows the Blackstone valley to Worcester, Mass., and re-enters Boston over one of the three main macadam routes between those two cities. Good roads are encountered practically all of the way from Providence, the beautiful Blackstone valley being ideal touring ground.

TOUR NO. 13.

Boston, Mass.—Provincetown, Mass.—Newport, R. I.—Boston.

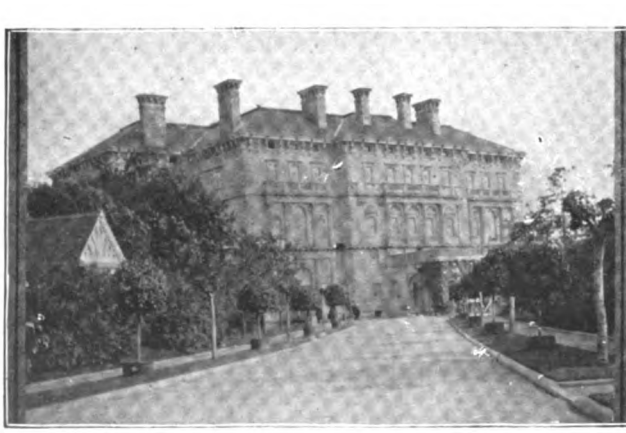
Three Days, 407.4 Miles.

First Day, Boston to Provincetown, Mass., 129.2 Miles.

Boston to	Miles to	Total Miles
Milton Lower Mills	7.4	7.4
Quincy	4.1	11.5
Hingham	6.2	17.7
Cohassett	6.6	24.3
Scituate Center	3.6	27.9
Greenbush	2.1	30.0
Marshfield	7.3	37.3
Kingston	8.6	45.9
Plymouth	4.6	50.5
Manomet	5.7	56.2
Sagamore	12.5	68.7
Sandwich	2.0	70.7
West Barnstable	7.8	78.5
Barnstable	4.4	82.9
Yarmouthport	2.6	85.5
Yarmouth	1.4	86.9
Dennis	3.3	90.2
East Dennis	1.9	92.1
Brewster	4.6	96.7
East Brewster	1.6	98.3
Orleans	3.7	102.0
Eastham	4.0	106.0
South Wellfleet	6.6	112.6
Wellfleet	2.3	114.9
North Truro	8.1	123.0
Provincetown	6.2	129.2

Second Day, Provincetown to Newport, R. I., 154.6 Miles.

Provincetown to	Miles to	Total Miles
Orleans	27.2	27.2
Chatham	9.2	36.4
South Harwich	4.8	41.2
Harwichport	1.8	43.0
West Harwich	2.1	45.1
West Dennis	3.1	48.2
South Yarmouth	0.8	49.0
West Yarmouth	3.2	52.2
Hyannis	2.0	54.2
Centerville	4.2	58.4
Osterville	2.9	61.3
Marston's Mills	2.6	63.9
Waquoit	7.6	71.5
East Falmouth	2.5	74.0
Falmouth	4.1	78.1
West Falmouth	4.1	82.2
North Falmouth	3.3	85.5
Monument Beach	5.7	91.2
Buzzards Bay	6.9	98.1
Onset	2.7	100.8



"The Breakers" at Newport's Summer Colony.



Historic Old Stone Mill in Truro Park, Newport.

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Seaconnet Point and Light in Southeastern Rhode Island.

East Wareham	1.4	102.2
Wareham	2.6	104.8
Marion	5.6	110.4
Mattapoisett	4.9	115.3
Fairhaven	5.1	120.4
New Bedford	2.0	122.4
North Dartmouth	10.5	132.9
Fall River	3.1	136.0
Tiverton, R. I.	6.2	142.2
Newport	12.4	154.6

Third Day, Newport to Boston, 123.6 Miles.

Newport to	Miles to	Miles Total
Bristol Ferry	11.9	11.9
Bristol	0.2	12.1
Warren	4.2	16.3
Barrington	1.6	17.9
East Providence	7.7	25.6
Providence	2.6	28.2
Pawtucket	4.1	32.3
Lonsdale	2.7	35.0
Ashton	2.4	37.4
Woonsocket	7.3	44.7
Blackstone, Mass.	1.6	46.3
Uxbridge	7.2	53.5
Whitins	1.8	55.3
Northbridge	4.2	59.5
Farnumsville	2.2	61.7
Saundersville	1.5	63.2
Millbury	3.2	66.4
Worcester	6.0	72.4
Grafton	8.0	80.4
West Upton	4.6	85.0
Upton	1.2	86.2
Milford	5.5	91.7
West Medway	5.7	97.4
Millis	4.0	101.4
Medfield	3.0	104.4
Westwood	5.7	110.1
Dedham	2.9	113.0
Boston	10.6	123.6

TOUR NO. 14.

Tour No. 14 leaves New London, Conn., for a three days' trip, most of which is spent in the state of Connecticut. Used in combination with Tour No. 21, it is possible to join Vacation Tour No. 2 at Great Barrington, Mass., and as it reaches the outward bound portion of Vacation Tour No. 1 at Danbury it affords abundant opportunity for Connecticut motorists to join the whole itinerary of tours presented herewith.

Leaving New London, the way leads along the Long Island sound to New Haven, at which point connection may be made with Bridgeport, forming what is termed the shore line to New York, and can be used as an alternative for Vacation Tour No. 1 from New London. Lyme is a venerable old hamlet, buried in foliage, its main street lined with old trees and historic mansions. At Saybrook Point was an old fort, built in 1635, which was destroyed in 1871 in order that the railroad might be cut through. It was in a fair state of preservation, and its long history should have deserved a more noble end. America, or at least Connecticut, had not begun to realize the importance of antiquities at that time, it would appear. The new bridge over the Connecticut river at Saybrook makes it unnecessary to utilize the ferry as it has been in previous years.

Westbrook, Clinton and Madison are pretty summer shore resorts, still untouched by the trolley and lacking the noisy amusement parks of those nearer the Elm City. Guilford was the hiding place of the regicides for a time. Between Guilford and Madison is Sachem's Head, so named because during the extermination of the Pequots, Uncas, the Mohegan sachem, pursued and shot a Pequot chief, placing his head in the fork of an oak tree, where it remained for many years. Branford bay is dotted with the Thimble islands, on which many summer homes are located.

At New Haven the buildings of Yale University are of particular interest, and if time permits, the Art School and Peabody Museum of Natural History should be visited. The shore line from this point to Bridgeport is through



Over the Litchfield Foothills Into the Housatonic Valley.

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West Haven, Milford and Stratford, macadam all of the way and practically impossible to lose.

The way now leads inland, across to Derby, Shelton and Huntington, three manufacturing centres at the confluence of the Naugatuck and Housatonic rivers. At Danbury connection is made with Vacation Tour No. 1 and with Tour No. 51, the latter of which is followed for a time, into the valley of the Housatonic.

At New Preston is the prettiest of all the Litchfield county lakes, Lake Waramaug. A splendid boulevard has been constructed around this body of water and makes a pleasant side trip of 8.5 miles. At Woodville the road dips abruptly into a narrow notch between two high hills, one of which is known locally as Mt. Tom. From this point the drive is through Bantam, and along the edge of Bantam lake to Litchfield, the night stop.

It is at Litchfield that connection is made with Tour No. 21 for Great Barrington, Mass. There is much of interest in the old town, situated in the midst of the Litchfield hills, particularly the old whipping post and the Gov. Wolcott mansion. In this latter the young women of the town melted the statue of King George, which was spirited away from New York City during the Revolution, thus furnishing bullets for the Continental army.

The second day the tourist crosses the hills to the Naugatuck valley at Torrington, the largest town in the county, famed as the birthplace of John Brown, the illfated abolitionist. Winsted, at the head of the valley, is another manufacturing town, with a number of memorials to William Gilbert which are worthy special attention. Highland lake, with a well kept boulevard, is also nearby. The tour soon enters the Farmington valley, passing through Satan's Kingdom, where the river dashes over a series of rapids for some miles. Long before Farmington is reached, however, the waters have calmed down, giving very little indication of their turbulent past.

At Farmington connection is made with Tour No. 21, on its return, and Vacation Tour No. 1 is reached again at Hartford. The journey from Hartford to Worcester, Mass., is almost in a direct line, crossing the new bridge into East Hartford, and thence to Manchester, Vernon and Rockville. The latter is one of the smallest cities in the state, with an abundance of cherry trees. The water supply is furnished by Sinipsic lake among the hills back of the city.

Stafford Springs is noted for its mineral springs, particularly those containing iron in solution with carbonic acid. The Indians utilized these waters with beneficial results, and the whites have been patronizing them for over 150 years.

Worcester is the second night's stop, and from this point the tour turns southward to Putnam, Conn. Near this city is Mt. Woodstock, a miniature Mt. Holyoke, looking down upon Woodstock lake, a beautiful sheet of water. Below Danielson is Quinebaug pond, where the Narragansett's fishing light is said to rise in the form of a pillar of fire once in seven years. This old legend is firmly rooted in the minds of the dwellers of the country side, and they claim to have seen the mysterious light over the pond.

Norwich is the Rose City, pleasantly situated on the banks of the Thames, its streets and homes forming neat terraces. Nearby are the Falls of Yantic, close to the Indian cemetery, a spot chosen centuries ago as the burial place for the royal blood of the Mohegans. Many of the grand sachems of the tribe are buried here, the last to be accorded such honors being Mazeen, who died in 1826. In the centre of the ancient monuments stands a massive obelisk erected to Uncas, the foundation stone of which was laid by President Jackson.

The return to New London is down the Thames valley, a portion of the distance being along the course of the intercollegiate boat races, between Harvard and Yale.



Three Views of Historic Litchfield: Left, Wolcott Mansion; Centre, Elm Street Drive; Right, Old Whipping Post.

TOUR NO. 14.

New London, Conn.—Litchfield, Conn. —Worcester, Mass.—New London.

Three Days, 326.1 Miles.

First Day, New London to Litchfield, Conn., 123.4 Miles.

New London to	Miles to	Total Miles
East Lyme	7.1	7.1
Lyme	8.6	15.7
Saybrook	3.9	19.6
Westbrook	4.1	23.7
Clinton	4.7	28.4
Madison	3.6	32.0
Guilford	4.9	36.9
Branford	8.5	45.4
East Haven	3.5	48.9
New Haven	4.2	53.1
Derby	9.6	62.7
Shelton	0.5	63.2
Huntington	3.9	67.1
Stepney	5.8	72.9
Upper Stepney	2.2	75.1
Hattertown	2.8	77.9
Dodgingtown	4.0	81.9
Bethel	3.3	85.2

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Danbury	2.8	88.0
Brookfield	7.8	95.8
Lanesville	4.2	100.0
Still River	0.8	100.8
New Milford	3.3	104.1
Northville	4.3	108.4
Marbledale	2.1	110.5
New Preston	1.2	111.7
Woodville	4.0	115.7
Bantam	4.0	119.7
Litchfield	3.7	123.4

Second Day, Litchfield, Conn., to Worcester, Mass., 127.3 Miles.

Litchfield to	Miles to	Total Miles
Torrington	5.5	5.5
Winsted	10.3	15.8
New Hartford	6.1	21.9
Cherry Brook	4.2	26.1
Canton	2.4	28.5
Unionville	4.6	33.1
Farmington	3.8	36.9
West Hartford	5.2	42.1
Hartford	3.6	45.7
East Hartford	1.9	47.6
Burnside	2.2	49.8
Manchester	6.5	56.3
Talcottville	8.0	64.3
Rockville	5.5	69.8
West Stafford	10.2	80.0
Stafford Springs	3.5	83.5
Stafford	2.5	86.0
Staffordville	1.8	87.8
Wales, Mass.	6.4	94.2
Brimfield	4.1	98.3
Fiskdale	2.0	100.3
Sturbridge	1.9	102.2
Southbridge	3.9	106.1
Charlton City	6.2	112.3
North Oxford	6.6	118.9
Worcester	8.4	127.3

Third Day, Worcester to New London, 75.4 Miles.

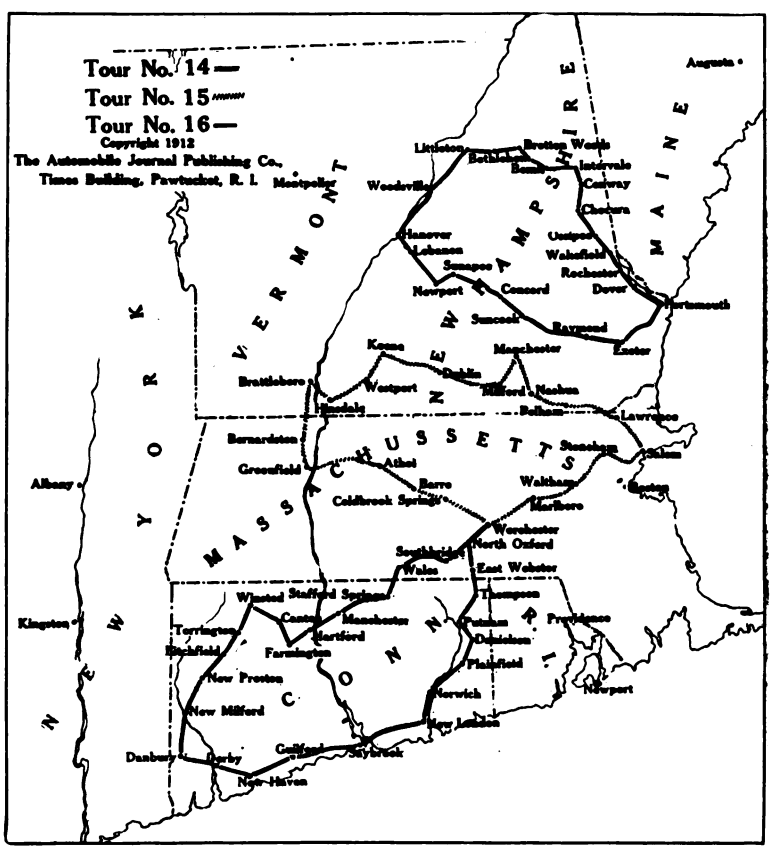
Worcester to	Miles to	Total Miles
North Oxford	8.4	8.4
Oxford	3.5	11.9
East Webster	4.3	16.2
Thompson, Conn.	7.6	23.8
Putnam	4.2	28.0
Attawaugan	3.9	31.9
Dayville	1.4	33.3
Elmville	1.6	34.9
Danielson	2.0	36.9
Central Village	5.9	42.8
Plainfield	2.8	45.6
Jewett City	7.3	52.9
Lisbon	1.4	54.3
Taftville	5.1	59.4
Norwich	3.1	62.5
New London	12.9	75.4

TOUR NO. 15.

Tour No. 15 starts from Worcester, Mass., with night stops at Brattleboro, Vt., and Nashua, N. H. It connects with Vacation Tour No. 1 at Greenfield, Mass., and Salem, Mass. Other connections make it possible to use this tour in combination with at least two others in a visit to the White Mountain region.

The first day's run is from Worcester across the hills of northern Massachusetts to the Connecticut river. At West Rutland is located a sanitarium for consumptives, suggesting the quality of air which greets the tourist over this portion of the journey. At Athol the Miller's river is reached and followed for some 25 miles, passing through Miller's and Turner's Falls, so named because of the pretty falls in the river which furnish power for manufacturing purposes.

At Greenfield the tour turns northward to Brattleboro, Vt., avoiding somewhat that laid out in Vacation Tour No. 1 between these two points. Brattleboro is



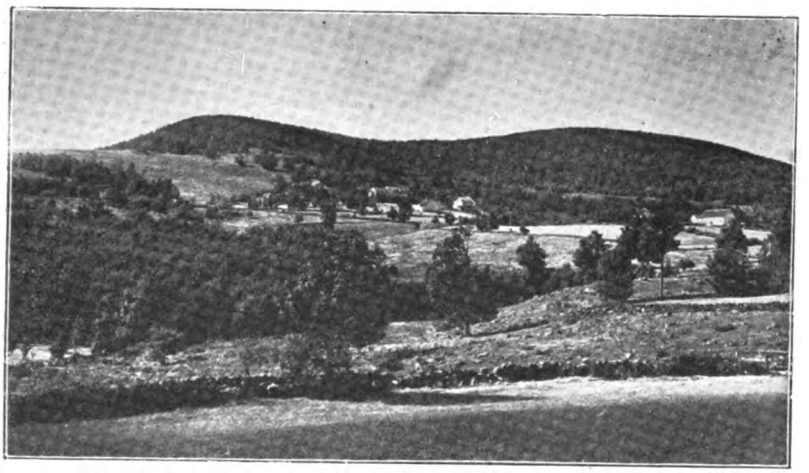
the night stop, and the second day's run crosses the Connecticut river to Hinsdale, N. H. Mine mountain, near Hinsdale, exhibited volcanic symptoms a few years ago, a lava-like substance having been thrown out and formed on the mountainside. On a hill near the Ashuelot river is to be seen the ruins of an ancient Indian fort.

From Keene the way leads across the southern end of New Hampshire, over ground that has not been covered by tourists until within a few years. Much interesting lake and mountain scenery rewards the visit to this region. At Milford a side trip to Mt. Vernon may be taken. From the spire of the church it is said that the sails of ships on the Atlantic can be seen. Amherst was the birthplace of Horace Greeley. The village is on a high plain and commands an excellent view of the surrounding country.

While direct connection may be made with Nashua from Amherst, the roads are much better by the way of Manchester and Merrimac in the Merrimac valley. Nashua is the night stop, and is a city of comparatively recent origin, although first settled long before the King Philip war and bravely defended during that conflict. As late as 1803 it was a sandy plain covered with pine trees. It hardly seems possible that indomitable energy has transformed this apparent waste land into the enterprising city of today.

The third day the way leads across a small portion of New Hampshire, touching Hudson and Pelham, to Lawrence, Mass. This is a manufacturing city of considerable importance, and among the

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Mt. Wachusetts on the Massachusetts State Reservation.

features of interest is the new city water supply, constructed at a cost of about $1,250,000. Andover is an ancient academic town, which has been noted for its theological schools for over a century. It was purchased from the Indians in 1643 for $24.64 and a coat.

The North Shore is reached at Salem, and before turning inland again the tourist follows this shore on an excellent parkway through Marblehead, one of the quaintest old towns in New England; Swampscott, where the surf beats higher and more wildly than at any other point on the North Shore, and Lynn.

Vacation Tour No. 1 may be followed to Boston with return to Worcester over at least three different roads, all of which are of macadam. The tour connects with one of these roads by way of Waltham, home of the Waltham watch works. Marlboro was the site of the old Christian Indian village of Okommakamesitt and was settled by Sudbury people in 1655. During the first few years of its history as Marlboro, the pastor of the settlement refused to baptise children born on the Sabbath.

Worcester is reached from this point by way of Northboro and Shrewsbury, Lake Quinsigamond being passed on the way.

The summer home of the Worcester Automobile Club is located on the banks of this lake, amid fine touring country.

TOUR NO. 15.

Worcester, Mass.—Keene, N. H.—Nashua, N. H.—Worcester.
Three Days, 275.9 Miles.

First Day, Worcester to Brattleboro, Vt., 80.1 Miles.

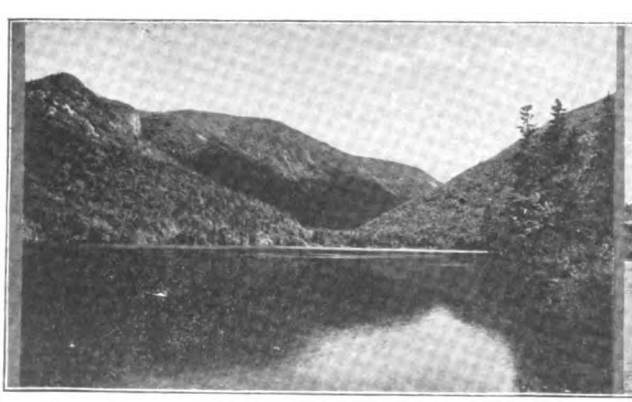
Worcester to	Miles to	Total Miles
Paxton	7.5	7.5
West Rutland	5.1	12.6
Colebrook Springs	4.1	16.7
Barre	3.8	20.5
Petersham	7.9	28.4
Athol Center	7.1	35.5
Athol	1.1	36.6
Orange	4.7	41.3
Wendell	2.7	44.0
Erving	2.4	46.4
Miller's Falls	6.3	52.7
Turner's Falls	4.4	57.1
Greenfield	3.2	60.3
Bernardston	6.2	66.5
Guilford	11.0	77.5
Brattleboro	2.6	80.1

Second Day, Brattleboro to Nashua, N. H., 96 Miles.

Brattleboro to	Miles to	Total Miles
Hinsdale, N. H.	6.9	6.9
Ashuelot	2.9	9.8
Winchester	3.0	12.8
Westport	5.3	18.1
West Swanzey	2.4	20.5
Keene	5.6	26.1
Marlboro	4.6	30.7
Dublin	8.5	39.2
Bond's Corner	2.1	41.3
West Peterboro	2.3	43.6
Peterboro	2.2	45.8
Wilton	12.8	58.6
Richardson	2.2	60.8
Milford	2.1	62.9
Amherst	2.2	65.1
Bedford	8.3	73.4
Manchester	4.5	77.9
Merrimac	8.6	86.5
Nashua	9.5	96.0

Third Day, Nashua, N. H., to Worcester, Mass., 99.8 Miles.

Nashua to	Miles to	Total Miles
Hudson	1.5	1.5
Pelham	7.7	9.2
Lawrence, Mass.	6.8	16.0
North Andover Center	3.9	19.9
Middleton	8.1	28.0
Danvers	5.1	33.1
Danversport	0.8	33.9
Salem	3.2	37.1
Marblehead	4.7	41.8
Swampscott	2.0	43.8
Lynn	1.9	45.7
Saugus	4.6	50.3
Melrose	3.0	53.3
Stoneham	2.0	55.3
Arlington	6.0	61.3
Belmont	2.0	63.3
Waltham	3.6	66.9
Weston	3.0	69.9
Wayland	3.4	73.3
South Sudbury	3.0	76.3
Marlboro	7.8	84.1
Northboro	5.6	89.7
Shrewsbury	4.5	94.2
Worcester	5.6	99.8



Echo Lake Among the Mountains at Franconia, N. H.



Lake Wachusetts in Vicinity of Princeton, Mass.

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The Beautiful Contoocook Lake, Near East Jaffrey, N. H.

TOUR NO. 16.

Tour No. 16 is a three-day trip from Portsmouth, N. H., with night stops at Bretton Woods and Sunapee, N. H. It would be possible to curtail the mileage in Vacation Tour No. 1 somewhat by utilizing a portion of this tour, running direct from Bretton Woods to Portsmouth, and eliminating the Maine woods portion of the trip.

Dover is the oldest place in the state, and is pleasantly located at the lower falls of the Cocheco river. From Milton it is possible to ascend Mt. Tenneriffe. Cobble Crown mountain appears at Union. Ossipee lake, with Green mountain on one shore and Mt. Ossipee on the other, are seen at Ossipee.

Nature is at its best beyond Chocura. The road passes Lake Chocura with the mountain by the same name near its shores. Champney's Falls, Diana's Bath, Echo lake, the Cathedral, vie with each other in holding the tourist's attention, and high above all is the majestic head of Mt. Kearsarge, reached from North Conway. The night stop is at Bretton Woods.

Crossing the White mountains to Bethlehem and Littleton, the tour descends into the Connecticut valley at Wells River, Vt. This beautiful river is followed almost to White River Junction. Hanover, N. H., is the seat of Dartmouth College, and from this point the way leads across the state, in practically a straight line to Lake Sunapee, where the night stop is made.

Bradford, reached early the third day, is a charming village near the island-strewn Bradford pond, much frequented by summer visitors. Mt. Kearsarge is 10 miles to the northeast, and a number of smaller mountains are within easy driving distance. Bradford mineral springs are five miles southwest.

Passing through Henniker and Hopkinton, two pretty little country villages, the next town of importance is Concord, capital of the state. While the city offers much of interest because of its fine old colonial buildings, some noble views are to be obtained from Echo hill, and the Birchdale springs, famed for their efficacy in cases of dyspepsia, offer a number of excellent groves on high, dry, sandy hills amid rich farming country.

Another point of interest at Concord is the beautiful home of the late Mrs. Mary Baker G. Eddy, head of the Christian Science church, called Pleasant View. The place is rightly named, as will be agreed by the tourist who takes the time to visit the grounds, commanding as it does an excellent view of the White mountains.

Exeter is the site of Phillips Academy, and is an elm-shaded, level farming town, in which there are a number of splendid residences. Nearby are Squamscott falls, the Indians about which were friendly to Rev. John Wheelwright, who settled Exeter after being banished from Massachusetts because of the heresy of Antinomianism. When this territory was annexed to Massachusetts in 1672, Wheelwright was banished still further west. The Indians left about the same time, migrating to Troy, N. Y., and their places were taken by more hostile tribes, who captured and destroyed the entire settlement. Phillips Academy was founded in 1781, by Hon. John Phillips, who endowed it with $134,000.

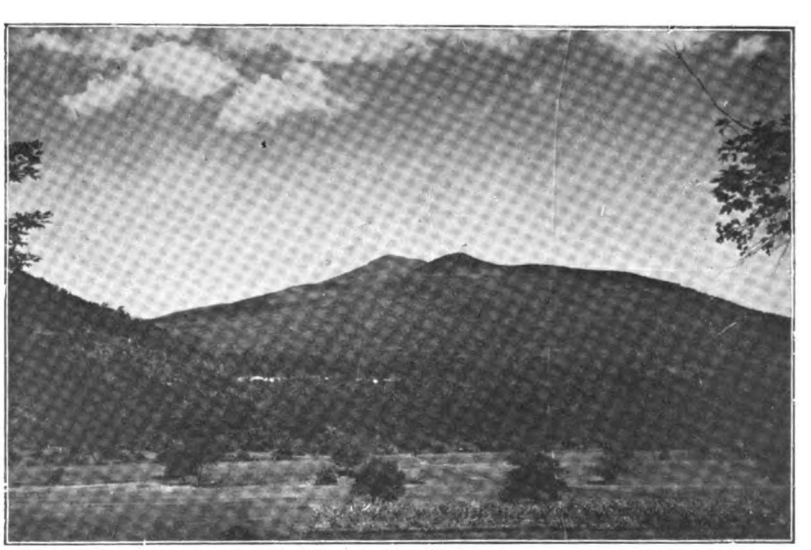
The return to Portsmouth is by the way of Stratham and Greenland, in the midst of rich fruit growing country.

TOUR NO. 16.

Portsmouth, N. H.—Bretton Woods, N. H.—Sunapee, N. H.—Portsmouth, N. H.
Three Days, 330.2 Miles.

First Day, Portsmouth to Bretton Woods, N. H., 114.6 Miles.

	Miles	Total Miles
Portsmouth to Dover Point	5.3	5.3



Majestic Mt. Kearsarge as Seen from Intervale, N. H.

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Dover	6.5	11.8
Rochester	9.0	20.8
Milton	8.3	29.1
Union	6.5	35.6
Wakefield Station	5.9	41.5
Ossipee	9.5	51.0
Center Ossipee	5.4	56.4
Lakewood	3.2	59.6
West Ossipee	2.9	62.5
Chocura	4.3	66.8
Pequaket	3.5	70.3
Iona	3.0	73.3
Conway Station	4.4	77.7
Conway	1.1	78.8
North Conway	5.4	84.2
Intervale	2.1	86.3
Glen Station	4.1	90.4
Bartlett	6.1	96.5
Bemis	6.2	102.7
Crawford House	8.6	111.3
Bretton Woods	3.3	114.6

Second Day, Bretton Woods to Sunapee, N. H., 117.5 Miles.

Bretton Woods to	Miles to	Total Miles
Twin Mountain House	5.3	5 3
Bethlehem Junction	5.1	10.4
Bethlehem	3.2	13.6
Littleton	5.0	18.6
North Lisbon	3.8	22.4
Lisbon	7.1	29.5
Bath	5.7	35.2
Woodsville	5.5	40.7
Wells River, Vt.	0.5	41.2
Newbury	5.8	47.0
Bradford	7.5	54.5
Fairlee	6.5	61.0
Ely Station	3.1	64.1
North Thetford	2.5	66.6
Hanover, N. H.	12.8	79.4
Lebanon	7.6	87.0
Grantham	14.4	101.4
Croydon	3.3	104.7
Croydon Flats	3.5	108.2
Newport	3.7	111.9
Guild	2.4	114.3
Sunapee	3.2	117.5

Third Day, Sunapee to Portsmouth, N. H., 98.1 Miles.

Sunapee to	Miles to	Total Miles
Guild	2.4	2.4
Edgemont	4.2	6.6
Newbury	2.8	9.4
South Newbury	2.8	12.2
Bradford	2.6	14.8
Henniker	10.5	25.3
Hopkinton	8.7	34.0
Concord	7.1	41.1
Pembroke	5.9	47.0
Suncook	1.4	48.4
Candia	14.6	63.0
Raymond	6.6	69.6
West Epping	3.6	73.2
Epping	2.6	75.8
Exeter	8.1	83.9
Stratham	3.7	87.6
Greenland	5.1	92.7
Portsmouth	5.4	98.1

TOUR NO. 21.

Tour No. 21 has Waterbury, Conn., as it starting point, with night stops at Benningington, Vt., and Greenfield, Mass. This course connects with Vacation Tours 1 and 2 in two places and opens up considerable touring country not available until recently.

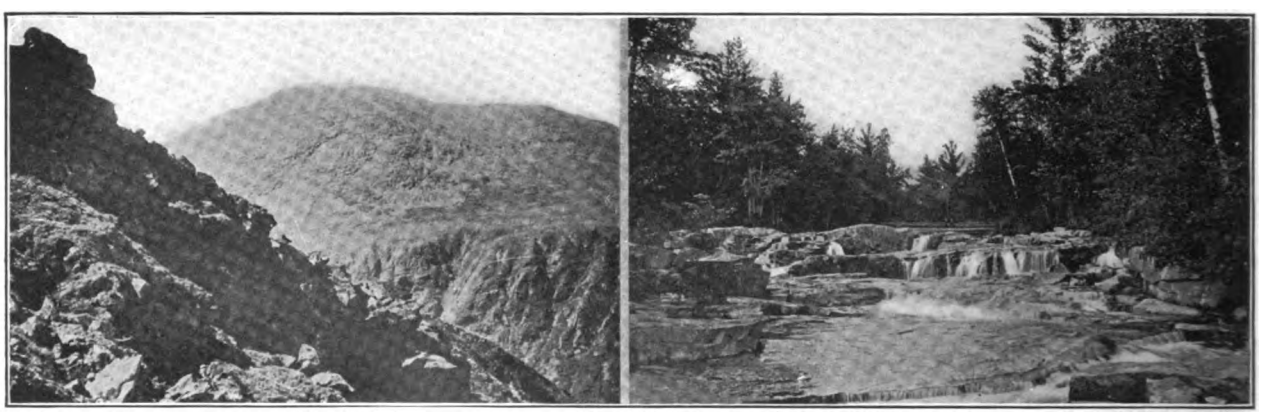
The first day's outline runs over the Litchfield foothills to Litchfield, along the shores of Bantam Lake, the latter portion of the way. Watertown is the seat of Taft's School for boys, of which the principal is Horace Taft, brother of the President. The town is somewhat famed for its silk mills, and while it is in the midst of a rich farming country, these manufacturing enterprises have made it possible for many of its people to enjoy life on a much wealthier scale than is usual in farming communities.

On the way to East Morris the route runs in sight of the Wigwam reservoir, the water supply for the city of Waterbury. Another large reservoir is in process of construction nearer East Morris. Some pretty lake views are to be had between East Morris and Litchfield, where connection is made with Tour No. 14.

Beyond Litchfield the way leads into Goshen, home of the Goshen hardhack, a troublesome bush, which overruns the country and completely devastates rich farms unless a continual warfare is made against it. Mountainous country is encountered on the way to Norfolk, located on the highest land in the state, and famed as a summer resort for many New York people. Within the past few years, Norfolk has come to be known for its summer concerts, for which Mr. and Mrs. Carl Stoeckel have provided an immense auditorium among the hills. Magnificent views in every direction are to be seen at this part of the trip.

At East Canaan, are the Twin lakes, on the banks of which are located a series of caves, recently discovered, through which the tourist may ramble for some distance in underground caverns. Bear, Bald Peak, Haystack and Talcott mountains are located near here, and from the top of Haystack mountain may be had a view probably not excelled in America. Mountain peaks in Connecticut, Massachusetts and New York are plainly visible.

The tour joins Vacation Tour No. 1 at Great Barrington, and follows it through Bennington, Vt., the night stop, to Manchester. Here, it turns toward the Green mountains, crossing them by way of Peru, Londonderry and Simonsville to Chester. The road of Peru mountain gives some excellent views, but is notorious for the number of water bars. Extreme care should be taken in driving over this portion of the route. At Chester, descent is made into the

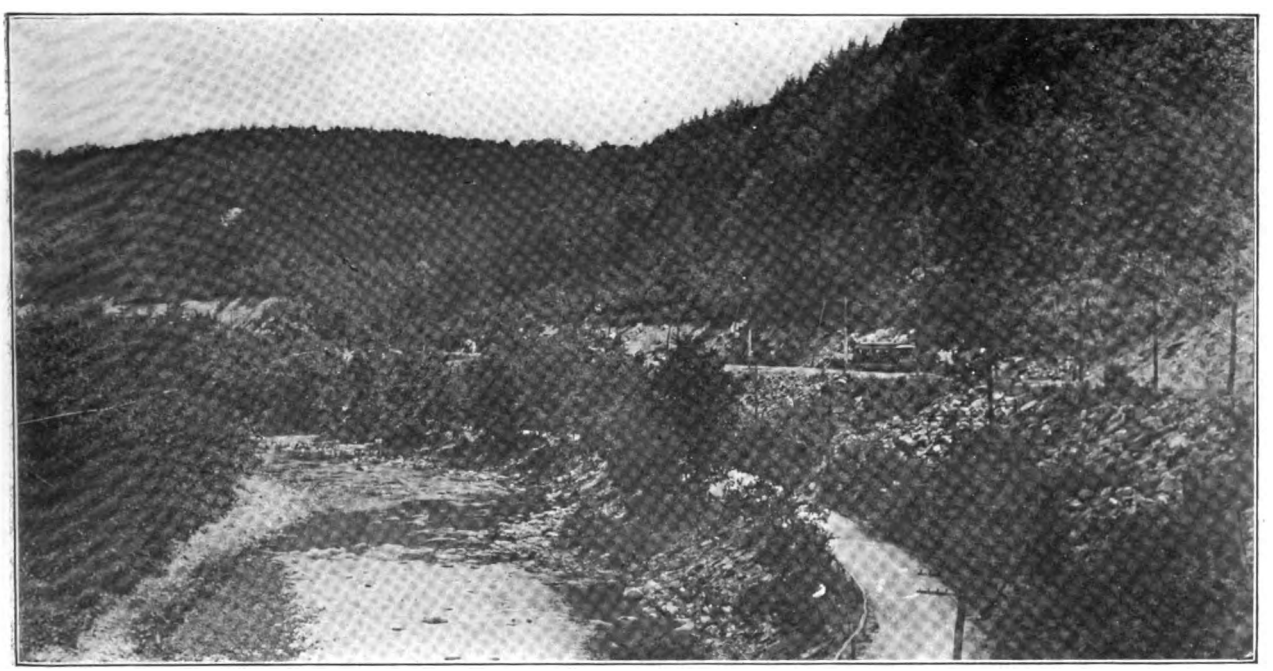


In the White Mountains of New Hampshire: At Left, Looking Toward Mt. Washington; at Right, Artist Falls Near North Conway.

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Connecticut valley at Bellows Falls and Brattleboro. The night stop is at Greenfield, the route being the same as that for Tour No. 15 at this point.

The third day gives the tourists some interesting country, over which it has not been thought possible to tour until recently. Road improvement has opened up this territory within the past few years and automobilists will do well to visit the country often. From Greenfield to Northampton the way leads along the west shore of the Connecticut river. Northampton is the seat of Smith College for girls, and there are some very interesting drives in its vicinity.



In the Naugatuck Valley, Above Waterbury, Conn., the Litchfield Foothills on Either Side.

On the way to Easthampton, seat of Williston Seminary for boys, Mt. Tom rears its head above at the left. Continuing through Southampton and Westfield the tourist approaches Southwick ponds, where is harvested a large portion of the ice supply for the city of New York. The Connecticut state line is crossed near these ponds, and just south of the line is Newgate prison, the first revolutionary prison in this country. The outlook from this point is doubly interesting not alone for its historic features, but because of the natural beauties.

Tour No. 14 is reached at Farmington and Vacation Tour No. 1 at Plainville, the latter of which may be followed back to Waterbury, but it is advisable to continue the present outline through Bristol, Terryville, Plymouth and Thomaston, the best known clock country in the world. The roads are excellent with exception of Plymouth hill, taking up the entire distance between the towns of Plymouth and Thomaston. The surface of this hill is macadam for the most part, but the grade is so steep and the railroad crossing at the foot so dangerous that extreme care must be taken. A detour is possible, going about by the Thomaston water works, and while it adds a few miles to the total itinerary the views are sufficient to repay for this.

The return to Waterbury from Thomaston is through the Naugatuck valley, with high hills on either side and some interesting glimpses of the river, if the season be not dry and the waters of the river nearly invisible in consequence.

TOUR NO. 21.

Waterbury, Conn.—Bennington, Vt.—Greenfield, Mass.—Waterbury.
Three Days, 316.7 Miles.

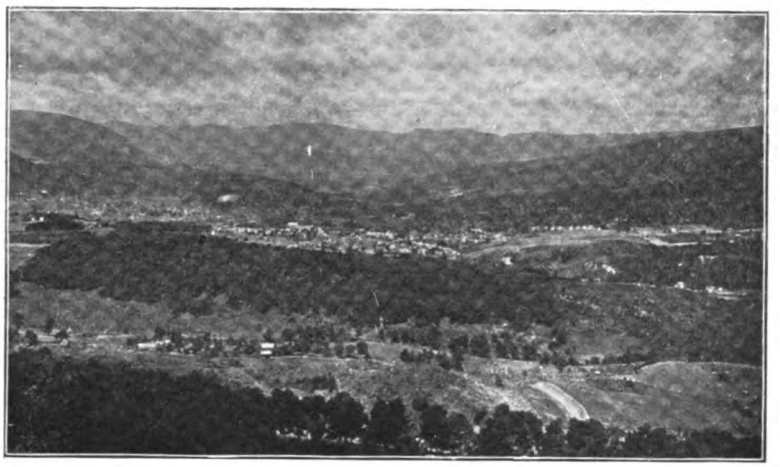
First Day, Waterbury to Bennington, Vt., 115.9 Miles.

Waterbury to	Miles to	Total Miles
Oakville	3.3	3.3
Watertown	2.6	5.9
East Morris	6.6	12.5
Litchfield	4.3	16.8
Goshen	6.4	23.2
South Norfolk	7.8	31.0
Norfolk	4.6	35.6
East Canaan	5.0	40.6
Canaan	2.4	43.0
Ashley Falls, Mass.	2.2	45.2
Sheffield	4.0	49.2
Great Barrington	6.1	55.3
Stockbridge	7.4	62.7
Lenox	6.0	68.7
Pittsfield	6.6	75.3
Lanesboro	5.3	80.6
Adams	10.3	90.9
North Adams	6.1	97.0
Williamstown	5.4	102.4
Pownal, Vt.	4.7	107.1
Pownal Centre	2.5	109.6
Bennington	6.3	115.9

Second Day, Bennington to Greenfield, Mass., 106.7 Miles.

Bennington to	Miles to	Total Miles
South Shaftsbury	5.4	5.4
Shaftsbury	4.8	10.2
Arlington	5.0	15.2
Manchester	8.1	23.3
Manchester Depot	1.8	25.1
Peru	9.6	34.7
Londonderry	4.9	39.6
Simonsville	7.4	47.0
Chester	6.5	53.5
Bellows Falls	9.1	62.6
Westminster	5.4	68.0
Putney	8.7	76.7
Brattleboro	9.8	86.5
Guilford	2.6	89.1
Bernardston, Mass.	11.0	100.1
Greenfield	6.6	106.7

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North Adams, Mass., as Seen from Florida Mountain.

Third Day, Greenfield to Waterbury, 94.1 Miles.

Greenfield to	Miles to	Total Miles
Deerfield	3.4	3.4
South Deerfield	5.1	8.5
Northampton	11.5	20.0
Easthampton	4.1	24.1
Southampton	4.8	28.9
Westfield	7.9	36.8
Southwick	5.2	42.0
Newgate, Conn.	6.2	48.2
Tariffville	5.0	53.2
Wheatogue	6.0	59.2
Avon	2.8	62.0
Farmington	6.3	68.3
Plainville	4.6	72.9
Forestville	2.1	75.0
Bristol	2.4	77.4
Terryville	3.9	81.3
Plymouth	2.2	83.5
Thomaston	1.0	84.5
Reynolds Bridge	2.0	86.5
Waterville	4.9	91.4
Waterbury	2.7	94.1

Southlands. Thence it skirts the western portion of the Franconia range, to Bethlehem, and from that point crosses the Presidential range to the eastern side, with night stops on the homeward trip at Poland Spring, Me., and Portsmouth, N. H.

The route selected is over ways not so well known to motorists, even in New England. For this reason, it is believed that it will be accepted as a most desirable alternative for the more extensively travelled White mountain tours. The location of the starting point is such that it may be reached readily from New York or the West.

Leaving Springfield the first day, the route lies along the Connecticut valley, through Chicopee and Holyoke, and thence over the hills to South Hadley, seat of Mt. Holyoke College for girls. Just before reaching the campus are the South Hadley falls, concerning the fantastic beauty and sublime majesty of which much has been written. The surroundings at the college are particularly pleasing, and the grove frequently is utilized as an outdoor stage, upon which to present Shakespearian plays and kindred productions.

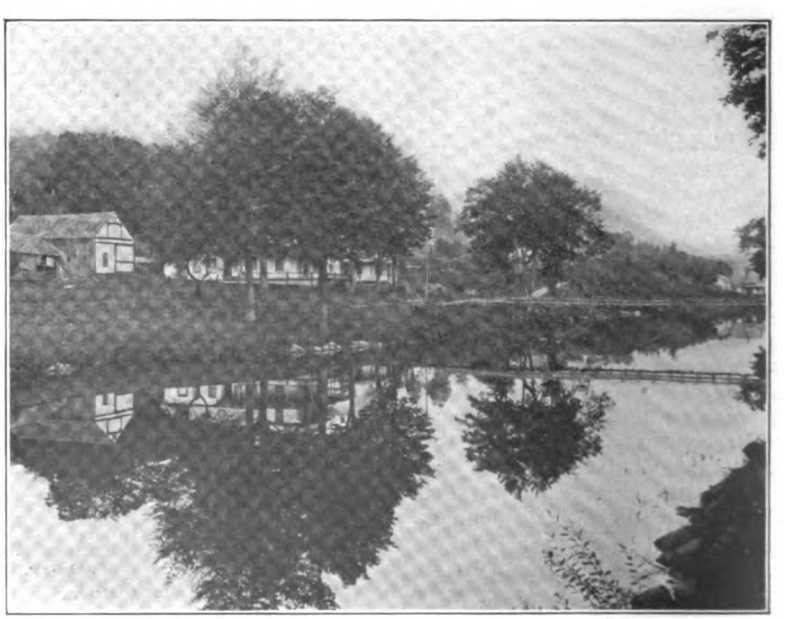
Just above Moody's Corner the road enters a narrow gorge between two mountains of the Holyoke range, and from this point to Amherst the views of Mt. Holyoke and Mt. Tom, on either side of the Connecticut river are particularly delightful. Several institutions of learning are passed during the day, including Amherst College at Amherst, Masachusetts Agricultural College at North Amherst, Moody's School for Girls at Northfield and Mt. Hermon School for Boys at East Northfield.

On the way to Hinsdale, N. H., a splendid outlook upon the new dam of the Connecticut River Company is afforded. The way then joins the better known route between Brattleboro, Vt., and Keene, N. H. Beyond Keene it turns toward Newport and the night stop is at Sunapee on the shores of the lake by that name.

TOUR NO. 22.

The great Appalachian system of mountains, extending from the Gaspe peninsular at the mouth of the St. Lawrence river in Canada to northern Alabama, possesses no more beautiful or awe inspiring group than that commonly known as the White mountains of New Hampshire. They fill the eye of the beholder throughout a stretch of country hundreds of miles in extent. The motorist may approach them from four different directions, and each time there is something new in their aspect.

In the itinerary outlined below, it is anticipated that the tourist will leave Springfield, Mass., and be occupied five days in visiting this region. The White mountain country is entered by way of Lake Sunapee, which may be regarded as one of the gateways to the



The Mirror in the River at South Londonderry, Vt.

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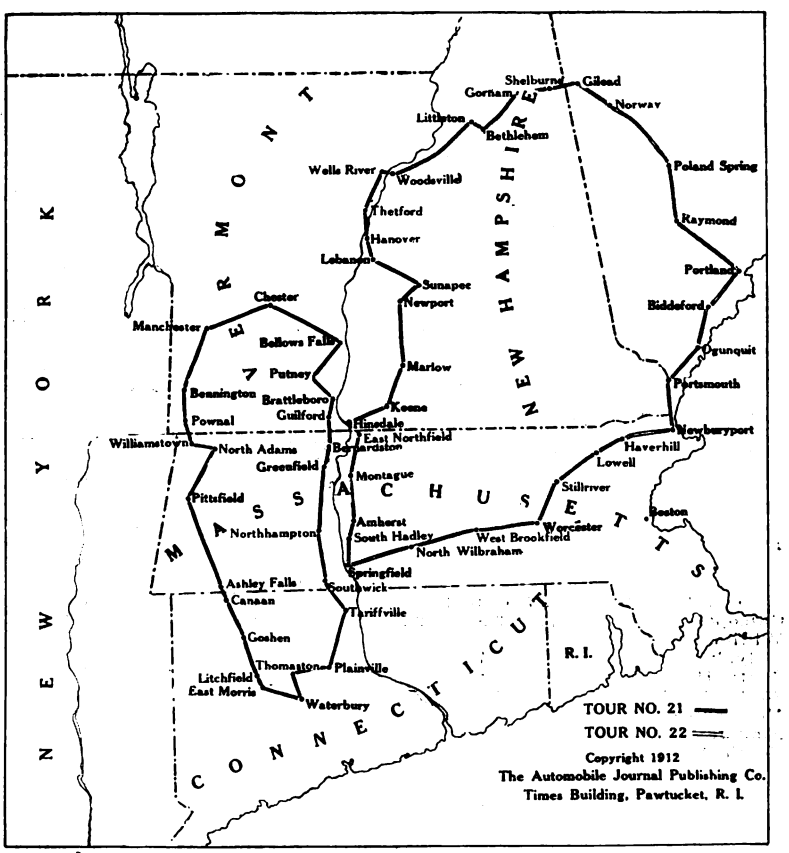
Several small mountains are in the vicinity of Newport, and there are any number of romantic glens along the Sugar river nearby. The new state highway begins at this point and is utilized into Hanover. Croydon is located near the mountain of that name. Splendid views follow each other with such rapidity as to bewilder the motorist. Lebanon is a small manufacturing village on an elevated plain near the falls of the Mascomy, while at West Lebanon is the Tilden Ladies' Seminary, whose fine buildings are seen on a commanding hill.

Hanover is the seat of Dartmouth College, founded in 1770 as a school for Indians, and which, at first, had 24 students, domiciled in huts built of green logs, situated in the midst of a vast wilderness. Distant views of Moosilauke and Bald mountains are obtained as the tourist approaches Thetford. North Thetford produces much copper ore, which is sent overland to Portsmouth, N. H., and thence to Baltimore by ship. Fairlee is a hilly town abounding in pretty lakes, one of which is nearly three miles long. Mt. Cuba and Mt. Sunday cast their reflections upon these waters. Cuba falls and the perpendicular cliffs of gray granite on Sawyer's mountain are worthy of notice. Near Bradford is Devil's Den on the side of Wright's mountain, where one Wright, who claimed to be a prophet, lived the life of a hermit in a dismal rocky cleft.

Crossing the Connecticut river from Wells River, Vt., to Woodsville, N. H., the tourist enters the White mountain region, the recurring grandeur of which he has been admiring throughout the day from a distance. Bath is a fine old farming village, with a picturesque glen. Lisbon is somewhat noted for its gold mining. Then comes Littleton on the far-viewing heights, from which splendid panoramic scenes of the Presidential and Franconia ranges may be had. Bethlehem, the night stop, is the summer capital of the entire region. The view of the White mountains is broader and in some respects more imposing here than that from any other point.

The third day takes the tourist through the very heart of the entire district. Those who desire, may obtain permission to ascend Mt. Washington from Randolph hill, where the view from the Tip-Top House is the most extensive in New England. River scenery combined with impressive mountain forms in the vicinity of Gorham is said to surpass all other districts from which the highest peaks are visible. The drive to Gilead, Me., is along the river with ever-changing pictures of the hills.

The broad intervales of the Androscoggin spread out in all



their fertility and fairness at Bethel, while splendid views of the mountains are still obtained from the surrounding hills. The tour then passes through a country well supplied with lakes and ponds, on the way to Norway and Welchville, and the night stop is at Poland Spring, a summering place much noted for the purity of its water, large quantities of which are exported to various countries.

The route from Poland Spring to Portland is somewhat longer than that usually followed, giving opportunity for a visit in the vicinity of Lake Sebago, 14 miles long and 11 wide. Picturesque contrasts of farm and forest, granite ledge and intervale, make this a delightful trip. From Portland to Portsmouth, the way is over the accepted trunk line from Boston and is almost too well known by motorists to need extended comment.

After spending the night at Portsmouth the tourist finds a long day's drive ahead of him before reaching Springfield. The roads are of macadam for the most part, and it is anticipated that little difficulty will be found in making the mileage indicated. The trunk line, above mentioned, is followed into Newburyport, Mass.

Haverhill, Lawrence and Lowell are all large manufacturing cities, each with its special individuality. Thus, Haverhill is built on hills which slope toward the Merrimac, navigable to this point. Lawrence is considered the most beautiful factory city in New England. Lowell is located at Pawtucket Falls, a favorite fishing place of the Indians, and is somewhat well

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Campus at Mt. Holyoke College.

Lake Sunapee and the Southlands.

known to motorists, because of the road races formerly held there.

Harvard is a picturesque farming town and Clinton is noted for its Brussels and Wilton carpets. Wachusett mountain and lake are passed just before reaching Worcester, and from this point the way is over the main trunk line between Boston and Springfield.

TOUR NO. 22.

Springfield, Mass.—Sunapee, N. H.—Bethlehem, N. H.—Poland Spring, Me.—Portsmouth, N. H.—Springfield.

Five Days, 565.5 Miles.

First Day, Springfield to Sunapee, N. H., 113.6 Miles.

Springfield to	Miles to	Total Miles
Chicopee	3.9	3.9
Willimanset	3.8	7.7
Holyoke	0.5	8.2
South Hadley Falls	1.4	9.6
South Hadley	3.1	12.7
Moody's Corner	0.8	13.5
Amherst	8.4	21.9
North Amherst	2.6	24.5
Montague	9.4	33.9
Lake Pleasant	0.8	34.7
Miller's Falls	3.4	38.1
Northfield	9.0	47.1
East Northfield	0.6	47.7
Hinsdale, N. H.	6.5	54.2
Ashuelot	2.4	56.6
Winchester	3.5	60.1
Westport	5.3	65.4
West Swanzey	2.4	67.8
Keene	5.3	73.1
Gilsum	8.1	81.2
Marlboro	7.1	88.3
East Lempster	8.9	97.2
Mill Village	6.1	103.3
Newport	4.7	108.0
Guild	2.4	110.4
Sunapee	3.2	113.6

Second Day, Sunapee to Bethlehem, N. H., 103.6 Miles.

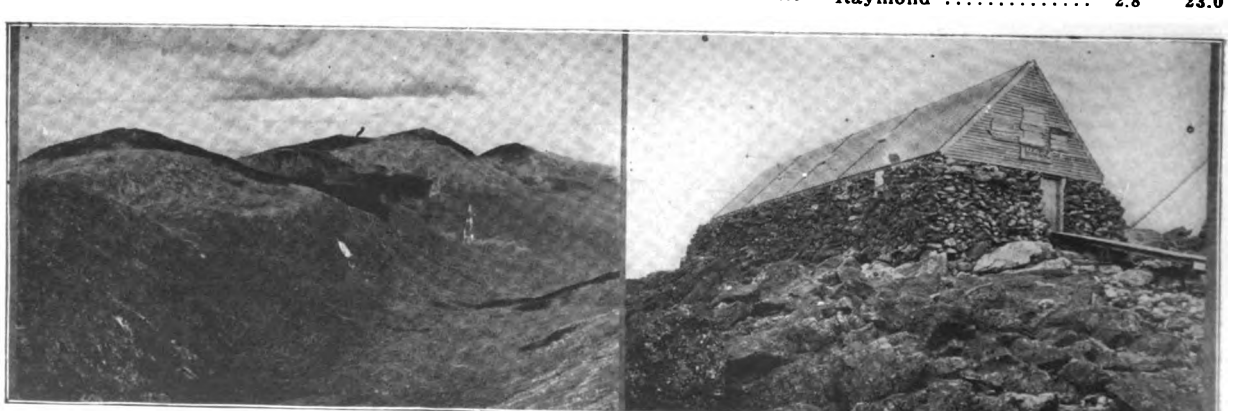
Sunapee to	Miles to	Total Miles
Guild	3.2	3.2
Newport	2.4	5.6
Croydon Flats	3.7	9.3
Croydon	3.5	12.8
Grantham	3.3	16.1
Lebanon	14.2	30.3
West Lebanon	3.8	34.1
Hanover	3,9	38.0
Thetford, Vt.	9.5	47.5
North Thetford	2.3	49.8
Ely	2.7	52.5
Fairlee	2.9	55.4
Bradford	6.5	61.9
Newbury	7.4	69.3
Wells River	4.9	74.2
Woodsville, N. H.	0.6	74.8
Bath	5.5	80.3
Lisbon	5.7	86.0
Sugar Hill	2.1	88.1
North Lisbon	3,4	91.5
South Littleton	1.7	93.2
Littleton	5.4	98.6
Bethlehem	5.0	103.6

Third Day, Bethlehem to Poland Spring, Me., 95.4 Miles.

Bethlehem to	Miles to	Total Miles
Maplewood	1.3	1.3
Bethlehem Junction ...	3.9	5.2
Twin Mountain House..	3.1	8.3
Cherry Mountain	8.8	17.1
Highlands	3.3	20.4
Randolph	7.3	27.7
Gorham	6.6	34.3
Shelburne	6.0	40.3
Gilead, Me.....	6.0	46.3
West Bethel	6.1	52.4
Bethel	3.8	56.2
Lockes Mills	4.9	61.1
South Pond	2.0	63.1
Twitchell Pond	1.5	64.6
Norway Lake	12.7	77.3
Norway	1.7	79.0
Welchville	7.2	86.2
Poland Village	6.2	92.4
Poland Spring	3.0	95.4

Fourth Day, Poland Spring to Portsmouth, N. H., 102 Miles.

Poland Spring to	Miles to	Total Miles
Summit Spring	3.2	3.2
Welch Hill	3.6	6.8
Cooks Mills	6.9	13.7
South Casco	6.5	20.2
Raymond	2.8	23.0



Tuckerman Ravine in White Mountains.

Tip-Top House on Mt. Washington.

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North Windham	5.3	28.3
Morrill's Corner	12.8	41.1
Woodfords	1.1	42.2
Portland	3.1	45.3
Scarboro	6.3	51.6
Dunstan's Corner	3.1	54.7
Saco	5.6	60.3
Biddeford	1.0	61.3
Kennebunkport	10.5	71.8
Wells	6.3	78.1
Moody	2.4	80.5
Ogunquit	2.9	83.4
York Beach	6.3	89.7
York Harbor	3.0	92.7
York Village	0.5	93.2
York Corners	0.8	94.0
Kittery	7.1	101.1
Portsmouth, N. H.	0.9	102.0

Fifth Day, Portsmouth to Springfield, 150.9 Miles.

Portsmouth to	Miles to	Total Miles
Rye Center	5.6	5.6
Rye Beach	2.6	8.2
Hampton Beach	6.5	14.7
Eaton's Corners	4.1	18.8
Salisbury	2.9	21.7
Newburyport, Mass.	2.6	24.3
Amesbury	5.2	29.5
Merrimac	4.5	34.0
Haverhill	6.0	40.0
Lawrence	9.4	49.4
Lowell	10.2	59.6
Chelmsford	3.9	63.5
East Littleton	6.4	69.9
Littleton Common	1.1	71.0
Littleton Center	0.7	71.7
Harvard	6.6	78.3
Still River	2.0	80.3
Clinton	6.8	87.1
Boylston	5.8	92.9
Worcester	7.5	100.4
Cherry Valley	4.2	104.6
Leicester	1.8	106.4
Spencer	5.0	111.4
Brookfield	6.8	118.2
West Brookfield	2.8	121.0
Warren	3.4	124.4
Palmer	11.4	135.8
North Wilbraham	5.3	141.1
Springfield	9.8	150.9

TOUR NO. 23.

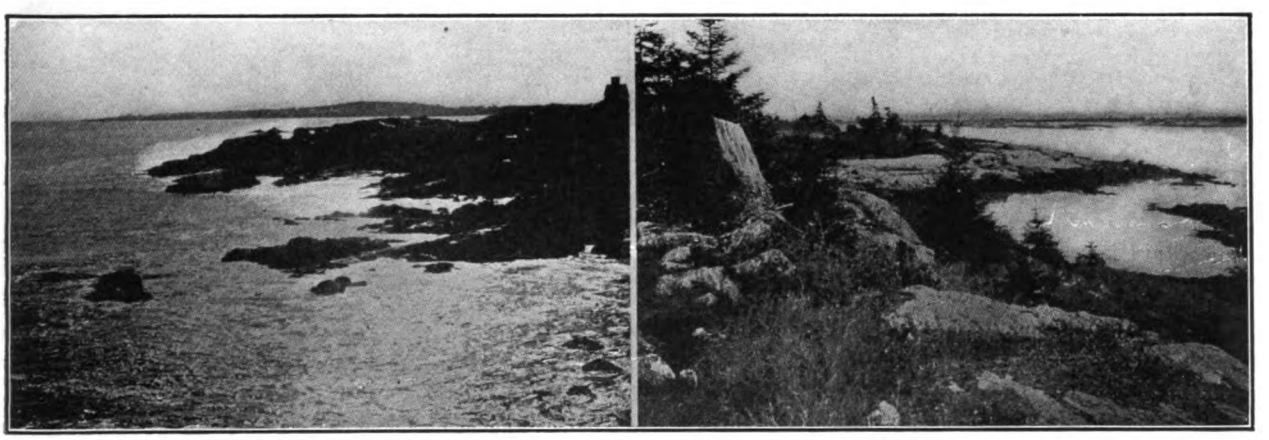
Tour No. 23 crosses Rhode Island in a diagonal direction, leading into Thompson, Conn., the Elysian Fields of the Nipmuck Indians and the reputed home of the Great Spirit. Beyond, on the way to Webster, Mass., is Lake Chabonakongkomon, which also is known as Chargoggagoggmanchoggagogg, an island strewn pond which is pretty enough to warrant an even better name.

After crossing the line into Massachusetts the tourist finds good macadam all the way to Springfield and beyond. At Westfield and Woronoco, a detour may be made to visit the Little River water works of the city of Springfield, the dam for which is located in a gorge. From this dam the water flows through a tunnel nearly a mile long to the filter beds near the road at Little River.

The road to Huntington is most picturesque and beyond that point the hills about Goshen and Williamsburg are to be found numerous rare minerals, although not in sufficient quantities to warrant extensive working.

Reaching Northampton, by the way of Haydenville and Florence, the road leads down the west bank of the Connecticut, passing Smith's Ferry, from which point it is possible to visit Mt. Holyoke. While Mt. Tom railroad station is reached before Smith's Ferry, the mountain itself is not passed until later. The view of the Connecticut at this point is unexcelled.

Holyoke is the Paper City and numerous paper mills are to be seen in connection with many handsome buildings. Still continuing on the west bank of the river, Springfield is entered over the North End bridge, crossed on the outward route. Going through the city to the South End bridge, the way leads into Connecticut at Suffield, a pretty little town in the midst of an extensive tobacco growing country. The road to Hartford, the night stop, is through Windsor Locks and Windsor, still on the west side of the river.



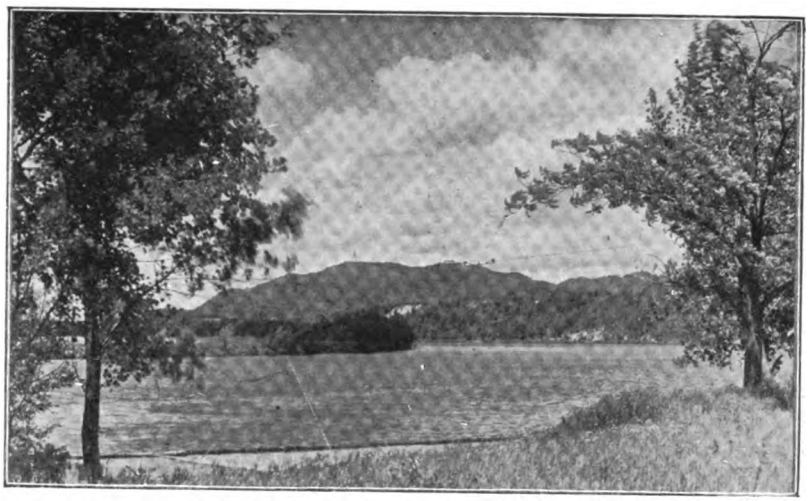
Shore at Cliff Island, Casco Bay, Me. **Sunrise at Cape Elizabeth, Portland Harbor.**

On the way from Hartford to Willimantic the tour enters Bolton Notch, a romantic pass from the Connecticut valley. A little later the smaller towns of eastern Connecticut are reached, and the journey from Chepachet to Providence is over the same itinerary as at the start. This tour may be utilized by Rhode Island people in connecting with Transcontinental Tour A at Albany.

Lee is best known because of its excellent white marble. Laurel lake is a pretty sheet of water about a mile north of the town. Then follows Lenox, with its beautiful wealthy estates, on the way to Pittsfield, the night stop.

Dalton is in the midst of the country noted for its Saxony and Merino sheep. Hinsdale offers some especially fine mountain views, and the hills of Peru are to be seen on the east. Cummington is another of the hill towns, noted for its grazing and dairies. In the Berkshire hills are crossed, Becket being the highest altitude. Jacob's Ladder no longer has terrors for the motorist, the old time road having been replaced with a fine macadam stretch. Several interesting lakes are located within the town of Becket.

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Mt. Holyoke, Across the Connecticut from Smith's Ferry.

TOUR NO. 23.

Providence, R. I.—Pittsfield, Mass.—Hartford, Conn.—Providence.

Three Days, 307.7 Miles.

First Day, Providence to Pittsfield, Mass., 137.6 Miles.

Providence to	Miles to	Total Miles
Centerdale	4.9	4.9
Greenville	3.5	8.4
Harmony	2.5	10.9
Chepachet	4.5	15.4
Thompson, Conn.	13.2	28.6
Brandy Hill	1.5	30.1
Webster, Mass.	6.2	36.3
Quinebaug	4.7	41.0
Southbridge	4.8	45.8
Sturbridge	3.9	49.7
East Brimfield	3.9	53.6
Brimfield	3.6	57.2
Palmer	8.1	65.3
North Wilbraham	5.3	70.6
Springfield	9.8	80.4
West Springfield	2.2	82.6
Westfield	7.4	90.0
Woronoco	5.6	95.6
Huntington	6.7	102.3
Chester	6.9	109.2
Bonnyrigg Four Corners	4.3	113.5
Becket Center	3.1	116.6
West Becket	2.2	118.8
East Lee	5.8	124.6
Lee	2.4	127.0
Lenox	4.0	131.0
Pittsfield	6.6	137.6

Second Day, Pittsfield to Hartford, Conn., 88.5 Miles.

Pittsfield to	Miles to	Total Miles
Dalton	6.0	6.0
Hinsdale	3.4	9.4
East Windsor	9.1	18.5
West Cummington	1.7	20.2
Cummington	5.1	25.3
Swift River	2.8	28.1
Lithia	1.8	29.9
Goshen	2.3	32.2
Williamsburg	5.6	37.8
Haydenville	1.8	39.6
Florence	3.1	42.7
Northampton	2.8	45.5
Mt. Tom	2.4	47.9
Smith's Ferry	2.2	50.1
Holyoke	3.8	53.9
Ingleside	1.1	55.0
Springfield	7.5	62.5
Suffield, Conn.	10.4	72.9
Windsor Locks	3.5	76.4
Windsor	5.6	82.0
Hartford	6.5	88.5

Third Day, Hartford, Conn., to Providence, 81.6 Miles.

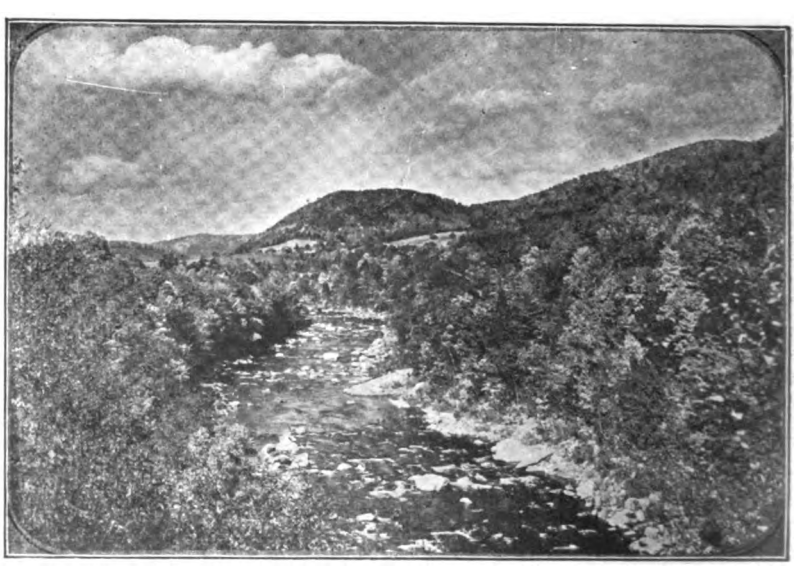
Hartford to	Miles to	Total Miles
East Hartford	1.9	1.9
Burnside	2.1	4.0
Manchester Center	4.7	8.7
Manchester Green	1.5	10.2
Bolton Notch	2.7	12.9
North Coventry	7.1	20.0
South Coventry	1.5	21.5
Willimantic	6.3	27.8
North Windham	4.5	32.3
Clark's Corners	4.1	36.4
Hampton	2.1	38.5
Brooklyn	6.1	44.6
Danielson	3.8	48.4
Elmville	2.7	51.1
Attawangan	1.8	52.9
Ballouville	1.2	54.1
Chepachet	12.1	66.2
Harmony	4.5	70.7
Greenville	2.5	73.2
Centerdale	3.5	76.7
Providence	4.9	81.6

TOUR NO. 24.

Famed as are the mountains, lakes and rivers of New England, it must not be denied there are numerous vacation spots in these states that are not so well known as their beauty would warrant. The same will hold true with respect to Long Island. And while this latter ground is more or less familiar to tourists from New York City, there are many motorists who have never taken the time to explore its resources.

In the accompanying itinerary, it is anticipated that three days will be devoted among the lesser known portions of this section. The start is made from Hartford, Conn., and the tour first reaches the Litchfield hills, and crosses Long Island sound for a day on the island itself, before returning to the capital of the Nutmeg State over ways perhaps somewhat better known.

Leaving Hartford, Farmington is the first interesting place reached. The town occupies a beautiful situation on the banks of the river of the same name. A broad and shaded street two miles



Deerfield River in the Vicinity of Shelburne, Mass.

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long, practically composes the village. It was settled in 1640, and it was here that the village pastor preached to the Continental army on its march to Boston in 1775.

Plainville, with its macadam ways, Forestville, and Bristol follow in quick succession. The tourist is now in the centre of the original clock making industry in America. Eli Terry began the manufacture of these goods in a small shop in Terryville, but the business very soon spread to Bristol and Thomaston, both of which have been producing clocks for many years. Just before reaching the latter town, the route leads down a very steep hill, practically one mile long, although a detour may be taken if deemed advisable.

Northfield is a knife making centre, much of the cutlery being hand forged; the material is imported steel from Sheffield, Eng., whence many of the employees came. The road from this point to Litchfield is nearly all upgrade, and as the hills are climbed new scenes unfold themselves in rapid succession, and while the so-called mountains are small of stature the car finds much less difficulty in making the grades than would be the case in other portions of the chain.

Litchfield occupies an interesting place in history. The first law school in America was opened in a small building which is shown visitors with justifiable pride. During the summer months, the hill top is the favorite home for many New York people, and Bantam lake, only a few miles distant, and distinctly visible from many points, lends an added charm.

This lake is passed on the way to Bantam and New Preston. Just beyond the former town the road takes a dip between two high hills, one of which is known locally as Mt. Tom. New Preston commands a pleasing view of the surrounding country and easily explains the attractiveness of the section. Here, time should be taken to drive about Lake Warramaug, a splendid boulevard making this possible without difficulty.

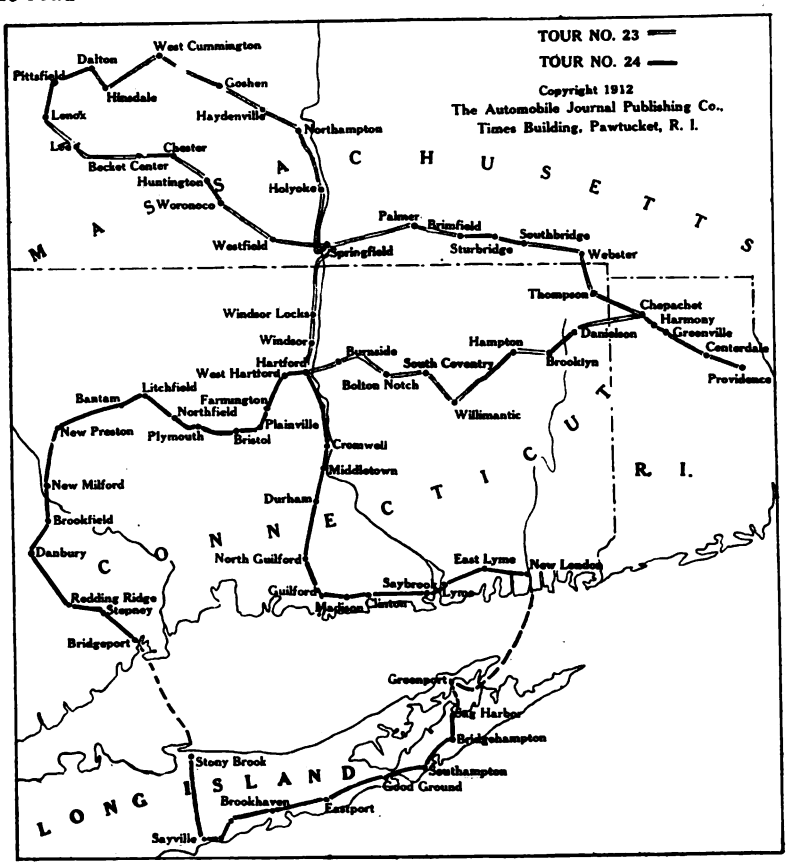
New Milford is near the junction of the Housatonic and Aspetuck rivers, with a wide verdant park and well shaded trees. Nearby is a silver mine, which was worked prior to 1790, and the town is one of the centres of the tobacco trade in the valley. The way then leads along the Housatonic to Brookfield and beyond, and finally reaches Danbury, the home of the hat industry.

From this point to Bridgeport the road is most direct. Stop may be made to visit Putnam Park, established in memory of Israel Putnam. If desired the boat across the sound may be taken in the evening. The ferry is operated only twice daily, at 1:30 and 6:30 in the afternoon. Should the tourist elect to remain over night in the Park city, abundant opportunity may be had to explore the vicinity before taking the first boat to Port Jefferson on the following day.

The harbor at the latter place is conceded to be one of the most beautiful on the sound. The town is built up on terraces, which extend back from the water's edge in pleasing array, the many hued trees lending their charm to the situation.

The second day soon finds the tourist at St. James, in which is located the summer estate of Mayor William J. Gaynor of New York City, Deepwells. A drive through pretty woodland leads to an arm of Lake Ronkonkoma, the terminus of the Long Island Motor Parkway. About this lake are numerous little coves and streams which form a perfect outline of a pair of spectacles. The lake itself has baffled government geologists in their efforts to learn why this body of fresh water should have a tide which rises and falls every seven years. It has no direct connection with the sound, the ocean or any other tidewater, and its actual depth is not known.

Then comes Bread and Cheese hollow and the headwaters of the Nissequogue river, the happy hunt-



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Interesting Connecticut Touring Ground: At Left, Among the Litchfield Foothills; Centre, Washington Street, Hartford; at Right, in the Naugatuck Valley Near Thomaston.

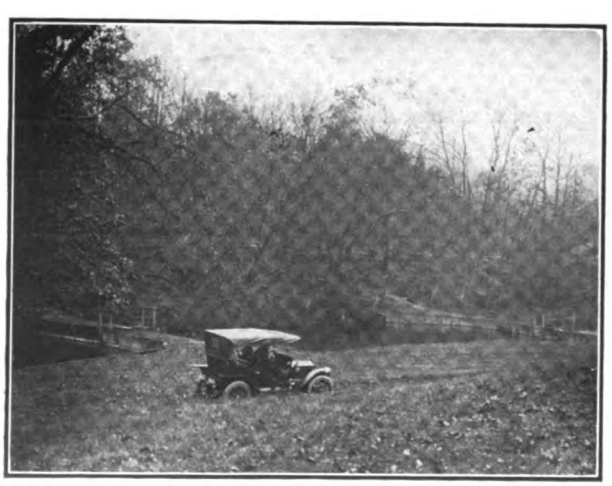
ing grounds of the Long Island Indians. And finally the motorist finds himself on the opposite shore of the island at Bayport. The way turns eastward along this shore to Sag Harbor and Greenport. Boats leave Sag Harbor for New London at 6 in the morning, at 12:30 in the afternoon, and Greenport at 6:30 and 1:40. The tourist has the option of remaining on the island or crossing to the mainland, depending largely upon the time he arrives at these places.

The third day leaves New London behind to enjoy the beauties of the Connecticut shore. The route is over the main line to New York for some distance, crossing the Connecticut river on the new bridge between Lyme and Saybrook. Of course, the return to Hartford may begin at Saybrook, following the better known Connecticut valley road, but it is anticipated that the trip will be undertaken for the purpose of exploration, and the itinerary as outlined from Guilford will be found fully as enjoyable.

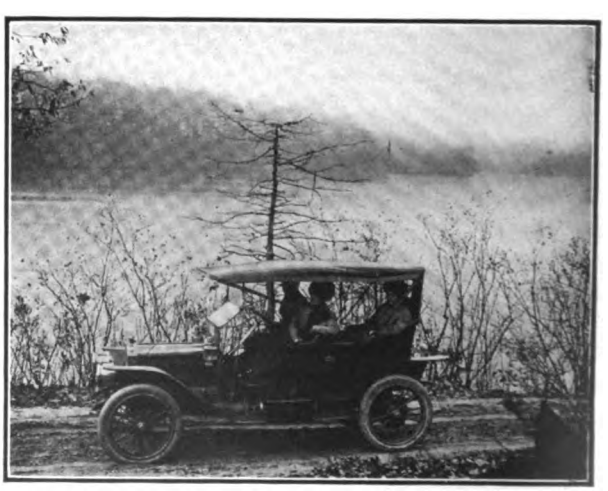
Lyme is a venerable hamlet, half-buried in foliage, its Main street lined with old trees and historic mansions, among the latter being Black Hall, the homestead of the patrician Griswolds. Westbrook and Clinton, are two quiet towns on the shore, much frequented by summer people, because of the absence of the trolley and other disturbing seaside factors. Madison is almost equally known in this respect.

Guilford was settled in 1639 by four immigrants from Kent and Surrey, England, its former Indian name being Menuncatuck. During the extermination of the Pequots by the Mohegans, a few years previous to this time, the sachem, Uncas had his headquarters at this point and numerous battles were fought in this vicinity. In 1781 the regicides were hidden in an old house, which still stands. Three frigates landed a force which marched through the streets during this period, but the rapidly gathering militia drove them off, before the fugitives were located.

North Guilford is somewhat isolated from the surrounding country and offers abundant opportunity to witness the quaint and beautiful. The sound may be seen at intervals, but the motorist's attention is much more likely to be



The Happy Hunting Grounds in Nissequogue Valley, on Long Island.



Skirting One of the Little Ponds in the Vicinity of Lake Ronkonkoma.

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taken up by the interesting bits of woodland scenery, which continue through Bluff Head, from which point pleasing outlooks upon the Connecticut river begin to come into view.

After reaching Middletown, the road follows this river through Cromwell, Rocky Hill and Wethersfield. This is a favorite drive for Hartford motorists and is almost too well known to need comment. Rocky Hill is so named because of its trap rock and sandstone ledges, and commands an interesting view of the river toward the north, clear weather making it possible to discern the outlines of Mts. Tom and Holyoke in Massachusetts, leagues away.

Redding Ridge	6.5	78.6
Stepney	6.8	85.4
Bridgeport	8.7	94.1

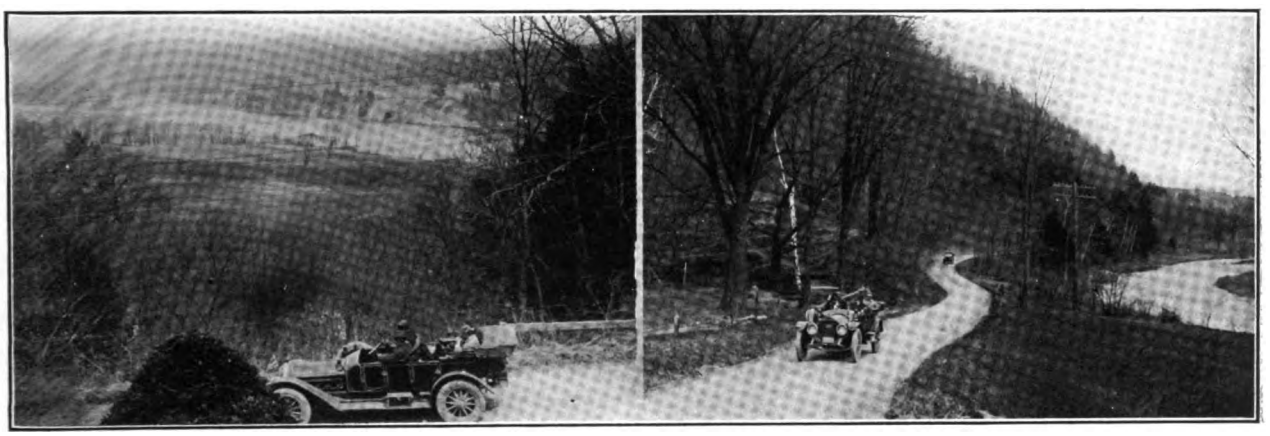
Second Day, Bridgeport to Greenport, L. I., 87.8 Miles.

Bridgeport to (Ferry to Port Jefferson, L. I.)	Miles to	Total Miles
East Satauket	1.8	1.8
Stony Brook	3.5	5.3
St. James	2.3	7.6
Nesconsett	4.9	12.5
Sayville	9.4	21.9
Bayport	1.5	23.4
Blue Point	1.7	25.1
Patchogue	1.8	26.9
Belleport	4.3	31.2
Brookhaven	2.1	33.3
Moriches	5.7	39.0
Center Moriches	2.2	41.2
Eastport	4.4	45.6
West Hampton Beach	5.4	51.0
Quogue	3.1	54.1
Good Ground	7.1	61.2

TOUR NO. 31.

Tour No. 31 opens up country, which until very recently was little frequented by motorists. It is outlined to occupy three days with night stops at Moosehead and Rangeley lakes. The starting point is Portland. The territory covered is largely in the Maine woods, but over roads which have been put in excellent condition within the past year. That portion of the tour lying between Portland and Moosehead lake has been constructed for the particular use of motorists, and a splendid new garage has been erected at Greenville Junction, where the steamer meets the tourist for the journey to Mt. Kineo. This tour connects with Tour No. 12 at Augusta and Vacation Tour No. 1 at Newport. By following the latter to Bangor, it is possible to connect with Tour No. 32, for New Brunswick points.

Moosehead lake is famed in prose and poetry for its immense size and scenic loveliness. It is the largest and best fishing ground in America. Deer and moose abound in great numbers. The lake itself is 40 miles long and from two to 18 miles wide. It contains many bays and beautiful islands which add to the charm and fascination of the scenery. The surrounding hills are lofty and covered with deep forests, while here and there a mountain towers above the green of the level woods, the whole forming a rare panorama of which the eye never tires. Grandest of all these is the



Two Pleasing Views in Vermont: At Left, in the Picturesque Connecticut Valley; at Right, Among the Foothills of Green Mountains.

TOUR NO. 24.

Hartford, Conn.—Bridgeport, Conn. —Greenport, L. I.—Hartford.

Three Days, 251.9 Miles.

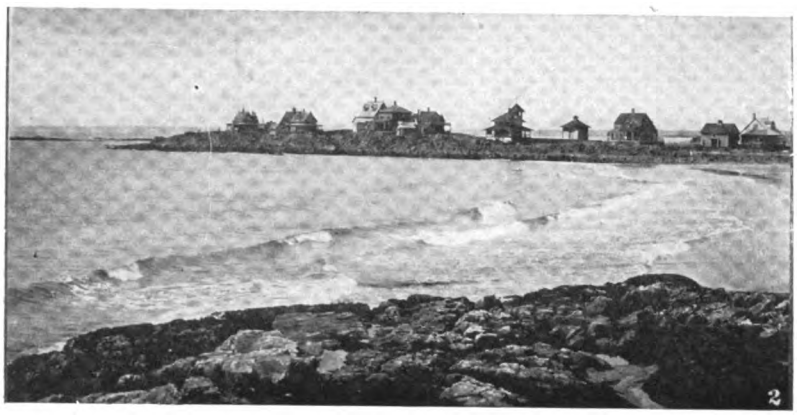
First Day, Hartford to Bridgeport, Conn., 94.1 Miles.

Hartford to	Miles to	Total Miles
West Hartford	3.7	3.7
Farmington	5.5	9.2
Plainville	4.6	13.8
Forestville	2.1	15.9
Bristol	2.4	18.3
Terryville	3.9	22.2
Plymouth	2.2	24.4
Thomaston	1.0	25.4
Northfield	2.7	28.1
Litchfield	6.0	34.1
Bantam	4.1	38.2
New Preston	8.1	46.3
Northville	3.3	49.6
New Milford	4.3	53.9
Still River	2.8	56.7
Brookfield	5.0	61.7
Danbury	7.3	69.0
Bethel	3.1	72.1
Southampton	6.1	67.3
Bridgehampton	7.7	75.0
Sag Harbor	5.3	80.3
Shelter Ferry	5.1	85.4
Greenport Ferry	2.4	87.6

Third Day, Greenport to Hartford, 70 Miles.

Greenport to (Ferry to New London, Conn.)	Miles to	Total Miles
East Lyme	7.1	7.1
Lyme	8.6	15.7
Saybrook	3.9	19.6
Westbrook	4.1	23.7
Clinton	4.7	28.4
Madison	0.7	29.1
Guilford	4.9	34.0
North Guilford	5.5	39.5
Bluff Head	4.1	43.6
Durham	4.6	48.2
Middletown	6.3	54.5
Cromwell	2.6	57.1
Rocky Hill	4.9	62.0
Wethersfield	3.8	65.8
Hartford	4.2	70.0

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One of the Pleasing Bathing Beaches at Kennebunkport, Me.

famous Mt. Kineo, whose precipitous face looms up nearly 1000 feet above the surface of the lake, and whose western slope runs off into a level, green-clad peninsula.

The route from Moosehead to Rangeley is through the Maine woods practically all of the way. The Rangeley lakes are five in number, and have a total area of about 90 square miles. All are interconnected by narrows and streams, making a continuous waterway of 56 miles. The Rangeleys are the source of the Androscoggin, which has its rise in Lake Umbagog, and emerges from the forest to find its way to the sea after turning scores of mill wheels on the way.

The farthest east is Lake Oquossoc, conceded to be the gem of the entire chain and most often referred to as Rangeley. Its elevation is 2000 feet above sea level. Across the outlet is Bald Head, a mountain easy to climb, and an ideal spot from which to watch the sunrise. Mooselucmaguntic is the largest of the five. Separated but slightly from this, and really a portion of the big lake, is Lake Cupsuptic. Then comes Molechunkamunk and Wolokennebacook. The waters of all these lakes is as clear as crystal and so large are the fish taken from them, it is an unwritten law that trout of less than three pounds shall be returned to their native element.

The return to Portland, the third day is over a portion of the route covered in entering the Rangeley lake region, thence southward through South Paris, Mechanics Falls, Lewiston, Auburn and Poland Spring. It is assumed that the tourist taking advantage of this tour will be most interested in the lakes and woods, although Poland Spring is a resort, which is much frequented in summer. It has many fine views of the White mountains as well as of the Maine woods, and the spring is famed the world over for the purity of its water.

TOUR NO. 31.

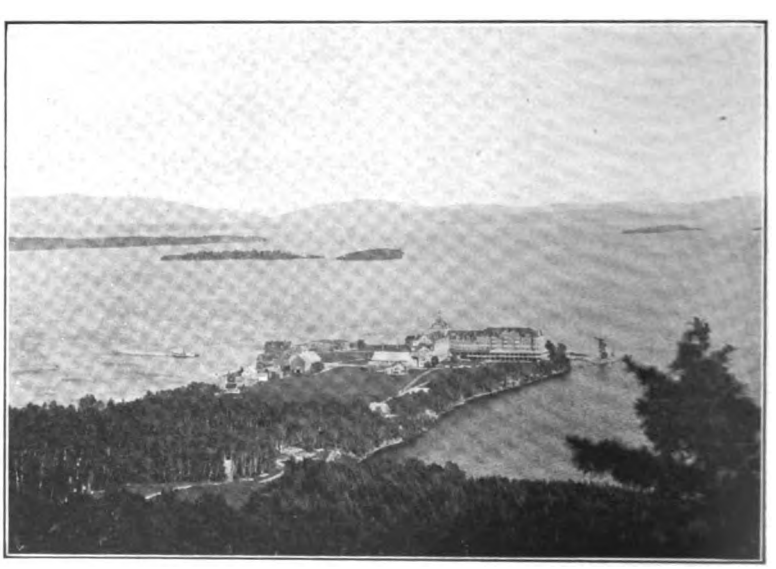
Portland, Me.—Moosehead Lake, Me.—Rangeley Lakes, Me.—Portland. Three Days, 460.2 Miles.

First Day, Portland to Moosehead Lake, Me., 164.2 Miles.

Portland to	Miles to	Total Miles
Falmouth Foreside	6.1	6.1
Cumberland	2.8	8.9
Yarmouth	2.8	11.7
Freeport	5.9	17.6
Hillside	4.9	22.5
Brunswick	3.9	26.4
Topsham	1.8	28.2
Bowdoinham	6.8	35.0
East Bowdoinham	3.8	38.8
Richmond	4.4	43.2
Gardiner	11.3	54.5
Farmingdale	1.5	56.0
Hallowell	3.0	59.0
Augusta	2.0	61.0
Vassalboro	11.9	72.9
Winslow	6.6	79.5
Waterville	0.9	80.4
Benton Station	0.6	81.0
Benton	1.8	82.8
Clinton	4.4	87.2
Burnham Junction	5.5	92.7
Pittsfield	7.5	100.2
Newport	7.3	107.5
Corinna	6.6	114.1
Dexter	8.4	122.5
Hazelton Corners	4.2	126.7
Silver Mills	1.0	127.7
Sangerville	8.4	136.1
Guilford	1.4	137.5
Abbott	5.3	142.8
Monson Junction	0.5	143.3
Monson	5.4	148.7
Shirley Corner	6.4	155.1
Greenville	7.7	162.8
Greenville Junction.....	1.4	164.2

Second Day, Moosehead Lake to Rangeley Lakes, 149.7 Miles.

Greenville Junction to	Miles to	Total Miles
Newport	56.7	56.7
Palmyra	4.1	60.8
Canaan	11.8	72.6
Skowhegan	8.9	81.5
East Mercer	10.8	92.3
Mercer	2.6	94.9
New Sharon	7.6	102.5
Farmington Falls	4.1	106.6
Farmington	4.7	111.3
Fairbanks	2.5	113.8
Strong	8.5	122.3
Phillips	7.0	129 3
Madrid	4.5	133.8
Rangeley	15.9	149.7



View of the Moosehead Lake from the Base of Mt. Kineo.

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Third Day, Rangeley to Portland, 146.3 Miles.

Rangeley to	Miles to	Total Miles
Madrid	15.9	15.9
Webb	14.6	30.5
Weld	3.0	33.5
Dixfield	12.4	45.9
Mexico	4.8	50.7
Rumford Falls	1.2	51.9
North Woodstock	12.6	64.5
South Paris	14.7	79.2
Mechanics Falls	13.0	92.2
Lewiston	10.7	102.9
Auburn	0.4	103.3
Minot	5.5	108.8
Hacketts Mills	0.9	109.7
Poland Corner	4.3	114.0
Poland Spring	1.8	115.8
Shaker Village	5.2	121.0
Dry Mills	5.0	126.0
Gray	2.6	128.6
West Falmouth	9.9	138.5
Allen's Corner	3.2	141.7
Deering Junction	0.9	142.6
Deering	0.8	143.4
Brighton Corners	0.5	143.9
Bradleys Corners	0.6	144.5
Portland	1.8	146.3

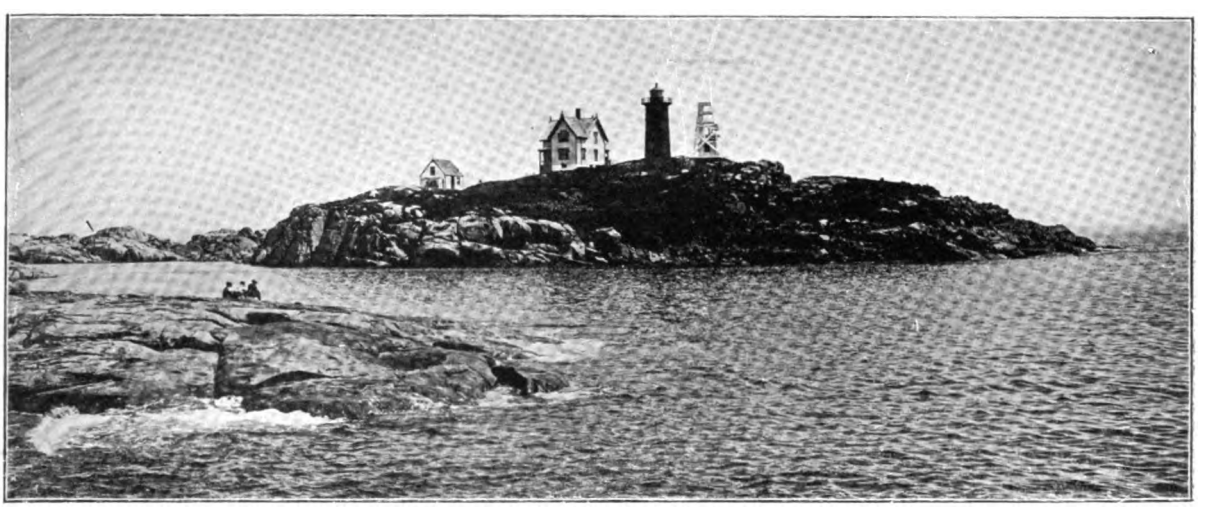
bile is sufficient indication that it can be travelled again, but its use is by no means advised except for the very excellent views to be had thereon.

At Ellsworth, on the first day's run, connection may be made with Mt. Desert Isle and Bar Harbor. As automobiles are restricted at this famous resort, it will be necessary to make inquiries before proceeding on this portion of the tour. A splendid view of the isle and the mountain thereon are to be obtained from this point.

Continuing on the direct route to Mt. Desert Isle the tour passes Franklin pond, a large sheet of water which empties into Frenchman's bay at Hancock. The way is along the eastern coast of Maine, with its many indentations, and consequent fine marine views, of the oldest Masonic lodge rooms in the country, the lodge having been instituted Sept. 10, 1778.

Marion is in the heart of a splendid partridge country. Deer are also plentiful in this section. Dennysville is a picturesque country village, on the shore of the Dennys river, which flows between high banks wooded with evergreens and through deep gorges with rocky sides.

Calais, the night stop, is well known as the border town. The people of Calais and those of St. Stephen, across the river in New Brunswick, always have lived on the most fraternal terms. They formed and kept a compact not to engage in the war of 1812. It is possible to make this region the basis for an extended stay in eastern Maine, visiting the Grand



Cape Neddick Light and the Nubble, a Notable Marine Scene Between Portland, Me., and Portsmouth, N. H.

TOUR NO. 32.

Tour No. 32 is planned as an auxiliary to Vacation Tour No. 1, connecting at Bangor for eastern Maine and New Brunswick points. It is scheduled to occupy four days, and an alternate return route from Calais to Bangor is given for the fourth day. It is not recommended, however, except for those venturesome spirits who are willing to test the car's endurance, over roads that are such in name only. Unless very recent changes have been made, much of this alternate route is overgrown with grass, and in places the tree branches seriously impede the car's progress. That it has been traversed by automobile through Sullivan, Gouldsboro and Steuben to Cherryfield.

This town is attractively situated on the picturesque Narraguagus river, and is in the midst of a number of noted fishing ponds. Several well known woodcock covers are also near here. Then comes Harrington, one of the prettiest little villages in Washington county, with many desirable drives along the bay.

Machias is an historic old town, noted for its many business enterprises. The town is located on both sides of the Machias river at tide water, and up this river, reached either by canoe or automobile, are numerous lakes, and a hunting and fishing territory embracing over 300,000 acres. At East Machias may be seen one lakes region, and a pretty little side trip to Eastport may be taken if desired.

The route from St. Stephen to St. John is by way of Fredericton, and while it is somewhat longer than the shore route, over which the return trip is made, it is assumed that the tourist will desire to visit this interesting country. As the road is practically all down grade from Fredericton to St. John, it follows that it is much better to take the trip in this direction, since there would be a steady climb to Fredericton if it were reversed. Customs regulations must be arranged at St. Stephen.

Fredericton is a small city, beautifully situated on the St. John river and distinguished be-

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cause of being the political capital of the province. The government house is a plain and dignified stone building in extensive grounds just north of the city, and the Parliament house is a modern structure near the deserted barracks. The University of New Brunswick has fine buildings on a commanding hill near the city.

The St. John river is very picturesque, and a number of other streams empty into it at various points, adding to the charm. Numerous islands are passed, and the road crosses many rich intervales. At one or two places may be seen abandoned forts, which were the centre of long sieges 200 or 250 years ago. Just before reaching St. John the river enters a narrow channel between palisades, and below is the suspension bridge over the famous reversing falls. The tides in the Bay of Fundy are well known throughout the world, and these falls, over which the river dashes through a narrow gorge at low tide, have the appearance of flowing up-hill as the tide rushes upward through the gorge far above the river level.

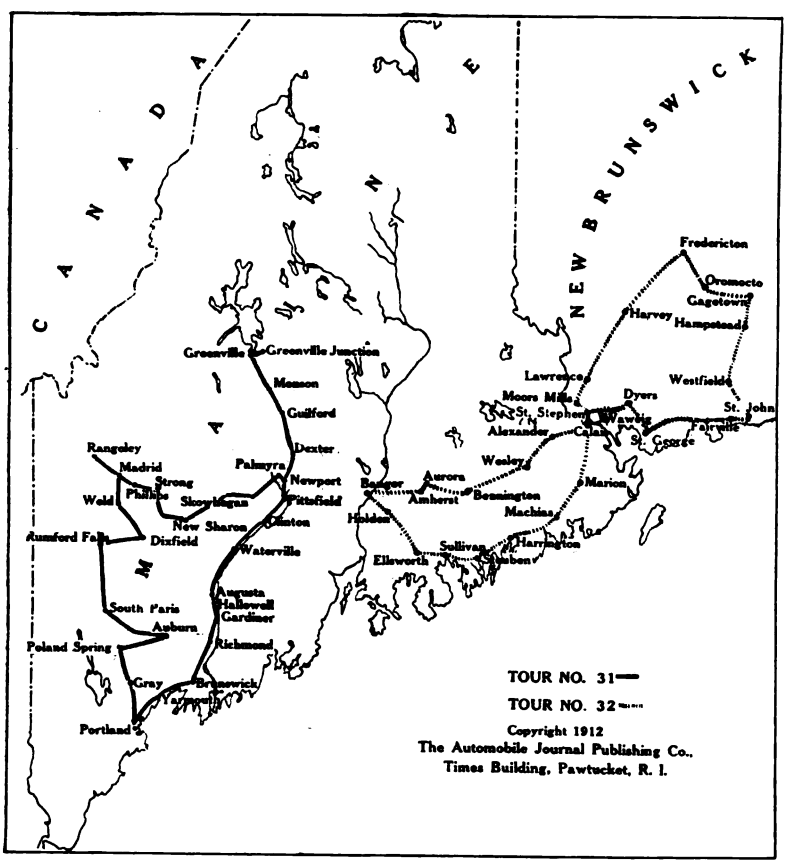
St. John is the metropolis of the province, and it is possible to make connections here for a number of pleasant trips through Nova Scotia, across the bay. Ample time should be available to take advantage of a number of interesting drives about the city, particularly that to the heights of Carelton; over Marsh bridge to Red Head, or to the cemetery and Loch Lomond.

The return trip to St. Stephen is along the coast, with splendid views all of the way. This is known as the St. George road, but care should be taken at Lepreaux that this old way is not followed between that town and St. George, inasmuch as the longer route outlined will be found to be much better. This is the main line taken by most tourists from the provinces to the States, and will be found in excellent condition throughout.

As explained at the beginning of this outline, the return route from this point to Bangor is not the best. However, there are some excellent views to be obtained and much of interest in the towns visited. Wesley is noted for the number of bears that have been shot within its confines. It does not follow that the tourist will see a bear if he takes this route, although he is pretty certain to find the woods well filled with deer in the immediate vicinity.

The virgin country about Beddington is particularly well supplied with partridges, and there are a number of splendid camping sites to be found readily. Connection may be made with Cherryfield, if the tourist has decided by this time that he would prefer the other route. The distance to Cherryfield is 20 miles from Beddington.

While the road is by no means good, the views from some of the hills en route are distinctive to this portion of the country. Wooded hills are intermingled with entrancing lakes, and each has its own particular individuality. It is all rich sporting and fishing country, and while houses will be found few and far between, and the gasoline supply an entirely unknown quantity, an occasional camp will be passed, and there is no danger of getting lost.



TOUR NO. 32.

Bangor, Me.—Calais, Me.—St. John, N. B.—St. Stephen, N. B.—Bangor,

Four Days, 490.1 Miles.

First Day, Bangor to Calais, Me., 136 Miles.

Bangor to	Miles to	Total Miles
Brewer	1.0	1.0
Holden	4.8	5.8
Hart's Corners	1.7	7.5
East Holden	1.5	9.0
East Dedham	6.9	15.9
Nicolin	3.2	19.1
North Ellsworth	1.4	20.5
Ellsworth	5.0	25.5
North Hancock	6.5	32.0
Hancock	2.8	34.8
West Sullivan	1.1	35.9
Sullivan	1.6	37.5
East Sullivan	3.0	40.5
West Gouldsboro	4.0	44.5
Gouldsboro	2.6	47.1
Steuben	4.9	52.0
Smithville	1.9	53.9
Cherryfield	6.1	60.0
Harrington	6.2	66.2
Columbia Falls	5.3	71.5
Machias	7.5	88.5
East Machias	4.5	93.0
Gardner Corners	4.1	97.1
Marion	9.4	106.5
Dennysville	4.5	111.0
Charlotte	10.3	121.3
Milton	12.7	134.0
Calais	2.0	136.0

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Second Day, Calais to St. John, N. B., 168 Miles.

Calais to	Miles to	Total Miles
St. Stephen, N. B.	0.8	0.8
Moore's Mills	7.7	8.5
Meadows	6.3	14.8
Lawrence	4.9	19.7
Brockway	7.0	26.7
Thomas Corner	9.9	36.6
York Mills	3.5	40.1
Harvey	7.6	47.7
Hanwell	13.1	60.8
Fredericton	13.1	73.9
Oromocto	12.0	85.9
Upper Gagetown	8.8	94.7
Gagetown	5.1	99.8
Otnalog	8.9	108.7
Hempstead	4.5	113.2
Evansville	3.2	116.4
Oak Point	13.0	129.4
Brown's Flats	11.2	140.6
Westfield	12.4	153.0
South Bay	8.8	161.8
Manchester Corner	2.0	163.8
Fairville	1.2	165.0
St. John	3.0	168.0

Third Day, St. John to St. Stephen, N. B., 86.6 Miles.

St. John to	Miles to	Total Miles
Fairville	3.0	3.0
Manchester Corner	1.2	4.2
Spruce Lake	4.8	9.0
Musquash	7.7	16.7
Lepreaux	8.8	25.5
New River Beach	8.0	33.5
Pennfield Corners	10.5	44.0
Spinney Corners	3.2	47.2
St. George	6.8	54.0
Stillwater Bridge	9.7	63.7
Digdequash	2.1	65.8
Dyers	3.0	68.8
Warveig	7.4	76.2
Roix	0.8	77.0
Oak Bay	2.9	79.9
Benson Corners	1.6	81.5
St. Stephen	5.1	86.6

Fourth Day, St. Stephen to Bangor, 99.5 Miles.

St. Stephen to	Miles to	Total Miles
Calais	0.8	0.8
Milltown	1.8	2.6
Baileyville	6.6	9.2
Alexander	6.7	15.9
Wesley	14.7	30.6
Beddington	22.5	53.1
Aurora	19.3	72.4
Amherst	2.8	75.2
Clifton	10.0	85.2
East Eddington	2.3	87.5
Eddington Bend	6.5	94.0
Brewer	4.5	98.5
Bangor	1.0	99.5

TOUR NO. 41.

The three-day trip outlined in Tour No. 41 is offered as a substitute for the better known route between Quebec and the States by way of Jackman, Me., and is suggested as a continuation to Vacation Tour No. 2 at Montreal. The starting point is at Newport, Vt., and the night stops, Quebec and Montreal.

The customs formalities must be arranged at Stanstead, a short distance from Lake Memphremagog. Several picturesque lakes are viewed on the way, including Massawippi, near the town of that name; Noir, near Marbleton; Weeden, near Weeden; Aylmer, at Garthby; Francis, at D'Israeli; Clapham and Marie, between Thetford Mines and Robertson. Marbleton is noted for its marble quarries and lime pits, while at Thetford Mines are located the largest asbestos deposits in the world. Bell mine has an area of several acres and a depth of over 150 feet.

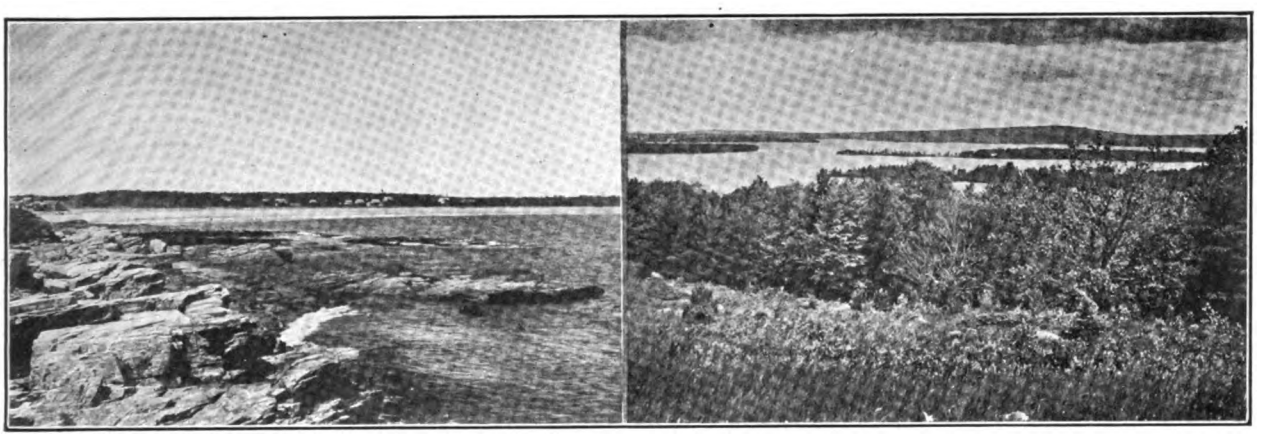
The final portion of the drive into Quebec is exceedingly picturesque. Beyond Leeds, Parkhurst and St. Giles, the road winds along the bank of the Beaurivage river to the St. Lawrence. It is expected that the magnificent Quebec bridge, which is said to be the largest single span bridge in the world, will be opened this year, and that the tourist will not be obliged to enter the city by ferry as has been necessary heretofore.

The wreckage of the destroyed bridge has been cleared away and the work of constructing the new span to take its place has been pushed rapidly toward completion.

Quebec is filled with historic interest. In many respects it is the most quaint and picturesque city on the American continent. Of the many side trips, the following may be mentioned: Ste. Anne de Beaupre, where thousands of pilgrims annually visit the relics for miraculous cures; the falls of Ste. Anne and those of Ste. Fereol, still further to the east; Lake Beauport, Indian Lorette, and Cap Rouge.

The view of Quebec from the St. Lawrence in the early morning is said to be a sight never to be forgotten. Above the city the river flows between the Laurentian mountains. Then the tour passes Lake St. Peter, where the St. Lawrence broadens out on the lowlands. Among the features of this body of water are the lumber rafts on which are carried the rude huts of the lumbermen. At various points along the route, quaint old towns are passed, in which the people, like those during the previous day's drive, speak French for the most part, and many old-world characteristics are noted.

Chambly, reached early the third day, was fortified by the French in 1711, and in 1775 it had a strong stone fort, erected by the British. The town is situated on a lake-like expansion of the Richelieu river, known as the Chambly basin, and the Chambly rapids are nearby. Knowlton is at the foot



Inspiring Shore Scene Near Scarboro, Me. **One of the Fishing Lakes in Eastern Maine.**

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In the Midst of the Lake Country in the Adirondacks.

of Brome lake, with Brome mountain about 10 miles distant, although in full view. At South Bolton, the tour goes through the Bolton notch, with excellent views along the way. Customs arrangements may be perfected at Mansonville. The return to Newport from this point is along the shore of Lake Memphremagog with excellent views of Owl's Head.

TOUR NO. 41.

Newport, Vt.—Quebec, Que.—Montreal, Que.—Newport.

Three Days, 467.3 Miles.

First Day, Newport to Quebec, Que., 177.8 Miles.

Newport to	Miles to	Total Miles
Derby	5.1	5.1
Stanstead, Que	5.9	11.0
Cassville	6.1	17.1
Massawippi	12.4	39.5
Lennoxville	10.2	39.7
Ascot	15.5	55.2
South Dudswell	2.2	57.4
Marbleton	9.4	66.8
Weeden	8.9	75.7
Garthby	10.9	86.6
D'Israeli	5.1	91.7
Coleraine	5.8	97.5
Thetford Mines	10.7	108.2
Robertson Station	5.2	113.4
Reedham	1.9	115.3
Kinnear's Mills	8.5	123.8
Leeds	6.2	130.0
Parkhurst	9.8	139.8
St. Giles	8.6	148.4
St. Etienne	11.9	160.3
Chaudiere	5.3	165.6
Levis	7.9	173.5
Levis Ferry—Quebec	4.3	177.8

Second Day, Quebec to Montreal, Que., 186.7 Miles.

Quebec to	Miles to	Total Miles
St. Augustin	14.3	14.3
Les Ecureuils	14.2	28.5
Cap Santo	4.3	32.8
Portneuf	5.1	37.9
Deschambault	4.2	42.1
La Chevrotierre	4.8	46.9
Grondines	2.3	49.2
St. Anne de la Perade	8.8	58.0
St. Genevieve	9.1	67.1
Champlain	8.9	76.0
Bonadventure	9.7	85.7
Three Rivers	4.1	89.8
Pointe du Lac	8.9	98.7
Yamachiche	8.3	107.0
Louisville	7.0	114.0
Maskinonge	7.1	121.1
St. Cuthbert	9.8	130.9
Berthier	4.4	135.3
Lanoraie	9.2	144.5
Lavaltry	6.1	150.6
St. Sulpice	5.7	156.3
L'Assomption	5.2	161.5
Charlemagne	8.7	170.2
Longue Point	9.6	179.8
Montreal	6.9	186.7

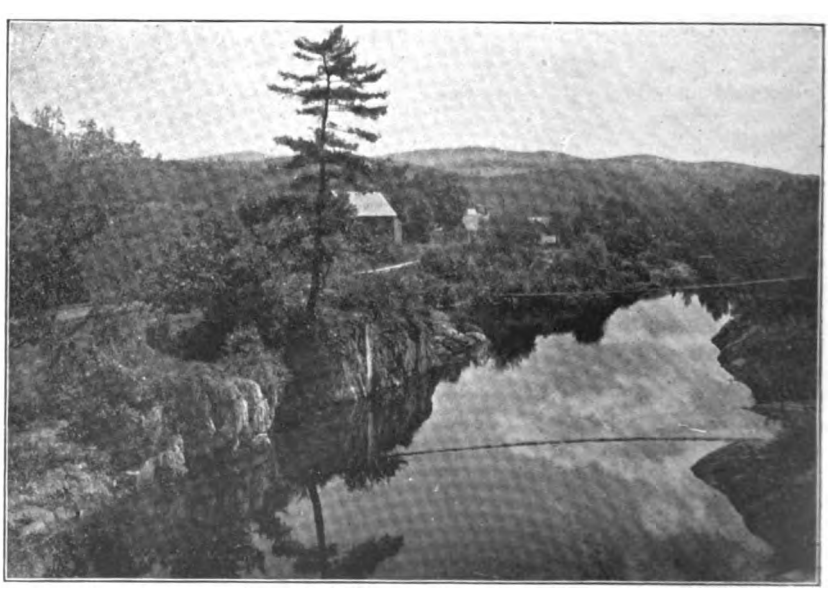
Third Day, Montreal to Newport, 102.8 Miles.

Montreal to	Miles to	Total Miles
Longueuil	3.0	3.0
St. Hubert	5.0	8.0
Chambly	8.9	16.9
Marieville	6.0	22.9
Rougemont	6.2	29.1
St. Cesaire	3.3	32.4
Abbottsford	6.8	39.2
Granby	8.4	47.6
Waterloo	11.9	59.5
Knowlton	9.6	69.1
South Bolton	9.8	78.9
Mansonville	8.4	87.3
Newport Center, Vt.	9.4	96.7
Newport	6.1	102.8

TOUR NO. 42.

Tour No. 42 is offered as a connecting route between Vacation Tours 1, 2 and 3, starting at Burlington, Vt., and occupying three days' time. The night stops are at Cascade Lake and Paul Smith's, both in the Adirondacks. It is anticipated that this will prove a valuable connecting link between New England points and other sections covered by the itineraries outlined in this annual touring number.

The first day takes the tourist along the east shore of Lake Champlain to Grand Isle and thence over the New York state line to Rouse's Point, where connection may be made with Vacation Tour No. 2 for Montreal. Reversing this route for some distance, the tourist visits Plattsburg and the Ausable Chasm, then turns away



Winooski River, Scene in the Vermont Hills at Middlesex.

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toward the Adirondack lake region. Vacation Tour No. 3 is reached at Keene.

The second day, after spending the night at Cascade Lake, is devoted to driving among the lakes of this region, including Upper, Lower and Middle Saranac, Tupper, Big Tupper, Clear, Regis, Spitfire and Lucretia. Innumerable small ponds are also included in the visit, and mountains as well. A fairly good automobile road is traversed all of the way. Those who so desire may venture still further within the mountain passes and explore still other lakes and ponds, but those included in the day's itinerary are all that may be visited with safety by automobile.

However, there remains another collection of lakes and mountains for the third day, on the other side of Vacation Tour No. 3. Lake Meacham is 12 miles north of Gabriel, three miles long by two wide, lying in the midst of 6000 acres of virgin forest. Rainbow lake has many devious windings which make it an ideal spot for canoeing. North of this is Lake Kushaqua, a beautiful resting place. A little to the west is Loon lake, 2.5 miles long with rocky irregular shores.

The tour then returns to Plattsburg and Lake Champlain, where it is anticipated that the motorist will have had quite enough of driving and will be anxious to return to Burlington by boat. In case he prefers to continue by automobile, he has the option of reaching Burlington over the reversal of the first day's itinerary or by way of Vacation Tour No. 3 to Westport and ferry to the Vermont side.

TOUR NO. 42.

Burlington, Vt.—Cascade Lake, N. Y. —Paul Smith's, N. Y.—Burlington.

Three Days, 275.2 Miles.

First Day, Burlington to Cascade Lake, N. Y., 126.5 Miles.

Burlington to	Miles to	Total Miles
Winooski	2.3	2.3
South Hero	16.6	18.9
Grand Isle	6.4	25.3
North Hero	6.6	31.9
La Grange	4.8	36.7
Alburg Center	5.0	41.7
Alburg	3.1	44.8
West Alburg	3.0	47.8
Rouse's Point, N. Y.	1.9	49.7
Champlain	5.1	54.8
Chazy	7.0	61.8
West Chazy	6.3	68.1
Beekmantown	3.7	71.8
East Beekmantown	2.0	73.8
Plattsburg	4.6	78.4
Peru	9.7	88.1
Keeseville	6.1	94.2
Clintonville	6.3	100.5
Ausable Forks	5.4	105.9
Jay	6.1	112.0
Upper Jay	3.7	115.7
Keene	6.1	121.8
Cascade Lake	4.7	126.5

Second Day, Cascade Lake to Paul Smith's, N. Y., 69.8 Miles.

Cascade Lake to	Miles to	Total Miles
Lake Placid	10.5	10.5
Saranac Lake	9.8	20.3
Coreys	13.0	33.3
Tupper Lake	8.0	41.3
Wawbeek	7.8	49.1
Upper Saranac	8.2	57.3
Lake Clear	5.0	62.3
Paul Smith's	7.5	69.8

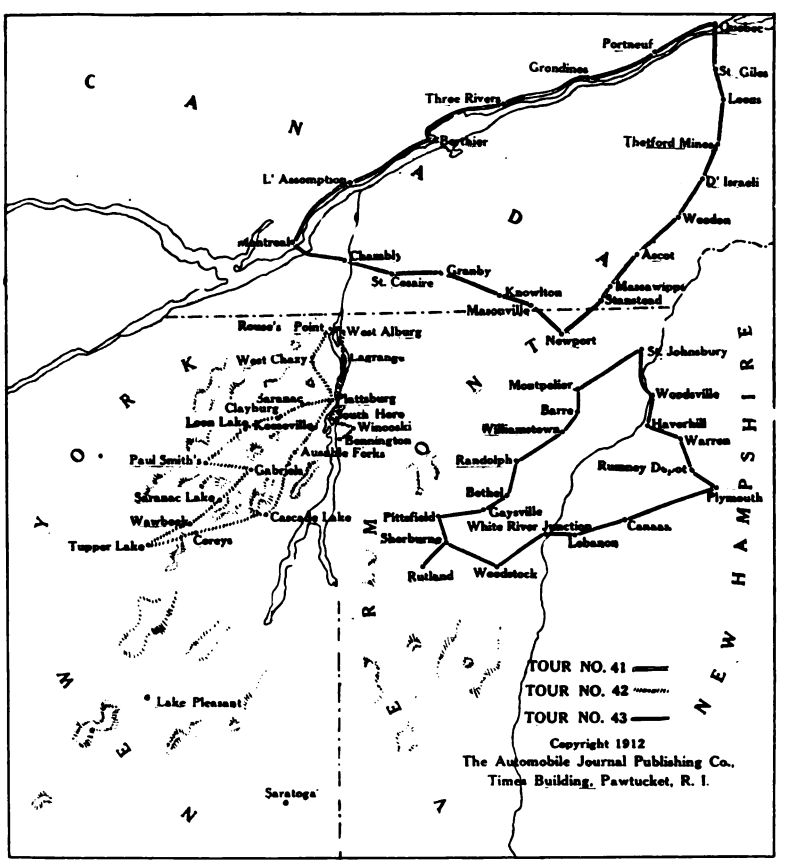
Third Day, Paul Smith's, N. Y., to Burlington, 78.9 Miles.

Paul Smith's to	Miles to	Total Miles
Gabriels	5.4	5.4
Bloomingdale	4.0	9.4
Vermontville	8.2	17.6
Loon Lake	12.8	30.4
Goldsmith	4.7	35.1
Clayburg	9.6	44 7
Redford	3.5	48.2
Moffitsville	2.3	50.5
Saranac	2.2	52.7
Elsinore	12.2	64.9
West Plattsburg	6.8	71.7
Plattsburg	7.2	78.9
Boat to Burlington		

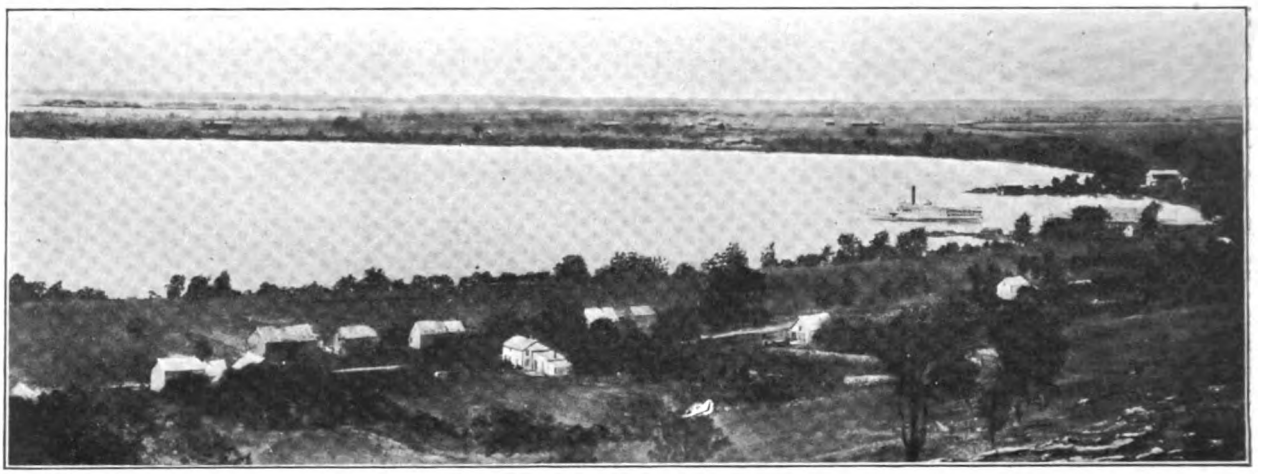
TOUR NO. 43.

Tour No. 43, starting from Rutland, Vt., is outlined primarily as affording a means of connecting Vacation Tours 1 and 2 at this point. It is anticipated that there will be those who will desire to leave New York for a visit to the Green mountains and continue their trip into the White mountains, without continuing Vacation Tour No. 2 to Canada. This three-day itinerary admits of this, and still offers the possibility of returning to take up the journey where it was broken off. Still another possibility is offered, in that Tour No. 43 connects with Vacation Tour No. 1 at three different points, furnishing the alternative of connecting with Tour No. 42 at Burlington and regaining Vacation Tour No. 2 at Rouse's Point, N. Y.

From Rutland, the itinerary leads across the easiest of all the Green mountain passes through Mendon, Sherburne and Bridgewater to Woodstock, on the crystal clear White river. From Mt.



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Pleasing View of St. Albans Bay, One of the Most Attractive Points on Lake Champlain.

Tom, near here, an excellent view down the river may be obtained. The valley of this river is followed to White River Junction, where connection is made with Vacation Tour No. 1.

Crossing the Connecticut river, the way leads to the White Mountain region at Plymouth, N. H., the night stop. Connection is made here with Tour No. 12, which may be followed in either direction to reach the Bretton Woods or Dixville Notch. The second day's outline returns to the Connecticut valley at Wells River, Vt., in full view of the Franconia range most of the way. St. Johnsbury, where Vacation Tour No. 1 is again reached, is the turning point toward the west.

The main route is touched again at Montpelier, after visiting Danville, South Cabot, Molly's Falls, Marshfield and Plainfield. This is made the second night's stop. The third day the main route is reversed for a short distance until the Williamstown gulf is passed. Then, the way turns toward the west to connect with the Green mountain pass by way of Gaysville, Stockbridge and Pittsfield.

TOUR NO. 43.

Rutland, Vt.—Plymouth, N. H.—Montpelier, Vt.—Rutland.

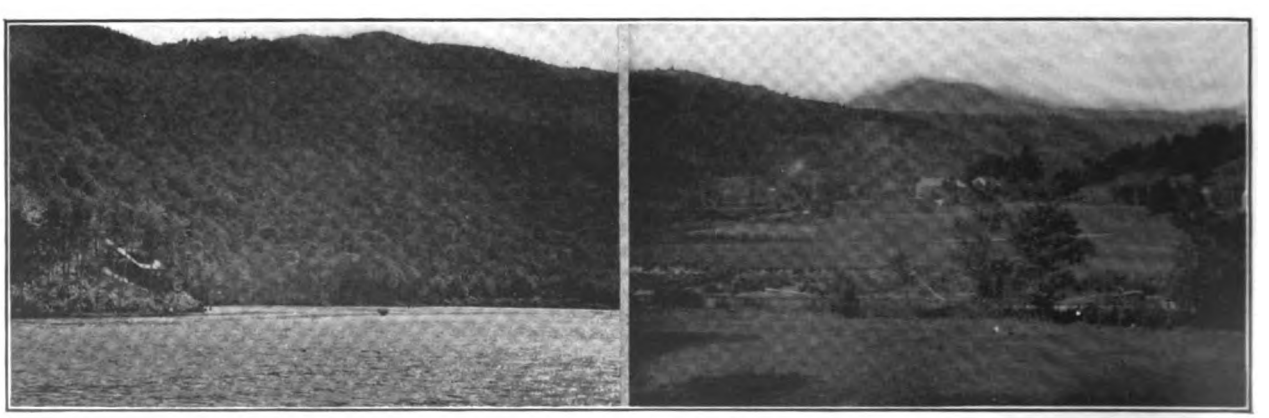
Three Days, 286.2 Miles.

First Day, Rutland to Plymouth, N. H., 104.4 Miles.

Rutland to	Miles to	Total Miles
Mendon	4.3	4.3
Sherburne	9.2	13.5
West Bridgewater	4.5	18.0
Bridgewater	7.6	25.6
West Woodstock	5.2	30.8
Woodstock	1.3	32.1
Taftsville	3.5	35.6
Quechee	3.4	39.0
White River Junction	6.5	45.5
West Lebanon, N. H.	1.6	47.1
Lebanon	3.2	50.3
Enfield	6.7	57.0
West Canaan	2.8	59.8
Canaan	5.0	64.8
East Grafton	7.4	72.2
Danbury	4.7	76.9
Bristol	9.7	86.8
Bridgewater	3.9	90.7
East Hebron	4.9	95.6
West Plymouth	5.2	100.8
Plymouth	3.6	104.4

Second Day, Plymouth, N. H., to Montpelier, Vt., 105.2 Miles.

Plymouth to	Miles to	Total Miles
West Plymouth	3.6	3.6
Rumney Depot	3.4	7.0
West Rumney	3.5	10.5
Wentworth	5.6	16.1
Warren	3.9	20.0
Glencliff	5.4	25.4
East Haverhill	5.5	30.9
Haverhill	4.9	35.8
North Haverhill	4.5	40.3
Woodsville	4.7	45.0
Wells River, Vt.	0.4	45.4
McIndoes	8.5	53.9
Barnet	3.0	56.9
East Barnet	2.3	59.2
Passumpsic	4.1	63.3
St. Johnsbury	3.1	66.4
Danville	7.7	74.1
West Danville	3.0	77.1
South Cabot	5.7	82.8
Molly's Falls	2.9	85.7
Marshfield	1.8	87.5



Two Famous Green Mountain Scenes: On Left, Lake Mansfield at Foot of Peak by the Same Name; at Right, View of Camel's Hump as It Appears from Waterbury, Vt.

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Plainfield	7.1	94.6
East Montpelier	3.5	98.1
Montpelier	7.1	105.2

Third Day, Montpelier to Rutland, Vt., 76.6 Miles.

Montpelier to	Miles to	Total Miles
Barre	6.8	6.8
South Barre	1.5	8.3
Williamstown	6.1	14.4
East Brookfield	8.0	22.4
North Randolph	3.6	26.0
Randolph	6.9	32.9
Bethel	6.5	39.4
Gaysville	5.9	45.3
Stockbridge	4.7	50.0
Pittsfield	3.9	53.9
North Sherburne	4.8	58.7
Sherburne	4.5	63.2
Mendon	9.1	72.3
Rutland	4.3	76.6

TOUR NO. 51.

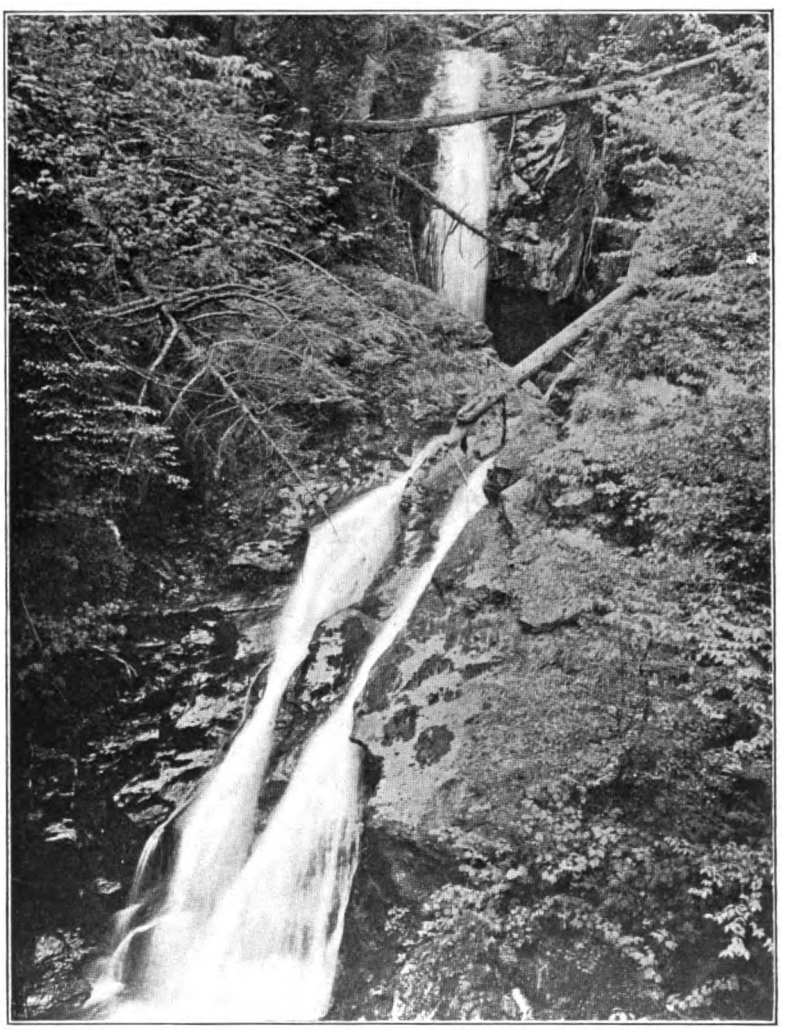
Tour No. 51, starting from Bridgeport, Conn., and with night stops at Poughkeepsie, N. Y., and Lake Hopatcong, N. J., offers a delightful trip among hills and dales without taxing the powers of the car unduly.

At Brookfield, north of Danbury, hills, high and steep, characterize the landscape, and this condition continues for some distance. Above New Milford, the hills and mountain ranges recede from the river on either side, and the river bottoms broaden into the most delightful intervales and meadow lands. Beyond New Milford lies Kent, having all the dignity of a respectable New England village, besides a great deal of scenic beauty and fine natural situations that are not always found in connection with dignified and eminently respectable towns, even in New England.

West Cornwall is the gateway to a wild and picturesque region traversed by the Cornwall range. Curiously tumbled about, rocky and broken, are these mountains and they possess a charm all their own. Lime Rock is sufficiently suggestive of the region in its neighborhood, for here ledges of the whitest limestone, seamed with lines of gray and black, show gleaming in the sunlight, or as white and gray patches among the shadows of the woods.

At Falls Village, the Housatonic takes a series of tumbles from a primeval rock dam, extending almost across the river bed, as a beginning of the descent, thence over a succession of natural terraces, alternating at no great distance, rushing and foaming and boiling among thickly strewn boulders, until it has fallen 130 feet. The falls not only form one of the most picturesque scenes on the whole trip, but furnish power for extensive manufacturing operations.

From Canaan the tour turns eastwood, past the iron mines in Salisbury and the ore hills beyond settled by Huguenot refugees from France in 1683. Many of its old stone houses, with high, steep pitched roofs, remain today much the same as when they were erected over 200 years ago. The surrounding country, with its smiling, well tilled fields and vine clad hillsides, still bears the imprint of the thrifty Frenchmen who were the first to reclaim it from the wilderness.



Sage's Ravine, Between Great Barrington and Lakeville, Conn.

Lakeville, down into the Hudson valley at Poughkeepsie, the first night stop. This is the seat of Vassar College and the centre of a vast touring country, up and down both sides of the Hudson.

Crossing the river the second day's itinerary enters some of the interesting touring country about New York City. New Paltz, on the west bank of the Wallkill, was

Napanoch is a favorite resort of artists, who take pleasure in transferring to canvas the many charming views of the surrounding country. Ellenville is located right under the shadow of the Shawangunk mountains, which rise to a height of 2500 feet and are crowned with castellated, massive bluffs, stretching for miles along their crest. Summits-

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Chestnut Point at the Head of Lake Hopatcong, N. J.

ville overlooks the entire length of the Mamakating valley.

Wurtsboro was first settled by the Dutch in 1660, and is surrounded by a number of lakes which furnish excellent fishing grounds. The same may be said for Westbrookville and Cuddebackville, on the way to Port Jervis, Milford, Penn., and Dingman's Ferry. New Jersey is entered at Layton and from that point to Lake Hopatcong, the night stop, the road lies through much picturesque country with the Blue Ridge and Pocono mountains of New Jersey and Pennsylvania ever in sight.

Lake Hopatcong is a favorite resort among the hills of northern New Jersey, and is noted not only for its beauties and pleasures, including excellent fishing, but for its healthfulness as well. Its high altitude, 1000 feet above sea level, is very invigorating. The lake is 11 miles long and from .25 to 3.5 miles wide.

Boonton is located near the large Jersey City reservoir which is about three miles long. The route now follows the old Morris and Essex canal, and many beautiful views are unfolded on the way. Paterson is a manufacturing city, the water power being furnished by the Passaic falls, about 50 feet high, inside the city limits.

The route now turns northward to Suffern, thence to the Hudson, over Vacation Tour No. 3. Leaving the Hudson at Tarrytown, the way leads across the state to Port Chester and enters Connecticut at Greenwich. The remainder of the distance into Bridgeport is over the shore line, by way of Stamford, Darien, Norwalk, Westport and Fairfield.

TOUR NO. 51.

Bridgeport, Conn.—Poughkeepsie, N. Y.—Lake Hopatcong, N. J.—Bridgeport.

Three Days, 371.3 Miles.

First Day, Bridgeport to Poughkeepsie, N. Y., 123.3 Miles.

Bridgeport to	Miles to	Total Miles
Long Hill	7.3	7.3
Stepney	1.4	8.7
Dodgingtown	8.8	17.5
Bethel	3.3	20.8
Danbury	2.9	23.7
Brookfield	4.2	27.9
New Milford	4.1	32.0
Boardman	3.0	35.0
Gaylordsville	4.5	39.5
South Kent	2.5	42.0
Kent	3.5	45.5
North Kent	4.0	49.5
Swift's Bridge	3.2	52.7
Cornwall Bridge	2.0	54.7
West Cornwall	4.2	58.9
Lime Rock	4.6	63.5
Falls Village	2.0	65.5
South Canaan	1.8	67.3
Canaan	4.2	71.5
Salisbury	7.9	79.4
Lakeville	1.8	81.2
Millerton, N. Y.	3.9	85.1
Amenia	9.0	94.1
Lithgow	4.8	98.9
Mabbettsville	3.2	102.1
Millbrook	5.4	107.5
Washington Hollow	3.9	111.4
Pleasant Valley	4.8	116.2
Poughkeepsie	7.1	123.3

Second Day, Poughkeepsie to Lake Hopatcong, N. J., 122 Miles.

Poughkeepsie to	Miles to	Total Miles
Highland Ferry	0.6	0.6
Highland	1.0	1.6
Lloyd	2.8	4.4
Ohioville	2.9	7.3
New Paltz	1.7	9.0
Tillson	6.6	15.6
Lawrenceville	2.1	17.7
High Falls	2.8	20.5
Accord Village	7.8	28.3
Napanoch	9.2	37.5
Ellenville	2.0	39.5
Spring Glen	4.5	44.0
Phillipsport	2.2	46.2
Summitsville	1.8	48.0
Wurtsboro	3.5	51.5
Westbrookville	4.9	56.4
Cuddebackville	4.6	61.0
Huguenot	3.5	64.5
Port Jervis	5.4	69.9
Milford, Penn.	6.0	75.9
Dingman's Ferry	8.5	84.4
Layton, N. J.	2.6	87.0
Tuttle's Corner	2.4	89.4
Culver's Gap	2.0	91.4
Branchville	3.7	95.1
Newton	7.0	102.1
Andover	5.8	107.9
Stanhope	6.3	114.2



One of the Pretty Lake Scenes at Laurel Springs, N. J.

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Port Morris	1.5	115.7
Lake Hopatcong	6.3	122.0

Third Day, Lake Hopatcong to Bridgeport, 126 Miles.

Lake Hopatcong to	Miles to	Total Miles
Kenvil	5.5	5.5
Dover	3.9	9.4
Rockaway	3.2	12.6
Denville	2.2	14.8
Parsippany	3.5	18.3
Boonton	2.5	20.8
Montville	1.9	22.7
Lowaco	2.3	25.0
Mountain View	4.3	29.3
Paterson	6.3	35.6
Hackensack	8.0	43.6
Arcola	3.5	47.1
Hohokus	6.2	53.3
Suffern, N. Y.	18.8	72.1
Spring Valley	6.0	78.1
Nannet	2.4	80.5
Nyack	5.3	85.8
Tarrytown Ferry	0.2	86.0
Tarrytown	0.5	86.5
Elmsford	3.3	89.8
White Plains	3.7	93.5
Port Chester	6.2	99.7
Greenwich, Conn.	3.1	102.8
Stamford	5.1	107.9
Darien	4.5	112.4
Norwalk	4.2	116.6
Westport	3.3	119.9
Fairfield	1.6	121.5
Bridgeport	4.5	126.0

TOUR NO. 52.

The first part of Tour No. 52 which starts at Pittsfield, Mass., and has night stops at Richfield Springs and Stamford, N. Y., may be used in connection with Tour No. 23 in connecting New England points with Transcontinental Tour A at Albany. It also connects Vacation Tours 2 and 3.

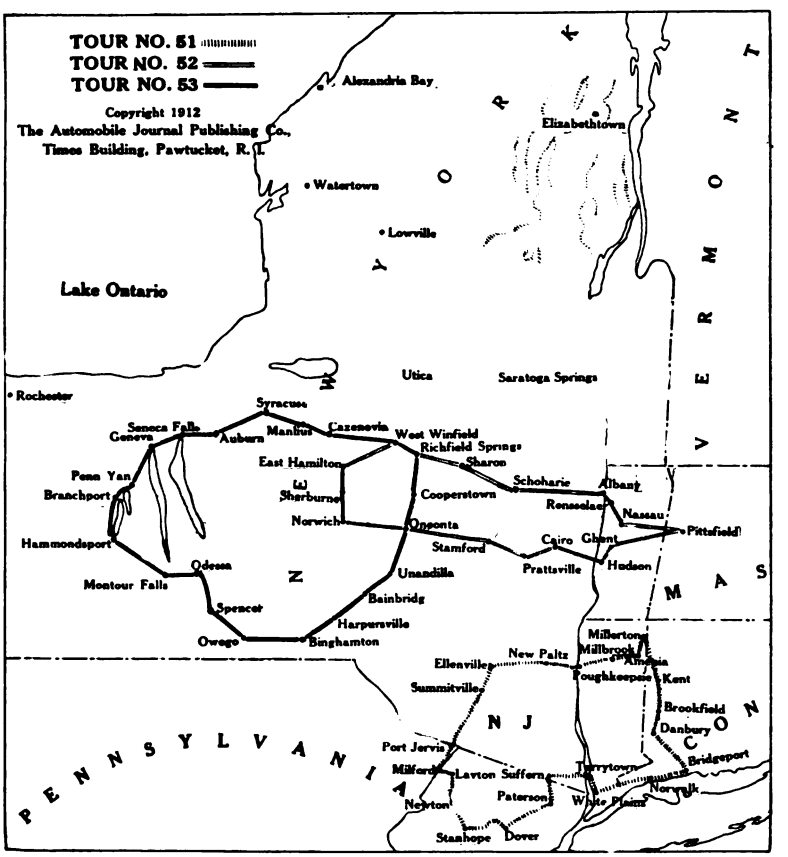
Shaker Village is the headquarters for the Lebanon Shakers. At New Lebanon Center are the famous Lebanon springs, which have enjoyed a reputation for efficacy in diseases of the skin and liver. The way then begins to lead down into the Hudson valley, crossing the river at Rensselaer to Albany.

Running along the foothills of the Catskills the tourist reaches Sharon Springs, in the Schoharie valley, 1100 feet above the sea level and surrounded by high hills. These springs are to the North what the White Sulphur springs of West Virginia are to the South. Analyses of the two waters as well as their beneficial results are said to be quite similar. A peculiar feature of Sharon is its mud baths which have been found extremely helpful in cases of rheumatism. Close at hand are the beautiful Tokeharawa falls.

The night stop is at Richfield Springs, near the head of Canadorago lake, with its elevation of 1700 feet; nestled among the mountains of Otsego county, it has every natural advantage to make it a charming place. The surrounding scenery; the wooded hills and cultivated plains form a landscape truly inspiring. The waters, obtained from the celebrated white sulphur springs, have earned for this pretty place a justly celebrated reputation.

After travelling through some of the central New York farming country the second day, visiting the large towns of Norwich and Oneonta on the way, the night stop is at Stamford, in the Catskill country. Oneonta is one of the principal gateways to the Catskills and the route to Stamford is through a decidedly picturesque valley. Stamford is one of the most popular resorts in the Catskill regions and is situated near the source of the Delaware river. Nearby is Mt. Utsayantha, 3365 feet high, which may be reached by road, if desirable.

Grand Gorge has an elevation of 1570 feet and is located between Irish and Bald mountains. Prattsville was named for Col. Pratt, who painted a number of the rocks white, giving them a decidedly curious and weird appearance. Other gorges and wild mountain passes are viewed on the way to Catskill, where the Hudson is crossed by ferry to Greendale and Hudson. Thence the way is back to New England, connecting with Vacation Tour No. 2 for the last portion of the return trip to Pittsfield.



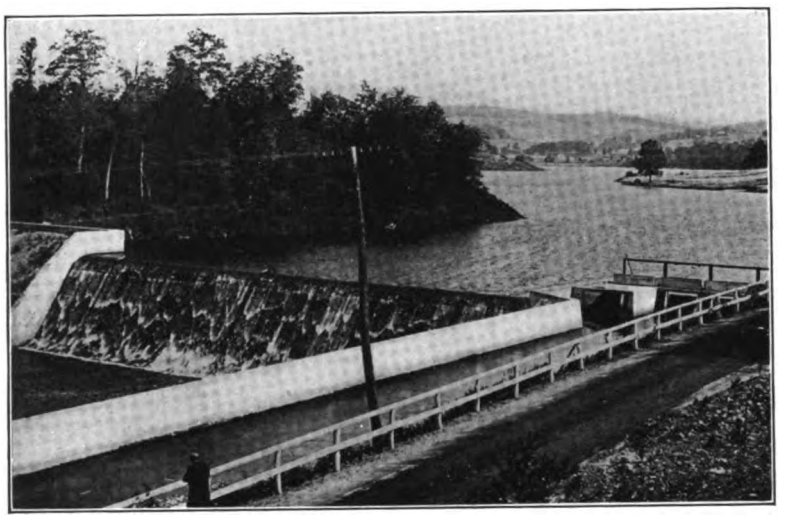
TOUR NO. 52.

Pittsfield, Mass.—Richfield Springs, N. Y.—Stamford, N. Y.—Pittsfield. Three Days, 332.8 Miles.

First Day, Pittsfield to Richfield Springs, N. Y., 106.4 Miles.

Pittsfield to	Miles to	Total Miles
Shaker Village	4.7	4.7
New Lebanon	6.1	10.8
New Lebanon Center	0.7	11.5
Brainard Station	6.2	17.7
Nassau	6.3	24.0
Schodack Center	5.5	29.5
East Greenbush	1.7	31.2

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Goodyear Lake on the Way to Colliyers in Southeastern New York.

Rensselaer	4.4	35.6
Albany	1.1	36.7
Altamonte	12.8	49.5
East Township	4.1	53.6
Gallupville	7.7	61.3
Schoharie	4.9	66.2
East Cobleskill	4.7	70.9
Cobleskill	5.0	75.9
Sharon	7.8	83.7
Sharon Springs	2.1	85.8
Cherry Valley	7.6	93.4
East Springfield	4.1	97.5
Springfield	2.0	99.5
Warren	3.7	103.2
Richfield Springs	3.2	106.4

Second Day, Richfield Springs to Stamford, N. Y., 120.6 Miles.

Richfield Springs to	Miles to	Total Miles
Winfield	8.7	8.7
West Winfield	2.2	10.9
Bridgewater	3.2	14.1
Sangerfield	7.0	21.1
Hubbardsville	8.3	29.4
East Hamilton	1.2	30.6
Poolville	3.9	34.5
Earlville	3.4	37.9
Sherburne	5.4	43.3
North Norwich	5.6	48.9
Norwich	6.3	55.2
Mt. Upton	11.8	67.0
Gilbertville	5.1	72.1
Morris	7.2	79.3
West Laurens	4.6	83.9
West Oneonta	5.6	89.5
Oneonta	3.9	93.4
West Davenport	6.2	99.6
Davenport Center	2.9	102.5
Davenport	3.8	106.3
Harpersfield	8.0	114.3
Stamford	6.3	120.6

Third Day, Stamford to Pittsfield, 105.8 Miles.

Stamford to	Miles to	Total Miles
Grand Gorge	7.8	7.8
Prattsville	5.1	12.9
Red Falls	2.5	15.4
Ashland	3.4	18.8
Windham	5.1	23.9
East Windham	5.9	29.8
South Durham	3.8	33.6
Cairo	6.2	39.8
South Cairo	2.7	42.5
Leeds	3.1	45.6
Catskill	3.8	49.4
Greendale Ferry	0.9	50.3
Greendale	2.6	52.9
Hudson	3.7	56.6
Claverick	4.5	61.1
Mellenville	3.5	64.6
Ghent	6.0	70.6
Chatham	3.1	73.7
New Concord	3.9	77.6
State Line	7.5	85.1
West Stockbridge, Mass.	3.0	88.1
Stockbridge	5.1	93.2
Lenox	6.0	99.2
Pittsfield	6.6	105.8

TOUR NO. 53.

For those who delight in the romantic, somewhat off the beaten paths, no section of the East contains more charm than the lake district of central New York. Fortunately the towns in the vicinity early recognized the advantages of cultivating automobile touring, inasmuch as they are not a little neglected by the railroads. Their delightful scenery is such as to merit wide attention on the part of the tourist and the motor car has done much to bring these beauties within easy reach.

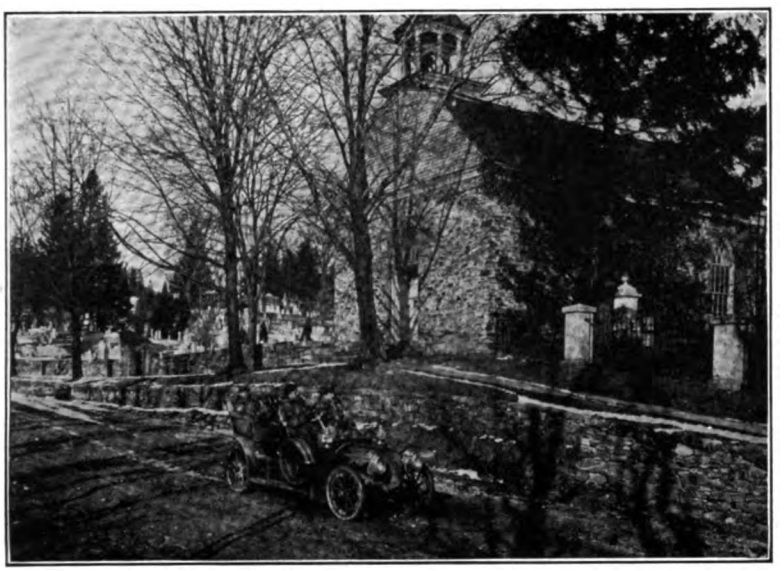
The three-day tour outlined below has Binghamton for its starting point, although the itinerary is reached easily from other sections. Motorists from New England, for instance, might join this tour at Richfield Springs, over a slight detour from the main route between Albany and Buffalo. Western tourists have the alternative of making this little trip by departing from the trunk line at Geneva. Binghamton would be the most logical point from which southern visitors would start.

Leaving Binghamton the morning of the first day, the tour follows the valley of the Susquehanna river for some distance, skirting the foothills of the Catskill mountains, particularly as the route nears Oneonta. Numerous



Pine Grove Drive, a Pleasing Scene Near Richfield Springs, N. Y.

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Washington Irving's Resting Place in Sleepy Hollow, New York.

small lakes and pretty little trout brooks divide attention with the hills and mountains in the distance, but it is not until Cooperstown is reached that it may be said the lake region is entered.

Cooperstown, the home of James Fenimore Cooper, is on the shore of Otsego lake, and this entire region has been so touched by his genius as to be familiar ground to those who revel in his works. In a park at the centre of the town is a boulder surmounted by the figure of an Indian, which marks the spot where Cooper lived. Fairly good roads encircle the lake, and time might be spent profitably in catching numerous glimpses of its remarkable beauty on this side trip.

The night stop is at Richfield Springs on Canandarago lake, better known by the name of Schuyler. No more inspiring views are to be found anywhere on the American continent than in this vicinity. It is extremely doubtful if the tourist will be satisfied with a night stop at this point, but other lakes still further along offer other charms, and it will be hard for the motorist to decide just how much time he may allow himself away from home.

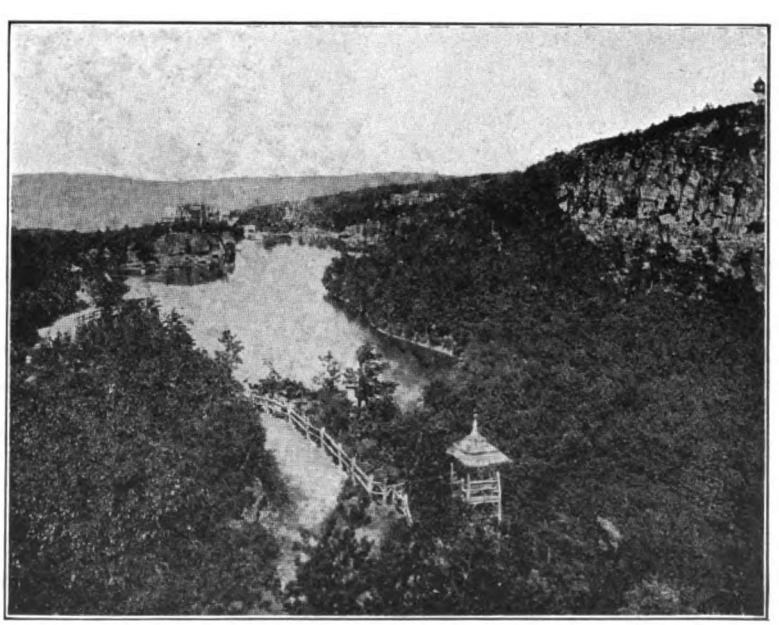
The second day's run enters the Mohawk valley, which is followed into Syracuse, not forgetting to mention Cazenovia, a summer resort of considerable repute situated at the foot of a pretty little lake, which empties into Lake Oneida. Time should permit of taking the pleasing little drive about the shores of this sheet of water. After leaving Syracuse, the main route through central New York is followed for a time, practically into Geneva.

Auburn is on Cayuga lake, which may be skirted if it is desired to extend the tour beyond the three days originally planned. This additional mileage will amply repay, as there are many attractions within easy driving distance. Among these may be mentioned Taghanic falls, at the end of a gorge a mile long and 400 feet deep, where the water takes a sheer drop of 250 feet, higher than Niagara.

Geneva is on Seneca lake, which is reached along the banks of the Seneca river from Seneca Falls, after the Montezuma marshes are passed. This lake is considered the most picturesque of the entire group. It is 38 miles long and from two to six miles wide. Steamers may be taken from Geneva to Watkins, if more time is desired for exploring portions of this district. This route anticipates making Penn Yan, on the shores of Keuka lake, the night stop.

Penn Yan is some 900 feet above the level of Seneca lake, and the road from Geneva is a gradual rise, although it can be made practically all of the way on high speed. Possibly it will be well to continue the journey about two miles south of the city itself for the night stop, as here opportunity is afforded to spend the night on the banks of the lake in a new hostelry, which is famed throughout this district for treatment accorded to motorists.

The third day finds the tourist between the two arms of the lake on his way to Bluff Point, 700 feet above the surface of Keuka, which is 900 feet above the level of Seneca. From this elevation



Lake Mohonk, Where the Peace Conferences Are Held, in the Catskills.

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an extensive view of the surrounding country is obtained, a clear day affording glimpses of four counties. Looking down upon the lake itself, the visitor is surprised to see what appears to be a toy steamboat, and finds it hard to believe it is one of the large lake steamers with a capacity of 400 to 500 people. Immediately below a reflection of glistening oars and little specks on the water, not unlike a school of minnows, prove to be full sized rowboats filled with fishing parties.



Watkins Glen, an Imposing Natural Wonder.

Keuka lake is in the centre of the rich grape country, and the district is famed for its wines and champagnes. None the least of the pleasing pictures from Bluff Point are the vine clad, ravine broken hills, many of which will be visited on the trip from Bluff Point to Hammondsport, but first the tourist must turn north to get around the lower end of the other arm of the lake at Branchport.

From Branchport to Hammondsport is a steady drop, with the lake level lost to view. On either side are to be seen the vineyards, and at Hammondsport, 300 feet above the surface of the lake, the tourist finds a view to the northward, which for breadth, distance and picturesque beauty is to be equalled nowhere.

Hammondsport is the home of Glenn H. Curtiss, and his plant for the manufacture of aeroplanes. A visit to this industry will offer a pleasing diversion, as many of the Curtiss aviators are continually testing out new machines in the vicinity of the city. Recent activities have been in connection with the perfection of the hydroplane, and the waters of Keuka lake are utilized by the United States naval students of aviation as well as the Curtiss instructors in exploiting the latest inventions.

Turning eastward again, the way leads past Lake Wauneta, between Weston and Wayne, and then on to Watkins, at the southern end of Seneca lake. Here, time should be spent in visiting the famous Watkins Glen, one of the most remarkable of nature's wonders, now a state park.

During the ages the small stream, in making its way from the hills to Seneca lake, has worn a deep gorge in the soft rock at this point, until now the water tumbles over a series of gorges, some of them nearly 200 feet deep. Sometimes the cut is no more than 10 feet wide, while at others it broadens out into vast amphitheatres, in which the echo of the tourist's voice sounds wierd and almost supernatural. This chasm penetrates the hills for three miles, winding and curving abruptly, and presenting an almost infinite variety of rocky and picturesque scenes.

The return to Binghamton is over the divide into the Susquehanna valley. The country is still picturesque, although by no means as romantic in its beauty as that which has occupied the tourist for the greater portion of three days. The road is excellent, while not of macadam, and good time can be made, so that if desired, the homeward journey may be delayed long enough to enjoy fully the interesting points on the way. Splendid views of the Susquehanna are afforded as the tourist approaches Owego and from that point the river is followed into Binghamton.

TOUR NO. 53.

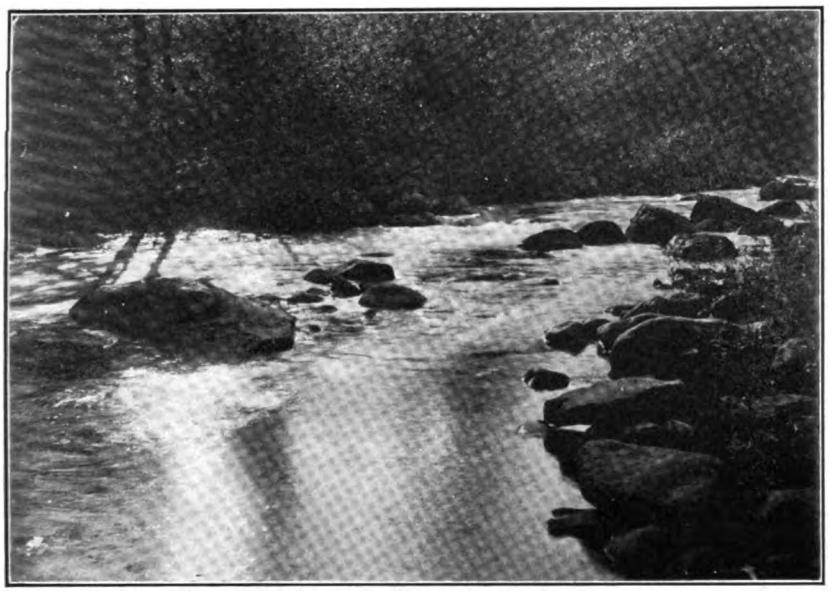
Binghamton, N. Y. — Richfield Springs, N. Y.—Penn Yan, N. Y.—Binghamton.

Three Days, 372.1 Miles.

First Day, Binghampton to Richfield Springs, N. Y., 100.4 Miles.

Binghamton to	Miles to	Total Miles
Port Crane	7.2	7.2
Sanitaria Springs	3.4	10.6
Belden	6.2	16.8
Harpursville	3.6	20.4
Ninevah	1.7	22.1
Afton	5.3	27.4
Bainbridge	5.3	32.7
Unadilla	10.8	43.5
Wellsbridge	5.1	48.6
Otego	4.4	53.0
Oneonta	8.4	61.4

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One of the Many Interesting Trout Streams in the Foothills of the Catskills.

Colliers	5.5	66.9
Milford Center	2.4	69.3
Portlandville	1.3	70.6
Milford	4.6	75.2
Hartwick	4.3	79.5
Cooperstown	4.3	83.8
Springfield Center	9.9	93.7
Warren	3.6	97.3
Richfield Springs	3.1	100.4

Second Day, Richfield Springs to Penn Yan, 138.6 Miles.

Richfield Springs	Miles to	Total Miles
East Winfield	9.1	9.1
West Winfield	2.2	11.3
Bridgewater	3.5	14.8
Sangerfield	7.5	22.3
Madison	6.1	28.4
Bouckville	3.2	31.6
Pine Woods	1.2	32.8
Morrisville	4.3	37.1
Nelson	3.9	41.0
Cazenovia	7.1	48.1
Oran	6.3	54.4
Manlius	2.9	57.3
Fayetteville	2.8	60.1
Syracuse	7.6	67.7
Camillus	8.3	76.0
Elbridge	7.2	83.2
Sennett	5.3	88.5
Auburn	5.2	93.7
Seneca Falls	12.8	106.5
Waterloo	3.6	110.1
Geneva	6.9	117.0
Flint	7.2	124.2
Halls Corners	6.2	130.4
Benton Center	4.2	134.6
Penn Yan	4.0	138.6

Third Day, Penn Yan to Binghamton, 133.1 Miles.

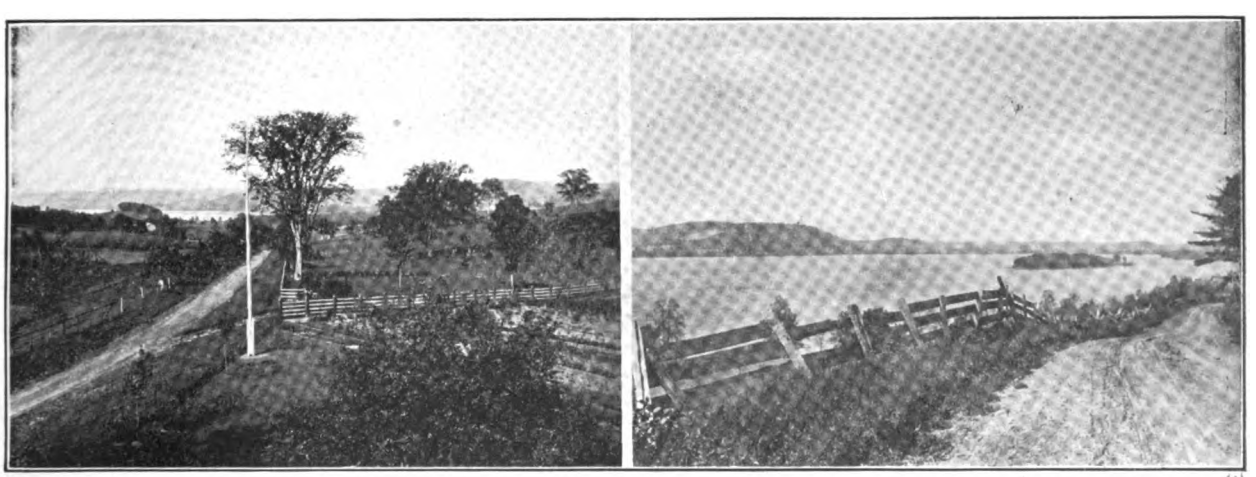
Penn Yan to	Miles to	Total Miles
Bluff Point	11.9	11.9
Branchport	7.8	19.7
Catawba	8.1	27.8
Urbana	6.2	34.0
Hammondsport	4.8	38.8
Wayne	8.6	47.4
Lake Wauneta	3.9	51.3
Weston	0.7	52.0
Tyronne	1.1	53.1
Watkins	9.9	63.0
Montour Falls	2.3	65.3
Odessa	3.8	69.1
Alpine	4.1	73.2
Cayuta	3.0	76.2
Vanetta	9.9	86.1
Spencer	3.3	89.4
Candor	8.6	98.0
Catatonk	6.0	104.0
Owego	4.5	108.5
Appalachan	8.1	116.6
Vestal	6.2	122.8
Endicott	1.1	123.9
Lestershire	5.3	129.2
Binghamton	3.9	133.1

TOUR NO. 61.

Tour No. 61 has Binghamton, N. Y., as its starting point with Delaware Water Gap, Penn., and Goshen, N. Y., as the night stops. It covers northeastern Pennsylvania, northern Jersey and the Wallkill valley of New York, and makes a number of connections with other tours outlined herein.

Crossing the Pennsylvania line, the first town of importance is Hallstead, rich in Indian traditions. The tiny gravel point in the middle of the Susquehanna at this place was once an island, around which the savages used to race in canoes, the prize for the swiftest being the honor of chief of the funmakers for the day. High upon the cliffs above the river, at a point seemingly inaccessible, was once a picture of a red chief in full war paint. The picture gradually faded, but the red remained, giving to the cliff its present name of Red Rock.

Scranton is situated in a pocket among the mountains and on the banks of the beautiful Lacka-



In the Midst of Central New York's Lakes: Left, Beautiful View in the Vicinity of Richfield Springs; Right, Inland Dotted Waters Vying with Mountains in Catskill Foothills.

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wanna. The outskirts of the city are marked by a number of culm banks and coal breakers, bearing eloquent testimony of the unceasing search for coal.

The tour then begins the climb to Mt. Pocono, and descends to Stroudsburg, the views presenting panoramas of waving pine, mountain laurel and rhododendron, which grows in endless profusion along the walks and driveways. The night stop is at Delaware Water Gap.

The second day's run enters New Jersey, climbing into the Schooleys mountain region, and then turning northward into the valley of the Wallkill. The roads will be found to be good for the most part, with occasional stretches of macadam. The views of mountains on either side, combined with those of the fertile valley, make this an ideal trip. The night stop is Goshen, N. Y., in the midst of a famed stock breeding country.

Middletown is the centre from which the famous Orange county milk and butter is shipped to New York City and other points. Highview is located on the eastern slope of the Shawangunk mountains, and as its name implies, affords a broad and extensive view of the valleys and the Catskills. Mamakating is on the other slope of the same mountain, and near this is Mamakating park on the banks of the lake by the same name, a beautiful body of spring water covering 100 acres.

Connection is made with Tour No. 51 at Wurtsboro, by which it is possible to reach New England points reversing Tour No. 61 to Wurtsboro and reversing Tour No. 51 to the Hudson river and beyond. Within 1.5 miles of Rock Hill are six lakes, besides numerous trout streams, making this town deservedly popular as a fishing ground.

At Ferndale the road crosses the east branch of the Mongaup river, the scenery around which is wild. Liberty falls, nearby, have an added interest. Lake Ophelia at Liberty is a pretty sheet of water, and the highlands about this region form a chain of foothills extending to the Catskills, 20 to 40 miles distant, although in plain view, from the broad plateau on which the town is located.

Parksville is in the heart of an immense trout country. Livingston Manor, at the junction of the Willowemoc and Little Beaverkill rivers, is situated in a wide valley, and the surrounding hills lend much to its attractions. Among the points of interest are the celebrated Eastman, Marguerite and Woolsey falls, near the highway.

It is said to be worth 10 years of city life to spend a week among the trout haunts in the vicinity of Cook's falls. At East Branch the Beaverkill pours its spring waters into the Delaware, and bass fishing is said to be the best in the state. The remainder of the distance into Binghamton is by way of Hancock, Rood's Creek, Deposit, Damascus and Windsor.



Eastman's Glen in the Vicinity of Livingston Manor, N. Y.

TOUR NO. 61.

Binghamton, N. Y.—Delaware Water Gap, Penn.—Goshen, N. Y.—Binghamton.

Three Days, 329.4 Miles.

First Day, Binghamton to Delaware Water Gap, Penn., 112 Miles.

Binghamton to	Miles to	Total Miles
Kirkwood	8.9	8.9
Great Bend, Penn.	5.7	14.6
Hallstead	0.7	15.3
New Milford	6.0	21.3
Harford	7.1	28.4
Glenwood	10.4	38.8
Fleetville	3.7	42.5
Wallsville	2.7	45.2
Waverly	4.0	49.2
Clark's Green	2.0	51.2
Clark's Summit	0.5	51.7
Chinchilla	1.7	53.4
Providence	3.1	56.5
Scranton	2.8	59.3
Elmhurst	8.5	67.8
Moscow	3.3	71.1
Gouldsboro	10.3	81.4
Tobyhanna	5.6	87.0
Mt. Pocono	5.1	92.1
Paradise	4.1	96.2
Henryville	2.8	99.0
Analomink	4.1	103.1
Stroudsburg	5.2	108.3
Delaware Water Gap...	3.7	112.0

Second Day, Delaware Water Gap to Goshen, N. Y., 84.1 Miles.

Delaware Water Gap to	Miles to	Total Miles
Portland	5.3	5.3
Myers Ferry	2.9	8.2
Delaware, N. J.	0.4	8.6
Bridgeville	5.6	14.2
Buttzville	1.2	15.4
Pequest	1.7	17.1
Townsbury	2.2	19.3

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Danville	2.5	21.8
Great Meadow	0.5	22.3
Vienna	1.0	23.3
Hackettstown	3.9	27.2
Warrenville	3.7	30.9
Allamuchy	1.5	32.4
Andover	6.2	38.6
Newton	5.7	44.3
Papakating	8.6	52.9
Sussex	5.2	58.1
Unionville, N. Y.	7.6	65.7
Slate Hill	8.6	74.3
Denton	5.3	79.6
Goshen	4.5	84.1

Third Day, Goshen to Binghamton, 133.3 Miles.

Goshen to	Miles to	Total Miles
Middletown	8.4	8.4
Highview	8.7	17.1
Manakating	1.9	19.0
Wurtsboro	1.6	20.6
Rock Hill	7.0	27.6
Bridgeville	1.6	29.2
Monticello	3.8	33.0
Bushville	5.7	38.7
Strongtown	3.3	42.0
Ferndale	0.9	42.9
Liberty	2.3	45.2
Parksville	4.1	49.3
Livingston Manor	5.6	54.9
Roscoe	6.7	61.6
Cooks Falls	6.2	67.8
Elk Brook	2.8	70.6
Bealsville	5.0	75.6
East Branch	1.9	77.5
Fish's Eddy	4.9	82.4
Hancock	8.4	90.8
Rood's Creek	6.0	96.8
Deposit	6.6	103.4
Damascus	12.5	115.9
Windsor	2.2	118.1
West Windsor	6.7	124.8
Binghamton	8.5	133.3

TOUR NO. 62.

Tour No. 62 leaves Harrisburg, Penn., for a visit to Eagles Mere and return by way of Easton. It connects with Vacation Tour No. 2 at Wilkesbarre and thus affords an opportunity for motorists in central Pennsylvania to connect with tours from that point to New England and the other itineraries listed in this section.

The first day's run is through the Blue mountain region, very nearly to Williamsport, and thence across the coal country to the famed Eagles Mere. Some care should be taken in driving through the small towns in the coal district, because of the narrow streets and the abundance of children. The views on the way are excellent and the conditions at Eagles Mere amply repay for the difficulties encountered in reaching it.

The beautiful "Lake of the Eagles" is situated 2200 feet above sea level, and is embedded like a brilliant emerald among the virgin forests of northern Pennsylvania. It is 1.5 miles long and one mile wide, and in many places 60 feet deep. Excellent opportunity for bathing is afforded, the beaches being covered with clean, sloping white sand. Eagles Mere park is a beautiful grove of about 400 acres, a greater part of which is primeval forest, located at the north end of the lake.

After leaving Wilkesbarre, Vacation Tour No. 2 is followed for a few miles, branching off for Easton and Weygadt mountain, with its celebrated Shawnee spring. The view from this point is decidedly commanding, and a mountain park affords excellent drives. Much time can be spent profitably in this vicinity.

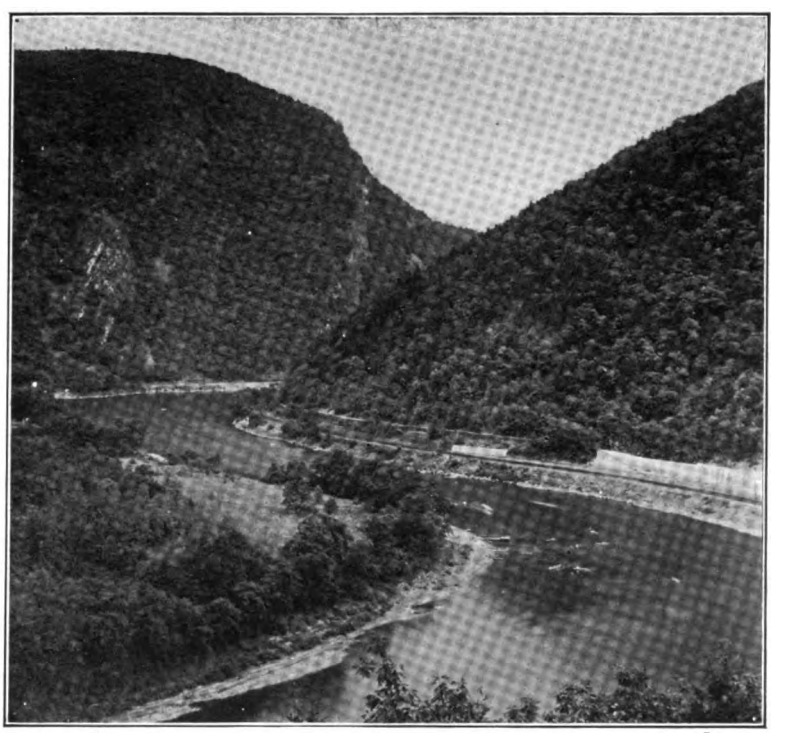
As laid out this route takes the short line between Easton and Bethlehem over the hills, where some excellent views are obtained. If the tourist reaches this point in wet weather, however, he is earnestly advised to take the longer route by way of Nazareth and Bethlehem, which is macadam all of the way.

Near Kutztown is a famous crystal cave. Reading is located on a narrow plain between the Schuylkill river, and the Penn and Neversink mountains. Penn mountain may be ascended by a switchback railroad, and affords a splendid view of the surrounding country. The White Spot, a piece of sandstone lying on the Laurentian rock, is another favorite point of view. The remainder of the route to Harrisburg is over good road, the chief objection being the numerous toll gates and the frequent stops occasioned thereby.

TOUR NO. 62.

Harrisburg, Penn. — Eagles Mere, Penn.—Easton, Penn.—Harrisburg.

Three Days, 369.4 Miles.



Mts. Tammany and Minsi in the Delaware Water Gap.

First Day, Harrisburg to Eagles Mere, Penn., 106.7 Miles.

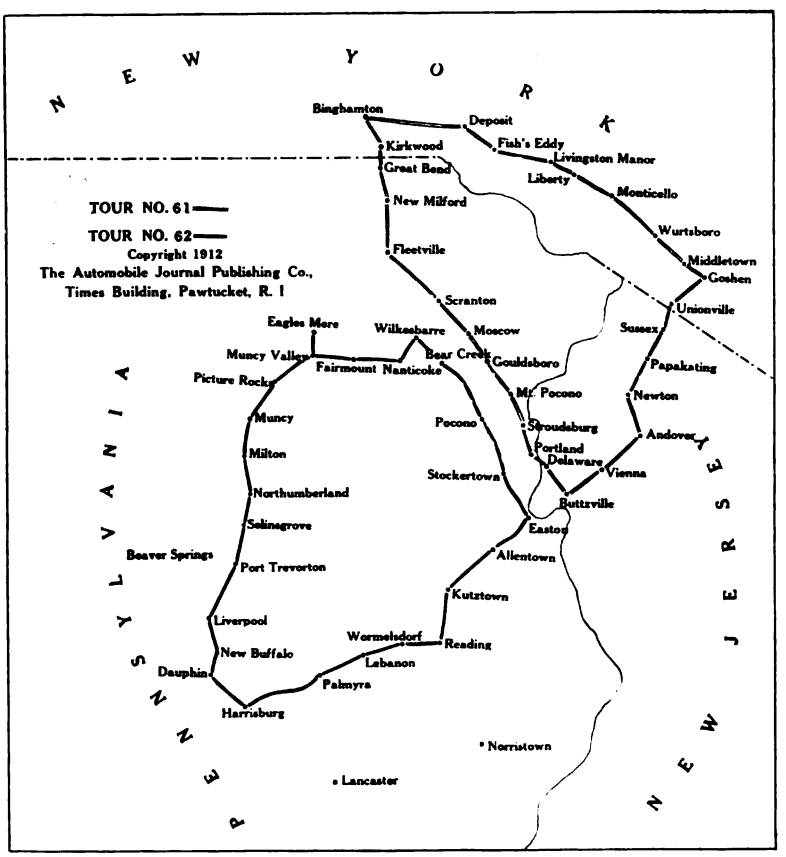
Harrisburg to	Miles to	Total Miles
Dauphin	8.4	8.4
Clarks Ferry	6.1	14.5
New Buffalo	5.1	19.6
Mt. Patrick	6.4	26.0
Liverpool	3.6	29.6
McKee's Half Falls	7.5	37.1
Independence	2.1	39.2
Chapman	1.4	40.6
Port Trevorton	1.4	42.0
Selinsgrove	4.7	46.7
Shamokin Dam	6.2	52.9
Northumberland	3.0	55.9
Milton	11.3	67.2
McEwensville	4.4	71.6
Muncy	9.7	81.3
Hughesville	4.5	85.8
Picture Rocks	2.7	88.5
Muncy Valley	11.3	99.8

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Eagles Mere	6.9	106.7

Second Day, Eagles Mere to Easton, Penn., 145.5 Miles.

Eagles Mere to	Miles to	Total Miles
Muncy Valley	6.9	6.9
Beach Glen	1.4	8.3
North Mountain	3.7	12.0
Lungerville	2.6	14.6
Guava	8.6	23.2
Laubach	2.3	25.5
Coles Mill	2.1	27.6
Fairmount Springs	3.5	31.1
Harveyville	4.6	35.7
Muhlenburg	5.2	40.9
Hunlock Creek	5.9	46.8
Harvey Creek	3.0	49.8
Nanticoke	1.4	51.2
Wilkesbarre	7.5	58.7
Ashville Plains	5.2	63.9
Allentown	5.3	21.0
Fogelsville	8.9	29.9
Maxatauny	5.6	35.5
Montery	2.0	37.5
Kutztown	3.4	40.9
Moslem Springs	3.9	44.8
Kirbyville	1.5	46.3
Maiden Creek	2.6	48.9
Reading	8.9	57.8
Sinking Springs	4.9	62.7
Wernersville	8.2	70.9
Robesonia	3.3	74.2
Wormelsdorf	2.9	77.1
Waterloo	2.8	79.9
Myerstown	3.9	83.8
Avon	4.9	88.7
Lebanon	2.1	90.8
Annville	4.8	95.6
Palmyra	4.5	100.1
Swatara	4.1	104.2



Fairview	1.5	65.4
Glen Summit	1.1	66.5
Bear Creek	8.9	95.4
Stoddartsville	9.2	104.6
Blakeslee	2.1	106.7
Pocono	4.3	111.0
Effort	9.8	120.8
Brodheadsville	2.7	123.5
McInhaney	1.9	125.4
Saylorsburg	4.1	129.5
Ross Common	1.5	131.0
Windgap	2.3	133.3
Belfast	4.3	137.6
Stockertown	2.1	139.7
Easton	5.8	145.5

Third Day, Easton to Harrisburg, Penn., 117.2 Miles.

Easton to	Miles to	Total Miles
Bethlehem	15.7	15.7
Hummelstown	3.5	107.7
Harrisburg	9.5	117.2

TOUR NO. 63.

Tour No. 63, outlined as a three-day trip from Trenton, N. J., to Mauch Chunk and Scranton, Penn., passes the point on the Delaware river crossed by Gen. Washington on his memorable trip Christmas night, 1776, previous to the battle of Trenton. The tour itself crosses the river at Stockton, by means of a long covered bridge, and turns right on to a narrow, rocky road along the cliff. The entire road into Easton is far from being good, but the views are splendid.

Reaching Allentown by way of Bethlehem, the way leads toward Mauch Chunk, over mountainous roads for some distance. A night stop is made at Mauch Chunk, affording ample opportunity to visit the mountain and take a ride on the switch-back railroad.

The mountain is in itself an island in the Lehigh river, the top being 900 feet above the river. The car is hauled up the side of this mountain by cable, along an incline of one in three. While this climb is but 664 feet, the car travels downward some 18 miles solely by the force of gravity, making one ascent of 462 feet on the trip, and returns to the town at the end of about an hour. A short distance from this mountain is Glen Onoko, a national park, and a visit to Mauch Chunk without stopping at this place of winding paths, splashing waters and windy chasms, would be decidedly incomplete.

On the way to Wilkesbarre the second day, mountain views are quite in order. At White Haven, is located Sunnyrest Sanitarium, which has an elevation of 1200 feet, and the cold bracing air of the Blue mountains is said to work wonders in stimulating the appetite, and insuring sound sleep. On one of the offshoots of the Alleghenies is Nescopec mountain, on the eastern spur of which is Glen Summit, with its famous springs, celebrated for its pure water and excellent air.

The third day finds the tourist on the itinerary for Tour No. 61 for a time, or until after leaving Delaware Water Gap. From this point back to Trenton several small towns are visited, most of them furnishing excellent views of the Delaware and Musconetcong valleys, or both. Washington is a particularly pleasing little town, with its old houses, its shady streets and splendid landscapes.

TOUR NO. 63.

Trenton, N. J.—Mauch Chunk, Penn. —Scranton, Penn.—Trenton.

Three Days, 337 Miles.

First Day, Trenton to Mauch Chunk, Penn., 108.9 Miles.

Trenton to	Miles to	Total Miles
Titusville	9.3	9 3

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Eagles Mere, a Beautiful Lake and State Park of Virgin Forest Within Easy Driving Distance of Wilkesbarre.

Lambertville	5.8	15.1
Stockton	3.5	18.6
Point Pleasant, Penn.	5.8	24.4
Narrowsville	13.4	37.8
Raubsville	5.0	45.9
Easton	5.4	51.3
Bethlehem	15.5	66.8
Allentown	5.3	72.1
Guthsville	6.1	78.2
Schencksville	3.9	82.1
Slatington	4.9	87.0
Bowmanstown	8.9	95.9
Leighton	3.2	99.1
Jackerton	7.9	107.0
Mauch Chunk	1.9	108.9

Second Day, Mauch Chunk to Scranton, Penn, 92.6 Miles.

Mauch Chunk to	Miles to	Total Miles
White Bear	7.9	7.9
Tamaqua	7.7	15.6
McAdoo	8.4	24.0
Yorktown	1.1	25.1
Hazleton	3.1	28.2
Harleigh	2.2	30.4
Ebervale	1.8	32.2
Oakdale	1.3	33.5
Drifton	1.9	35.4
Freeland	1.1	36.5
Pound Creek	3.6	40.1
White Haven	4.7	44.8
Bear Creek	10.9	55.7
Glen Summit	8.8	64.5
Fairview	2.3	66.8
Ashley	4.2	71.0
Wilkesbarre	3.8	74.8
Pittston	7.5	82.3
Duryea	2.8	85.1
Taylor	3.7	88.8
Scranton	3.8	92.6

Third Day, Scranton to Trenton, N. J., 135.5 Miles.

Scranton to	Miles to	Total Miles
Elmhurst	8.6	8.6
Moscow	3.2	11.8
Gouldsboro	10.4	22.2
Tobyhanna	5.6	27.8
Mt. Pocono	5.1	32.9
Henryville	6.8	39.7
Anatomink	4.1	43.8
Stroudsburg	5.3	49.1
Delaware Water Gap	3.7	52.8
Portland	5.3	58.1
Myers Ferry	2.9	61.0
Bridgeville	5.6	66.6
Buttzville	1.2	67.8
Washington	8.7	76.5
Hampton	5.1	81.6
Clinton	5.8	87.4
Annandale	1.6	89.0
Lebanon	1.5	90.5
Potterstown	2.1	92.6
White House	8.9	101.5
Flemington	10.9	112.4
Copper Hill	3.1	115.5
Ringoes	2.8	118.3
Moore	6.9	125.2
Trenton	10.3	135.5



Atlantic City Possesses One of the Best Known Bathing Beaches and Recreation Spots in America.

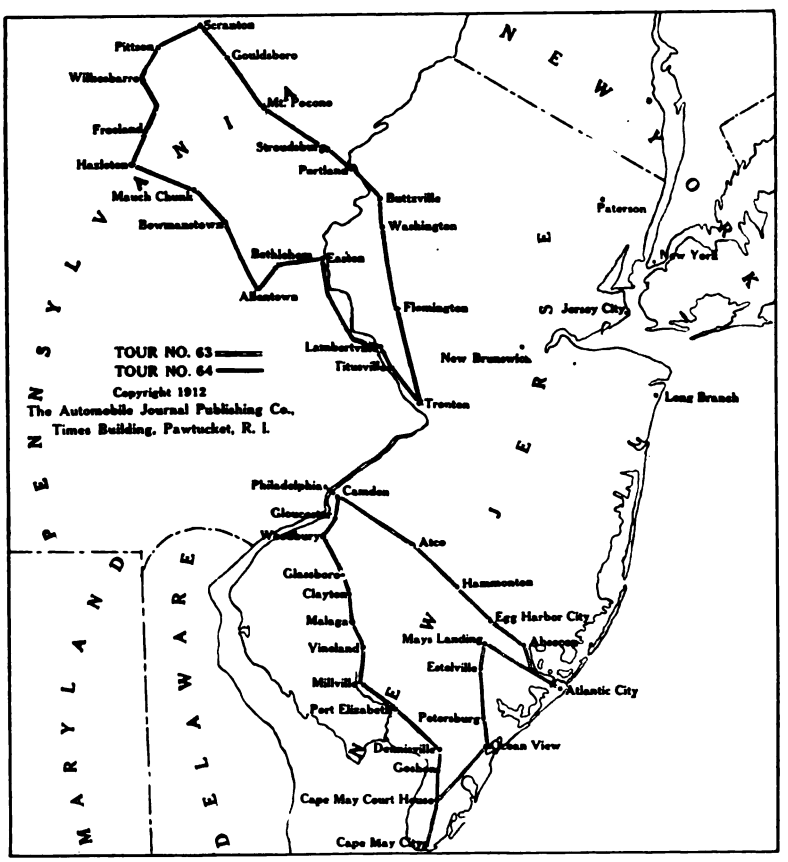
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TOUR NO. 64.

Tour No. 64 is planned to connect Philadelphia with two well known summer resorts on the south Jersey shore. It is anticipated that tourists from other parts of the region covered in this series will desire to include either one or both of these in their itinerary, particularly as New Jersey now encourages touring within its borders. The night stops are Cape May and Atlantic City.

Care should be taken in traversing this end of New Jersey, particularly during the summer season, because of the numerous railroad crossings and the frequent train service. The second day's run is from cool Cape May, as it is termed, to Atlantic City, one of the best known convention cities, as well as a famous watering place.

The location of Atlantic City is particularly advantageous. Built upon an island lying seven miles out from the mainland, it is entirely surrounded by salt water. Elegant displays of art and bric-a-brac, magnificent hostelries and all forms of legitimate amusements are to be found side by side, fronting the greatest esplanade in the world, called the board walk.



The first day's route lies along the shores of Delaware bay to the tip end of New Jersey, with its excellent yachting harbor at Cape May. Here, it is claimed that surf bathing is the best and safest in America. A fine ocean boulevard, 60 feet wide, extending to Sewell's Point, provides a matchless drive, which at no point is more than 100 feet from high tide for a distance of five miles. Public pavilions are maintained on the ocean side of the board walk and the city furnishes a band which gives open air concerts daily, morning, noon and evening.

The return to Philadelphia is across the state in almost a straight line. The roads are much better than over the first day's run.

TOUR NO. 64.

Philadelphia—Cape May City, N. J.—Atlantic City, N. J.—Philadelphia.

Three Days, 216 Miles.

First Day, Philadelphia to Cape May City, N. J., 90.2 Miles.

Philadelphia to	Miles to	Total Miles
Camden	2.0	2.0
Gloucester	5.8	7.8
Woodbury	3.8	11.6
Pitman Grove	8.3	19.9
Glassboro	2.4	22.3
Clayton	3.1	25.4
Franklinville	2.8	28.2
Malaga	3.4	31.6
Newfield	2.6	34.2
North Vineland	1.3	35.5
Vineland	2.8	38.3
Millville	7.5	45.8
Port Elizabeth	6.6	52.4
Eldora	10.8	63.2
Dennisville	5.0	68.2
Goshen	4.7	72.9
Cape May Court House.	4.2	77.1
Cape May City	13.1	90.2

Second Day, Cape May City to Atlantic City, N. J., 63.3 Miles.

Cape May City to	Miles to	Total Miles
Cape May Court House.	13.1	13.1
Ocean View	8.7	21.8
Seaville	2.3	24.1
Petersburg	5.1	29.2
Tuckahoe	2.0	31.2
Estelville	7.9	39.1
Mays Landing	4.7	43.8
Idlewood	9.2	53.0
Pleasantville	3.5	56.5
Atlantic City	6.8	63.3

Third Day, Atlantic City to Philadelphia, 62.5 Miles.

Atlantic City to	Miles to	Total Miles
Pleasantville	6.8	6.8
Absecon	2.6	9.4
Pomona	5.7	15.1
Germania	3.1	18.2
Egg Harbor City	2.1	20.3
Elwood	5.5	25.8
Dacosta	4.1	29.9
Hammonton	1.5	31.4
Aucora	5.7	37.1
Atco	4.9	42.0
Berlin	3.4	45.4
Overbrook	4.1	49.5
Magnolia	3.0	52.5
Hadden Heights	2.9	55.4
Camden	5.4	60.5
Philadelphia	2.0	62.5

The Automobile Journal feels confident that the motoring public will agree that the collection of tours presented in this American section covers the richest touring ground in the country. Studied in connection with the directory of touring information in the front of the magazine, these itineraries will supply data more than sufficient to satisfy the most exacting for a single season. In fact, this number will have a permanent value and will be retained as a book of reference throughout the entire year. Additional information, covering any specified territory may be obtained by addressing the Touring Department of The Automobile Journal.

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DIGEST OF AMERICAN MOTORING LAWS.

ALABAMA.

(Act of 1911.)

Registration—Annual, Secretary of State, Montgomery.
Fees—20 hp., $7.50; 20-30, $12.50; 30-40, $17.50; over 40, $20.
License—Chauffeur, $5; renewal, $2.50.
Non-Residents—Full reciprocity.
Lights—Two front; one red rear, visible 50 feet; one-half hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed—Reasonable and proper; maximum 30 miles per hour for .25 mile.
Local Ordinances—Prohibited.

ARIZONA.

(No law. Bill pending.)

ARKANSAS.

(Act of 1911.)

Registration—Annual, Secretary of State, Little Rock.
Fees—$5.
License—Chauffeur, $1.
Non-Residents—Exempt.
Lights—Two front; one red light rear; front visible 200 feet; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and sufficient.
Speeds — Reasonable and proper; closely built-up sections, 15 miles per hour for .125 mile; outside, 20 miles per hour for .25 mile; corners, curves and in obstructed traffic, six miles per hour.
Local Ordinances—Prohibited, except in parks, special speedways, etc.

CALIFORNIA.

(Act of 1905, amended 1907.)

Registration—Perpetual, Secretary of State, Sacramento.
Fees—$2.
License—Chauffeur, $2.
Non-Residents—Exempt, temporarily.
Lights—Two forward; one red rear; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and efficient.
Speed—Reasonable and proper; closely built-up, one mile in six minutes; elsewhere in cities and towns, one mile in four minutes; outside, one mile in three minutes.
Local Ordinances—Permitted as to speed of all vehicles.

COLORADO.

(No law, but cities and towns may pass ordinances requiring registration and license.)

CONNECTICUT.

(Act of 1911.)

Registration—Annual, Secretary of State, Hartford.
Fees—50 cents a horsepower; pro ratio after March 1.
License—Operator, $2.
Non-Residents—Exempt.
Lights—Two forward, visible 200 feet; one red rear, illuminating number plate; one-half hour.
Warning Signal—Bell or horn.
Brakes—Two sets, one on driving wheels.
Muffler Cut-Out—Prohibited between 9 in the evening and 6 in the morning.
Speed—Reasonable and proper; curves, crossing, etc., 10 miles per hour; outside cities, 25 miles per hour for .25 mile; passing street cars, three miles per hour.
Local Ordinances—Prohibited.

DELAWARE.

(Act of 1909, amended 1911.)

Registration—Annual, Secretary of State, Dover.
Fees—$5.
License—Operator, $5.
Non-Residents—United States, reciprocity; foreign nation, special license.
Lights—One forward, visible 200 feet; one red rear; one hour.
Warning Signal—Horn, bell or other device.
Brakes—Good and sufficient.
Tire Chains—Prohibited on certain surfaces.
Speed—Closely built-up, one mile in five minutes; elsewhere, one mile in three minutes.

DISTRICT OF COLUMBIA.

(Act of 1906 and police regulations.)

Registration—Automobile Board, Washington.
Fees—$2.
License—Driver, $2.
Non-Residents—Reciprocity.
Lights—Two forward; one red rear; one-half hour.
Warning Signal—Bell, gong or horn; unnecessarily loud or discordant alarm prohibited.
Muffler—Required.
Speed—Between intersecting street, 12 miles per hour; parks, 15; across streets, eight; around corners, six.
Special Regulations—Unlawful to drive on certain streets. Ask for police regulations.

FLORIDA.

Registration—Secretary of State, Tallahassee.
Fees—$2.
License—Chauffeur, $2.
Non-Residents—Exempt 30 days.
Lights—Two, from sunset to sunrise.
Warning Signal—Bell, horn or whistle.
Speed—Reasonable and proper; curves, crossings, etc., four miles per hour.

GEORGIA.

(Act of 1910.)

Registration—Secretary of State, Atlanta.
Fees—$2.
Non-Residents—Exempt 30 days.
Lights—One front, visible 100 feet; one red rear, illuminating number plate; one hour.
Warning Signal—Bell, horn, gong or other device.
Speed—Reasonable and proper; curves, crossings, etc., six miles per hour.
Local Ordinances—Permitted, must not conflict.

IDAHO.

(No law.)

ILLINOIS.

(Act of 1911.)

Registration—Annual, Secretary of State, Springfield.
Fees—25 hp., $4; 25-35, $6; 35-50, $8; over 50, $10; electrics, $5.
License—Chauffeur, $5.
Non-Residents—Exempt, 60 days.
Warning Signal—Bell, horn or other device.
Brakes—Good and sufficient.
Speed—Reasonable and proper; closely built-up, 10 miles per hour; residential portions, 15; elsewhere in cities and towns, 20; outside, 25.
Local Ordinances—Prohibited except as to traffic regulations.

INDIANA.

(Act of 1911.)

Registration—Perpetual, Secretary of State, Indianapolis.
Fees—$1.
Non-Residents—Exempt.
Lights—After dark.
Warning Signal—Bell, horn or other device.
Speed—Reasonable and proper; closely built-up, eight miles per hour; elsewhere in cities and towns, 15; outside, 20.
Local Ordinances—Permitted, but speed limit must not be reduced.

IOWA.

(Act of 1911.)

Registration—Annual, Secretary of State, Des Moines.
Fees—20 hp., $8; over 20, 40 cents a horsepower; electrics and steam, $15.
Non-Residents—Exempt.
Lights—Two front; one red rear, visible 50 feet, illuminating number plate; one-half hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed—Careful and prudent manner; maximum 25 miles per hour.
Local Ordinances—Permitted as to speed limitation, but in no case less than one mile in six minutes.

KANSAS.

(No law. Bill pending.)

KENTUCKY.

(Act of 1910.)

Registration—Annual, Secretary of State, Frankfort.
Fees—25 hp., $5; 25-50, $10; over 50, $20.
Non-Residents—Exempt.
Lights—Two forward, visible 200 feet; one red rear; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and sufficient.
Speed—Reasonable and proper; closely built-up, 10 miles per hour for .125 mile; residential portions, 15 miles per hour for .125

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mile; outside, 20 miles per hour for .25 mile; obstructed traffic, eight miles per hour.
Local Ordinances—Prohibited, except as to parks, etc.

LOUISIANA.

(No law. Bill pending.)

MAINE.

(Act of 1911.)
Registration—Annual, Secretary of State, Augusta.
Fees—20 hp., $5; 20-35 $10; over 35, $15.
License—Operator, $2.
Non-Residents—Exempt, 30 days.
Lights—Two forward; one red rear, illuminating number plate; one-half hour.
Warning Signal—Horn, bell or other device, heard at least 200 feet.
Brakes—Over 10 horsepower, two sets.
Speed—Reasonable, safe and proper; cities and towns, 10 miles per hour; outside, 25.
Local Ordinances—May permit greater speed.
Special Provisions—Use of automobiles restricted in certain towns.

MARYLAND.

(Act of 1911.)
Registration—Annual, Commissioner of Motor Vehicles, Baltimore.
Fees—10 hp., $5; 10-20, $10; 20-30, $15; 30-40, $20; over 40, $25.
License—Operator, $2; professional chauffeur, $5.
Non-Residents—Special license for two periods of seven days each, except reciprocity with following states under governor's proclamation: New York, Pennsylvania, Delaware, Virginia and West Virginia.
Lights—Two forward, visible 200 feet; one red rear; one hour.
Warning Signal—Bell, horn or other device; bulb horn or electric bell during night season in cities and towns.
Brakes—Adequate.
Muffler Cut-Out—Prohibited in towns and cities.
Speed—Reasonable and proper; thickly settled sections, 12 miles per hour; outlying districts, 18; open country, 25.
Local Ordinances—Permitted, but signs must be posted conspicuously.

MASSACHUSETTS.

(Act of 1909, amended 1912.)
Registration—Annual, State Highway Commission, Boston.
Fees—20 hp., $5; 20-30, $10; 30-40, $15; 40-50, $20; over 50, $25. Half-rate after Sept. 30.
License—Owners and chauffeurs, $2.
Non-Residents—Exempt 10 days.
Lights—Two forward, visible 200 feet; one red rear, illuminating number, visible 60 feet; one-half hour; all vehicles must display lights.
Warning Signal—Bell, horn or other device.
Brakes—Over 10 hp., two sets.
Speed — Reasonable and proper; thickly settled or business portion, 15 mph for .125 mile; outside, 20 mph for .25 mile.
Local Ordinances—Permitted.

MICHIGAN.

(Act of 1909.)
Registration—Annual, Secretary of State, Lansing.
Fees—$3.
License—Chauffeur, $2.
Non-Residents—Exempt.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed—Reasonable and proper; business portions of cities and towns, 10 miles per hour; elsewhere in cities and towns, 15; open country, 25.
Local Ordinances—Permitted as to speedways, parks, etc.

MINNESOTA.

(Act of 1911.)
Registration—Triennially, Secretary of State, St. Paul.
Fees—$1.50.
License—Chauffeur, $3; renewal, annually, $2.
Non-Residents—Exempt, 30 days.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed — Reasonable and proper; closely built-up, 10 miles per hour for .125 mile; residential portions, 15 miles per hour for .125 mile; outside, 25 miles per hour for .25 mile; congested traffic, six miles per hour.
Local Ordinances—Prohibited.

MISSISSIPPI.

(Act of 1912.)
Registration—Annual, State Auditor, Jackson.
Fees—25 hp., $5; 25-40, $15; 40-50, $20; over 50, $25.
Non-Residents—Exempt, 30 days.

MISSOURI.

(Act of 1911.)
Registration—Annual, Secretary of State, Jefferson City.
Fees—12 hp., $2; 12-24, $3; 24-36, $5; 36-48, $7; 48-60, $8; 60-72, $10; over 72, $12.
License—Chauffeur, $1.50.
Non-Residents—Exempt 20 days.
Lights—Two front, visible 200 feet; one red rear.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed—Careful and prudent; maximum, 25 mph for .25 mile.
Local Ordinances—Prohibited, except cities and towns may require annual license tax from owners residing therein.

MONTANA.

(No law.)

NEBRASKA.

Registration—Annual, Secretary of State, Lincoln.
Fees—$2.
Non-Residents—Exempt 30 days.
Speed—Reasonable and proper; cities and towns, 12 mph; outside, 25.

NEVADA.

(No law.)

NEW HAMPSHIRE.

(Act of 1911.)
Registration—Annual, Secretary of State, Concord.
Fees—15 hp., $10; 15-30, $15; 30-40, $20; 40-50, $25; 50-60, $30; over 60, $40. Half-rates after Oct. 1.
License—Private operator, $3; professional chauffeur, $5; renewals, $1.
Non-Residents—Exempt 10 days; special rate, half-fees, for months of July, August and September.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate to be visible 50 feet; one-half hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed — Reasonable and proper; thickly settled portions, 15 mph; elsewhere, 25; curves, crossings, etc., 10.

NEW JERSEY.

(Act of 1906, amended 1912.)
Registration—Annual, Commissioner of Motor Vehicles, Trenton.
Fees—10 hp., $4.50; 11-29, $7.50; 30 and over, $15. Half-rate after Sept. 1.
License—Operator, $2 or $4, according to horsepower of machine.
Non-Residents — Reciprocity, 15 days.
Lights—Two front, visible 250 feet; one red rear, one-half hour. All vehicles must show light at night.
Warning Signal—Suitable device.
Brakes—Two sets.
Muffler Cut-Out—Prohibited in cities and towns, and elsewhere within 200 feet of horsedrawn vehicle.
Speed — Reasonable and proper; curves and corners, one mile in seven minutes; cross roads, one mile in four; closely built-up sections, one in five; elsewhere, 25 mph.
Local Ordinances—Prohibited.

NEW YORK.

(Act of 1910, amended 1911.)
Registration—Annual, Secretary of State, Albany.
Fees—25 hp., $5; 25-35, $10; 35-50, $15; over 50, $25. Half-rate after Aug. 1.
License—Chauffeur, $5.
Non-Residents—Full reciprocity.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate, visible 50 feet; one-half hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed—Careful and prudent; maximum, 30 mph.
Local Ordinances—Prohibited.

NORTH CAROLINA.

(Act of 1909.)
Registration—Annual, Secretary of State, Raleigh.
Fees—$5.
Non-Residents—Exempt.
Lights—Two front; one red rear, visible a reasonable distance; one-hour.
Speed — Reasonable and proper; business portions of cities and towns, eight mph; other parts of cities and towns, 12; outside, 25.
Local Ordinances—Permitted as to parks, etc.

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NORTH DAKOTA.

Registration—Annual, Secretary of State, Bismarck.
Fees—$3.
Non-Residents—Exempt.
Lights—Customary equipment.
Warning Signal—Horn or other device.
Speed—Cities and towns, eight mph; outside, 25.

OHIO.

(Act of 1911.)

Registration—Annual, Secretary of State, Columbus.
Fees—Gasoline or steam, $5; electric, $3.
License—Chauffeur, $2.
Non-Residents—Exempt.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate; one-half hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Speed — Reasonable and proper; closely built-up sections, 15 mph; other portions, 20; outside, 25.
Local Ordinances—Permitted to define closely built-up sections.

OKLAHOMA.

(No law.)

OREGON.

(Act of 1911.)

Registration—Annual, Secretary of State, Salem.
Fees—26 hp., $3; 26-36, $5; 36-40, $7.50; over 40, $10.
License—Chauffeur, $2.
Non-Residents—Exempt 30 days.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate, visible 50 feet; one hour.
Warning Signal—Bell, horn, whistle or other device.
Brakes—Adequate.
Speed — Reasonable and proper; maximum 25 mph.

PENNSYLVANIA.

(Act of 1909, amended 1911)

Registration—Annual, State Highway Department, Harrisburg.
Fees—20 hp., $5; 20-50, $10; over 50, $15.
License—Driver, $2.
Non-Residents—Exempt 10 days.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate; one hour.
Warning Signal—Horn, bell or other device.
Brakes—Good and sufficient.
Speed — Reasonable and proper; maximum, one mile in 2.5 minutes; must stop for street cars discharging passengers.
Local Ordinances—Prohibited, except as to parks.

RHODE ISLAND.

(Act of 1909, amended 1912.)

Registration — Annual, Board of Public Roads, Providence.
Fees—5-20 hp., $5; 20-30, $10; 30-40, $15; over 40, $25.
License—Operator, $2.
Non-Residents—Exempt 10 days.
Lights—One or more forward; one red rear, illuminating number; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Adequate.
Muffler Cut-Out—Prohibited at all times.
Speed — Reasonable and proper; closely built-up sections, 15 mph; outside, 25.
Local Ordinances — Prohibited, except exclusion from certain streets, which must be posted.

SOUTH CAROLINA.

(Act of 1906.)

Registration — Clerk of County Court.
Fees—$1.
Non-Residents—No special provision.
Speed—Maximum 15 mph.

SOUTH DAKOTA.

(Act of 1911.)

Registration—Annual, Secretary of State, Pierre.
Fees—$3.
Non-Residents—Exempt temporarily.
Lights—At least two front, visible a reasonable distance; one red rear, showing registration number; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and efficient.
Muffler Cut-Out—Prohibited in cities and towns.
Speed — Reasonable and proper; cities and towns, 10 mph; outside, 30 mph.
Local Ordinances—Prohibited.

TENNESSEE.

(Act of 1905.)

Registration — Perpetual, Secretary of State, Nashville.
Fees—$2.
Non-Residents—No special provision.
Warning Signal—Bell or horn.
Speed—Maximum, 20 mph.
Local Ordinances — May restrict speed.

TEXAS.

Registration—County Clerk.
Fees—Fifty cents.
Non-Residents—No special provision.
Speed—Cities and towns, eight mph; elsewhere, 18.

UTAH.

(Act of 1909, amended 1911.)

Registration—Perpetual. Secretary of State, Salt Lake City.
Fees—$2.
License—Chauffeur, $2.
Non-Residents—Exempt temporarily.
Lights—Two forward; one red rear, illuminating number plate; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and efficient.
Speed — Reasonable and proper; closely built-up sections, one mile in six minutes; elsewhere in cities and towns, one in four; outside, one in three.
Local Ordinances—Prohibited.

VERMONT.

(Act of 1908, amended 1910.)

Registration—Annual, Secretary of State, Essex Junction.
Fees—$1 a horsepower.
License—Operator, $2.
Non-Residents—Full reciprocity.
Lights—Two front, visible 200 feet; one red rear, illuminating number plate, visible 50 feet; 45 minutes.
Warning Signal—Bell, horn, or other device.
Brakes—Adequate.
Speed—City or town, 10 mph; outside, 25.

VIRGINIA

(Act of 1910, amended 1912.)

Registration—Annual, Secretary of the Commonwealth, Richmond.
Fees—20 hp., $5; 20-45, $10; over 45, $20.
License—Chauffeur, $2.50.
Non-Residents—Exempt, two periods of seven days each.
Lights—One front, visible 100 feet; one red rear, illuminating number plate; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and sufficient.
Speed—Cities and towns, 12 mph; outside, 20.

WASHINGTON.

(Act of 1911.)

Registration—Annual, Secretary of State, Olympia.
Fees—$2.
Non-Residents—Exempt.
Lights—One front; one red rear, illuminating number; hours of darkness.
Warning Signal—Bell or horn.
Brakes—Good and efficient.
Muffler Cut-Out — Prohibited in cities and towns.
Speed—Thickly settled districts, one mile in five minutes; outside, one in 2.5.
Local Ordinances—Prohibited.

WEST VIRGINIA.

(Act of 1911.)

Registration—State Auditor, Wheeling.
Fees—$10.
License—Chauffeur, $2.
Non-Residents—Full reciprocity.
Lights—Two front; one red rear; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Good and sufficient.
Speedometer—Required.
Speed — Reasonable and proper; closely built-up, 10 mph; elsewhere in cities and towns, 15; outside, 20.
Local Ordinances—Permitted.

WISCONSIN.

(Act of 1911.)

Registration—Annual, Secretary of State, Madison.
Fees—$5.
Non-Residents—Exempt.
Lights — One reasonable bright front; one red rear; one hour.
Warning Signal—Bell, horn or other device.
Brakes—Required.
Speed — Reasonable and proper; cities and towns, 15 mph; outside, 25.
Local Ordinances—Prohibited except as to parks, etc.

WYOMING.

(No law, bill pending.)

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TOURING AMONG HIGHLANDS OF ONTARIO.

Former Wilderness of Woods, Rocks and Lakes Now Offers Unlimited Possibilites for the Venturesome Motorist---Unimproved Road Conditions More Than Offset by Splendid Combinations of Primitive Scenic Grandeur.

SINCE the advent of automobile touring there has arisen an almost insatiable desire to know more of the beauties of nature, heretofore hidden away among almost impenetrable forests and in otherwise inaccessible places. With the continued increase in the practicability of the motor car, it is possible to utilize this modern method of transportation over ways that only a few years ago presented insurmountable difficulties to those who were forced to depend upon the horse drawn conveyance. Fortunately, interests closely allied with satisfaction of the tourist's demands have recognized in the automobile a valuable recruiting agent, and have expended no little effort in placing the roads leading to their localities in sufficiently good condition to enable their use by motorists under comparatively favorable circumstances, though these ways in many instances are still far from being ideal.

In this manner, the vast section of Canada, north of Toronto and bordering on Georgian bay, the latter an arm of Lake Huron, known as the Highlands of Ontario, has been transformed from a wilderness into a delightful summer playground. The Grand Trunk Railway system traverses this entire district, and through its efforts, many of the old trails have been reconstructed into a semblance of modern dirt roads. Several parties of automobilists have penetrated the forests to the Muskoka lakes, the Lake of Bays and the district of Parry Sound.



Pleasing View of Moon River, Near Bala, on the Shores of Lake Muskoka, Highlands of Ontario.

The Ontario Motor League, with headquarters at 123 Bay street, Toronto, Can., of which E. W. Wilcox is secretary, is authority for the statement that roads are good as far as Orillia, while beyond that point they are very rough and rocky with bad hills in places. Says Mr. Wilcox: "This region is a semi-wilderness of woods, rocks and lakes, so that motoring is difficult, although the scenery is very beautiful." Among those who have taken the trip are J. S. Eaton, William Dobie and J. A. Walker, all of Toronto.

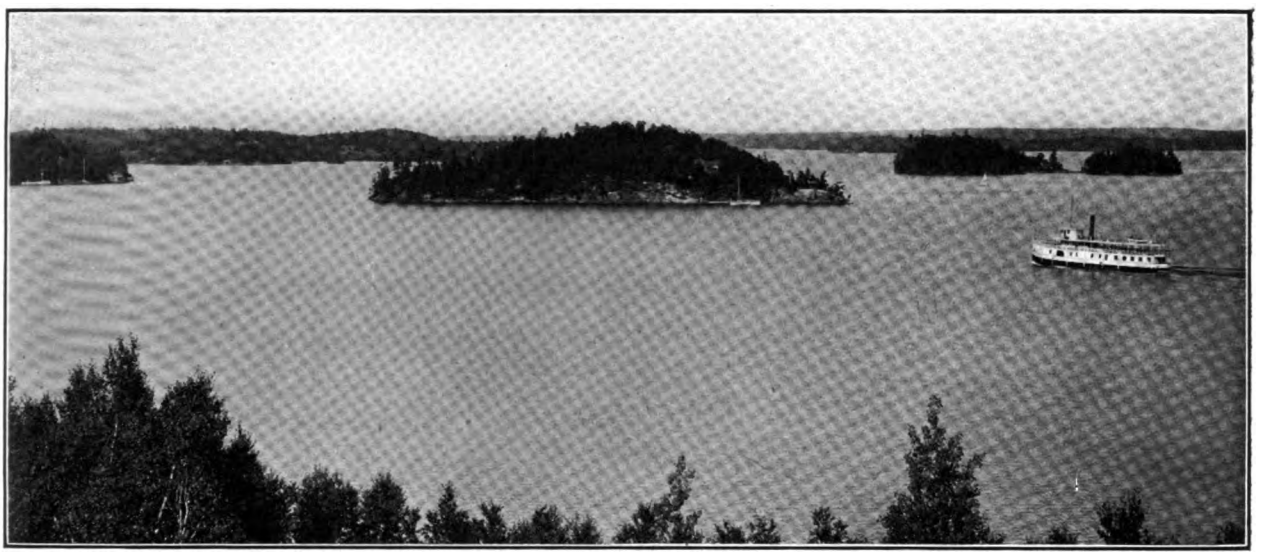
From other sources it is learned that very fair roads exist between Orillia and Gravenhurst, and that motoring tourists have been patronizing this section for a number of years. As early as three years ago, automobiles had reached the Lake of Bays district, and as it was at that time a comparatively new resort and much work has been accomplished in the interim, it is anticipated that motorists will have little difficulty in covering the itinerary outlined below. It should be mentioned, in this connection, however, that the distances given herein are approximated only, from the best information available.

The trip northward from Ontario is most interesting, taking the traveller through a continuous scene of hill and dale, diversified with beautiful lakes and rivers, until the more rugged portion of the country is reached. The prosperous farmer is much in evidence, judging from the well tilled fields and pretentious buildings on every side. Cooks Bay, on Lake Simcoe, is reached between Gilford and Lefroy, and this lake is skirted throughout the remainder of the distance to Orillia.

Allandale is a divisional point on the Grand Trunk Railway and a place of considerable importance in the district. Across the Kempenfeldt bay is the crescent town of Barre, charmingly situated and commanding a splendid view of the lake. Orillia, the night stop, is a thriving centre with some 6000 inhabitants, boasting of many beautiful residences, prosperous stores and manufacturing establishments. It is located on the shores of Lake Couchiching, which has water connection with Lake Simcoe.

The second day's route lies along the shores of Lake Couchiching and between that and Lake St. John, through Atherley, Rama, Longford and Washaga to Severn, Kilworthy and Gravenhurst. The latter is at the foot of Lake Muskoka, the southernmost of the three big lakes which give this the name of the

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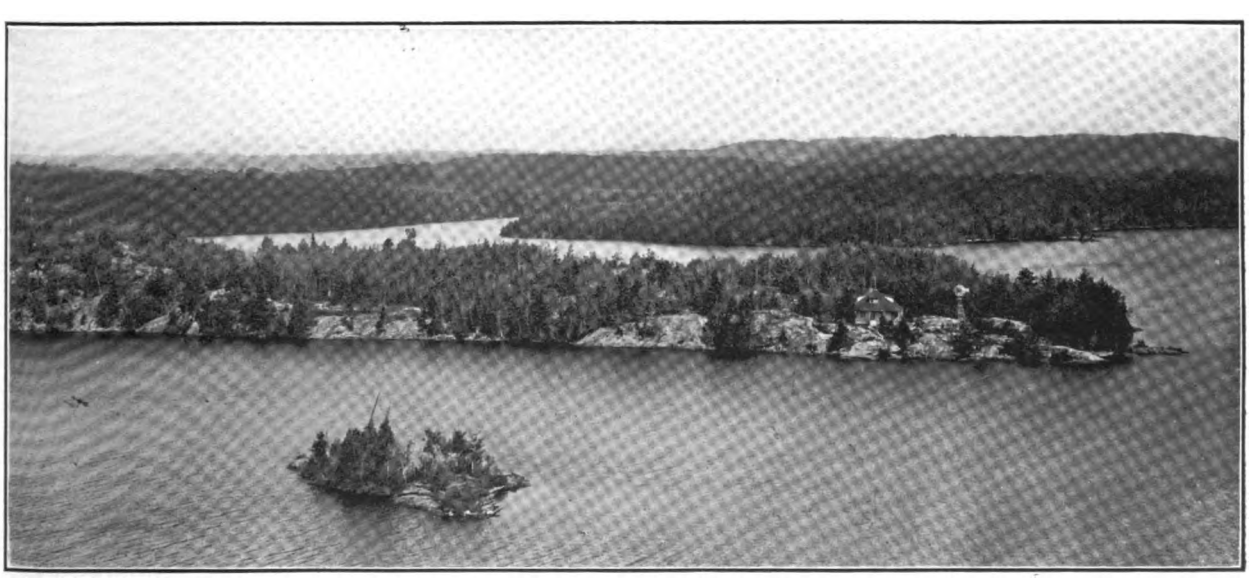
Miles of Inland Waterways and Islands Unite Their Charms in the Extensive Touring Country About Lake Rosseau, of the Muskoka Chain.

Muskoka region. The city possesses several extensive lumbering plants, and because of its healthful surroundings has been selected as the location of two large sanitaria for consumptives.

To those who desire to visit the Muskoka region, only Gravenhurst will be the objective point. Boats leave Muskoka Wharf, one mile distant, for all points on the lakes, while passable roads encircle the entire section, even affording opportunity to cross some of the narrow portions and explore one or two of the larger islands.

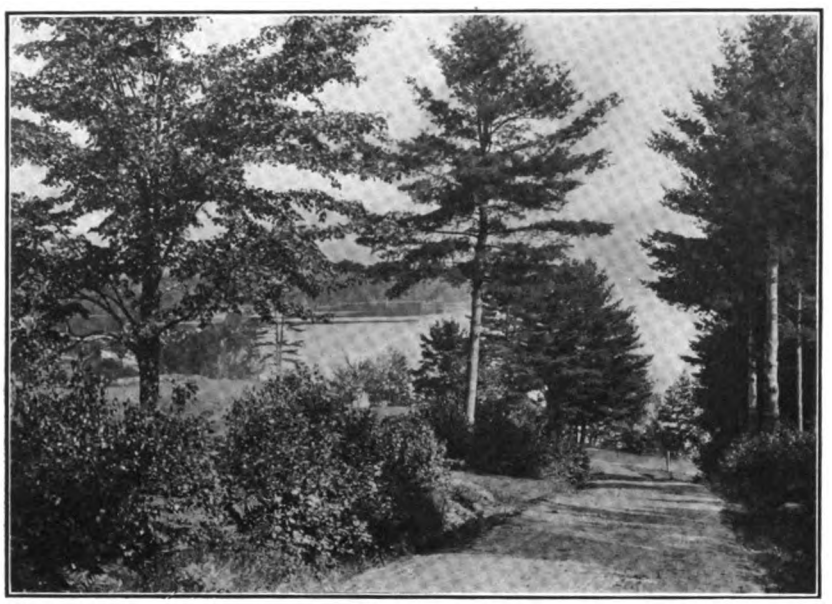
It is presumed, however, that the tourist will prefer to skirt the eastern shore of Lake Muskoka for a time, branching off at Bracebridge for Falkenburg, Utterson and Huntsville, the latter the gateway to the Lake of Bays district. Here, again, the motorist has the alternative of taking a boat for the trip through the bays, or he may continue the journey by automobile, over somewhat troublesome roads to Deerhurst, Port Cunnington, Grunwald, Point Pleasant, Dorset, Port Sydney and a dozen other well known resorts.

The Lake of Bays is only one, although the largest, of several lakes, some of them linked by locked rivers, and others by open, free flowing streams. The shores are lined with curious dappled rocks and quaint little nooks, where ferns and foliage bend low as if to catch the whispering of the soft, cool waters that lap the land. Dark pines and cedars seem to grow out of the very rocks. At Norway Point is a charming sandy bathing beach, where the water is shallow for some 500 feet from the shore. Excellent fishing and hunting are among the diversions promised during their



Lake Cecebe, an Expansion of the Magnewatan River, Offers an Attractive Rendezvous for the Tourist in the Parry Sound District.

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"Five O'Clock in the Morning," on the Way to Lake Rosseau in Muskoka Region.

season. Some exceptionally large catches are reported.

Huntsville offers a variety of scenery. The calm pastoral of Vernon, the romantic and ragged mountainous grandeur of Hollow, vie with the picturesque beauty of the Lake of Bays in deterring the tourist from continuing his trip. Here, indeed, are the Highlands of Ontario, a continuation of the great Laurentian range, through another portion of which flows the Ottawa river on its way to Montreal.

After spending such time as is deemed best amid these delightful surroundings, the itinerary anticipates the resumption of the tour to Parry Sound. The way reverses the inward trip as far as Utterson, at which point it turns toward the west, past Skeleton lake and across the Skeleton river to Rosseau, on the shores of the Muskoka lake by that name.

Rosseau is 33 miles from Gravenhurst, and between these two points lie two of the big lakes, varying in width from a few hundred yards to open stretches of water six miles across. Near this town is Rosseau river, which empties into the lake over a pretty falls, amid the greenery. In the three lakes are between 400 and 500 islands of every shape and size, ranging from one in Lake Rosseau comprising over 1100 acres to those containing but one tree, or a rock rising sheer from the water's edge. The most numerous, however, are densely covered with pine, balsam, cedar, birch, maple, oak and other varieties of trees. Many are the private property of wealthy Americans and Canadians, who have erected handsome summer homes thereon. Continuing along the old stage line the tour passes Blackstone, Star and Crane lakes, beautiful sheets of water, although suffering somewhat in comparison with the larger bodies but recently left behind. The night stop is at Parry Sound with its sheltered harbor just off Georgian bay. If preferred the tourist may ship the car to Collingwood and cruise among the 30,000 islands of this bay on the homeward trip. It is impossible to describe this wonderful waterway in a satisfactory manner, as nature has been most liberal in adorning it with rich scenic effects. Islands of every shape and size present their variegated foliage and moss covered rocks for the delight of the tourist.

Another interesting sail from Parry Sound is toward the north and the mouth of the Magnewatan river. It would be possible, with some difficulty, to continue by automobile from Huntsville to Burk's Falls, and thence by steamship down the river to Bying Inlet and Parry Sound. This is practically new territory and is by no means advised as touring ground except for those who are seeking adventure. The scenery is unexcelled, however.

Resuming the itinerary as outlined, Port Cockburn at the head of Lake Joseph, the third of the Muskoka chain, is the first point of interest. This is 45 miles from Muskoka Wharf, by boat, and here once more the tourist has the option of shipping the car or continuing to explore the Old Port Carling road. Within a radius of five to 10 miles from Port Cockburn there is found some of the best bass fishing in the northern resorts. At Bala, the Moon river connects Lake Muskoka with Georgian bay. This stream offers ex-



Lake Joseph at Port Cockburn Presents Much Beautiful Island Scenery.

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cellent maskinonge fishing, and many have been caught weighing from 27 to 33 pounds. Near by are Long, Clear, Echo, Nine-Mile and Black lakes, each of which assures capital sport for the angler.

The return to Muskoka Wharf and Gravenhurst is along the old Bala road. This time Gravenhurst is made the night stop, after which the tourist reverses the route to Atherley. If desired this reversed itinerary may be continued back into Toronto, instead of the route as outlined, through the Kawartha lake region.

If possible, time should be spared for a side trip to Sparrow lake, which is reached from Severn. In addition to its romantic beauty, it has the attraction of being easy of access. Opportunity also is afforded for a beautiful steamer ride down the upper Severn river to Honey harbor and Midland, from which point another boat may be taken for a short ride amid the islands of Georgian bay.

As has been stated already, the following mileages are estimated, but it is believed that they will be found accurate. It is anticipated that those who attempt this tour with a full realization that they will be roughing it, away from modern cities and towns, will appreciate making the night stops where at least a good meal can be obtained.

ITINERARY.

Toronto—Orillia—Huntsville — Parry Sound—Gravenhurst—Toronto.

Five Days, 382.0 Miles.

First Day, Toronto to Orillia, 86 Miles.

Toronto to	Miles to	Total Miles
North Parkdale	2.2	2.2
Davenport	2.4	4.6
Downsview	2.9	7.5
Concord	6.5	14.0
Maple	4.0	18.0
King	4.4	22.4
Aurora	7.3	29.7
Newmarket	4.3	34.0
Holland Landing	3.6	37.6
Bradford	3.6	41.2
Gilford	7.5	48.7
Lefroy	2.9	51.6
Craigville	5.6	57.2
Allandale	5.5	62.7
Barrie	1.3	64.0
Gowan	5.5	69.5
Oro	4.6	74.1
Hawkestone	3.6	77.7
Orillia	8.3	86.0

Second Day, Orillia to Huntsville, 59.9 Miles.

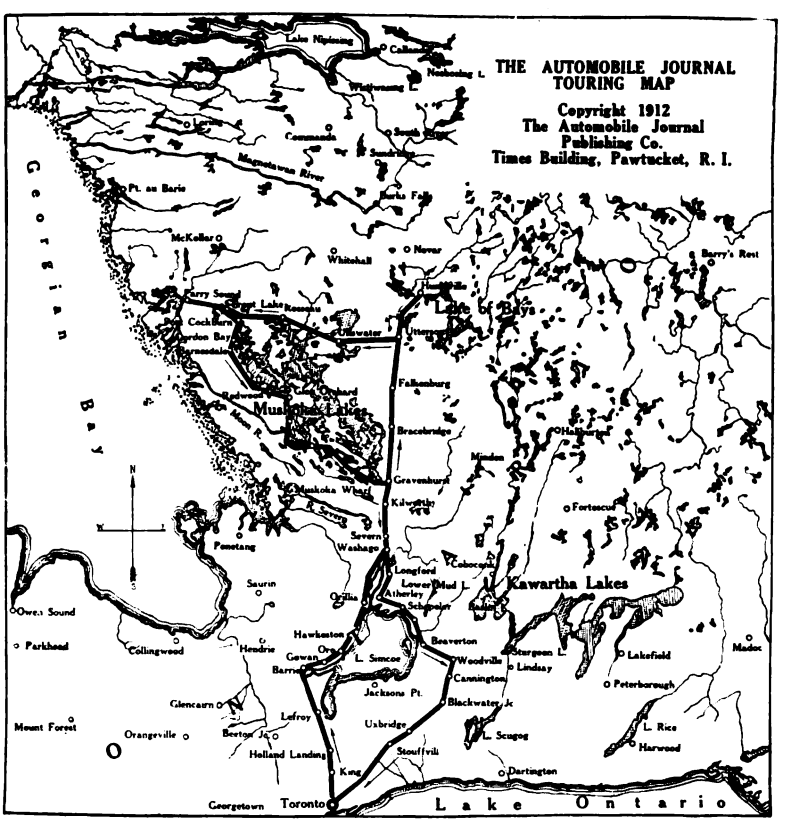
Orillia to	Miles to	Total Miles
Atherley	2.2	2.2
Rama	4.3	6.5
Longford	1.0	7.5
Washago	5.0	12.5
Severn	1.6	14.1
Koshee	4.0	18.1
Kilworthy	1.8	19.9
Gravenhurst	5.5	25.4
Bracebridge	10.2	35.6
Falkenburg	4.8	40.4
Utterson	8.7	49.1
Huntsville	10.8	59.9

Third Day, Huntsville to Parry Sound, 56.3 Miles.

Huntsville to	Miles to	Total Miles
Utterson	10.8	10.8
Ullswater	12.1	22.9
Rosseau	12.3	35.2
Ashdown	1.8	37.0
Trout Lake	9.6	46.6
Parry Sound	9.7	56.3

Fourth Day, Parry Sound to Gravenhurst, 69.4 Miles.

Parry Sound to	Miles to	Total Miles
Trout Lake	9.7	9.7
Port Cockburn	5.4	15.1
Gordon Bay	4.8	19.9
Barnesdale	2.0	21.9
Redwood	13.8	35.7
Glen Orchard	3.6	39.3
Whiteside	1.8	41.1
Uptergrove	1.5	24.7
Schepeler	4.3	29.0
Brechin	3.1	32.1
Gamebridge	3.5	35.6



Dudley	3.1	44.2	Beaverton	4.4	40.0
Bala	3.2	47.4	Lorneville	7.4	47.4
Torrance	4.8	52.2	Woodville	1.7	49.1
Muskoka Wharf	16.2	68.4	Cannington	4.1	53.2
Gravenhurst	1.0	69.4	Sunderland	5.8	59.0
			Blackwater	2.1	61.1
			Uxbridge	9.9	71.0
			Goodwood	5.6	76.6
			Stouffville	5.6	82.2
			Markham	6.3	88.5
			Unionville	2.7	91.2
			Millikens	3.0	94.2
			Agincourt	3.0	97.2
			Scarboro	4.7	101.9
			York	3.6	105.5
			Lindenhurst	1.1	106.6
			Riverdale	2.0	108.6
			Toronto	1.8	110.4

Fifth Day, Gravenhurst to Toronto, 110.4 Miles.

Gravenhurst to	Miles to	Total Miles
Kilworthy	5.5	5.5
Koshee	1.8	7.3
Severn	4.0	11.3
Washago	1.6	12.9
Longford	5.0	17.9
Rama	1.0	18.9
Atherley	4.3	23.2

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TWO WEEKS IN ENGLAND AND SCOTLAND.

Natural Beauties of Great Britain Vie with the Historic in Attracting the Motorist---A Foreign Tour That Gives Ample Opportunity to Study British Life.

THOSE who have never toured abroad little realize the natural beauties of England and Scotland. Much has been written about the Alps, the Riviera, the Black Forest and other noted points on the Continent, but the British Isles most generally are considered as offering the greatest interest in things historic. To be sure, there are certain localities which have special attraction because of their association with men of letters; as for instance, Shakespeare's country, Canterbury and the land of Chaucer, and those sections made famous by Dickens, Burns, Scott and others. The fact remains, however, that nature has been quite as liberal in endowing England and Scotland with her choicest gifts, as any other portion of the globe.



One of the Beautiful Old Buildings in the University Town of Cambridge, England.

The tour outlined herein takes the motorist along the east coast of England through the lowlands of Scotland, to the very gateway of the highlands, and back to London through the English lake region. The outward trip visits the old university town of Cambridge and some of the summer beaches on the North Sea. Plenty of the historic and romantic is offered, as well, affording the tourist who has two weeks at his command, ample opportunity to enjoy thoroughly almost every phase of English and Scottish life.

The information contained in this article is presented in connection with an article appearing elsewhere in this issue to which the reader is referred for details concerning the shipping of the car or hiring one abroad, and local regulations. It also should be mentioned that the Michelin Tire Company of 81 Fulham road, Chelsea, London, S. W., a branch of the Michelin Tire Company of Milltown, N. J., the well known tire maker, maintains a free touring office, to which every motorist is invited to apply for assistance in any manner. This company will prepare detailed itineraries for foreign tourists if requested. The itinerary is so arranged that the tourist may include as much or as little of it as desirable, continuing the trip by rail if preferred.

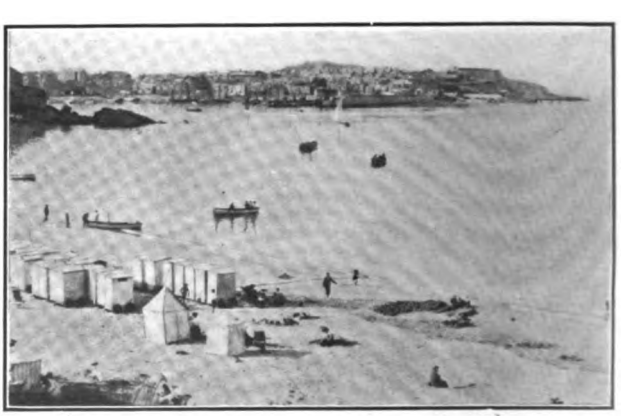
Leaving London the first day, Cambridge is the objective point, with Huntingdon as the night stop. The situation of Cambridge, bridging the River Cam, is not quite so picturesque as the sister university of Oxford, nevertheless, it is an attractive town, the stately old buildings being set off admirably by groups and avenues of magnificent trees which flourish nowhere to better advantage than in English scenery. The oldest college is Peterhouse, established in 1284. The most ancient building in the city is St. Benedict church, the tower of which is Saxon.

The way to Fenstanton is through marshland, where the great fortress of the Fens formerly stood on the Isle of Ely, entirely surrounded by water. It is memorable as having been the last stronghold of the Saxons, who maintained themselves here against the Norman conquest from 1066 to 1071. St. Ives is a very old town, and contains Slebe hall, once the residence of Oliver Cromwell, who was born at Huntingdon, of Saxon origin. It possesses much of historic interest.

Peterborough, reached early the second day, was founded as Medeshamstade by a thane of Mercia in 656. About this ancient abbey, has grown up the present town; the ruins of the monastic buildings, especially of the cathedral, are magnificent. The great feature of the latter is the west front, which was completed in the 13th century, and has three great open arches, making what probably is the finest church portico in Europe.

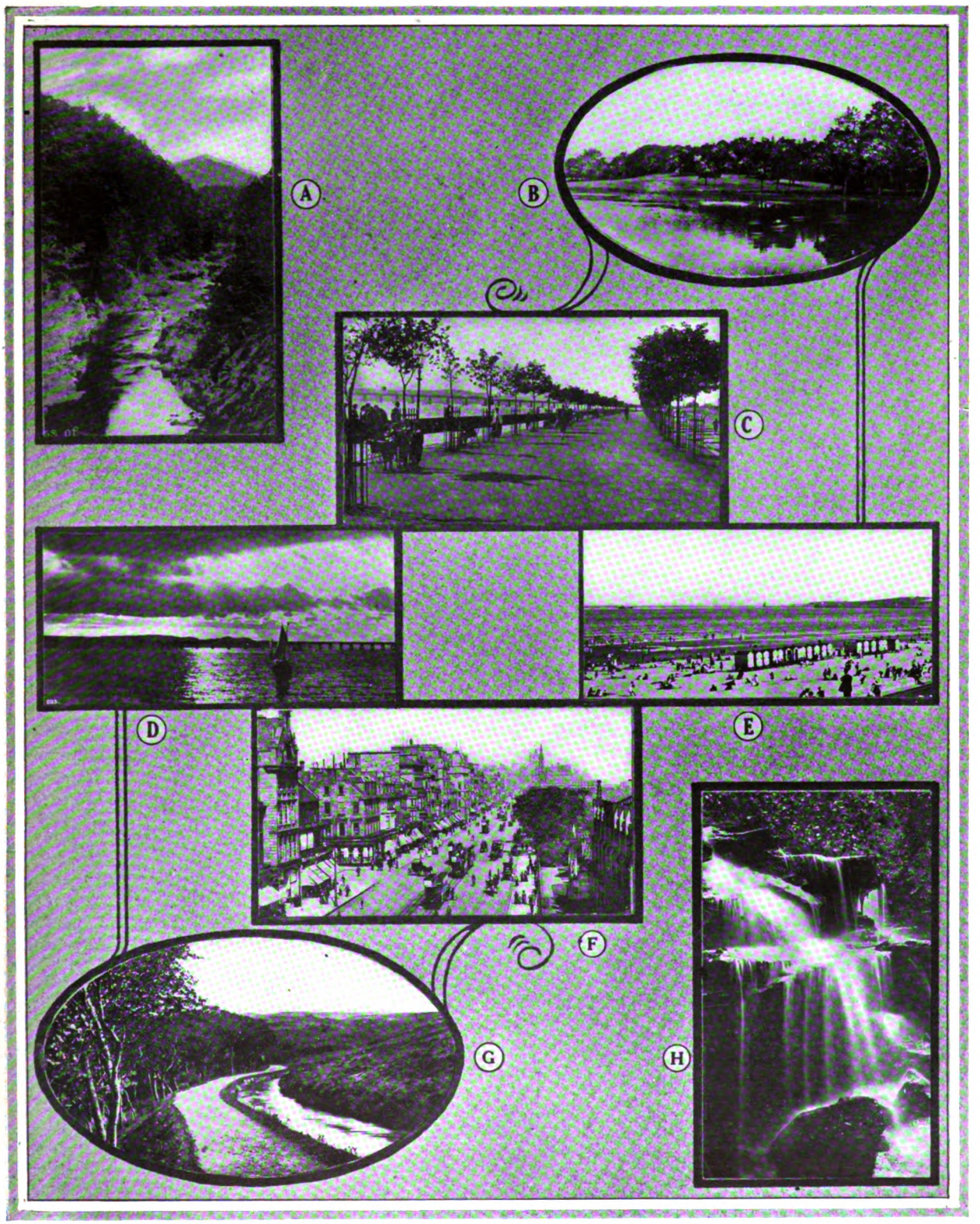
A short distance south of Stamford is the well known Burghley house, now the seat of the Marquis of Exeter, which is said to have furnished the text for Lord Bacon's "Essay on Building." The earliest English newspaper, the Stamford Mercury, was published here.

At Grantham is the quaint old Angel Inn, formerly owned by the Knights Templar, and so old that King John is said to have held court there in 1213. It was here that Richard III signed the death warrant of the Duke of Buckingham. Extensive iron works



Porthminster Beach Attracts Many Tourists to St. Ives, England.

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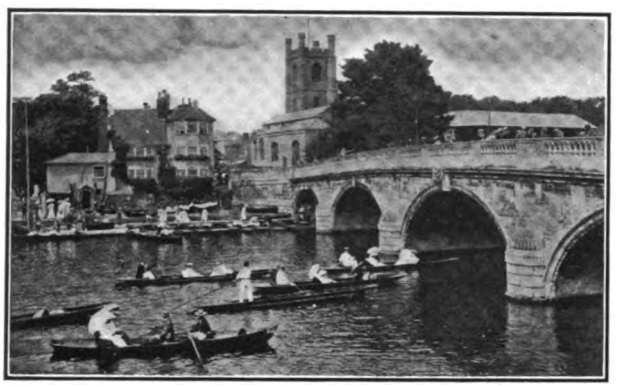


Picturesque Glimpses of Scotland: A, Pass of Killiecrankie and Benny-Gloe; B, Lindores Loch, Newburgh; C, the Esplanade, Dundee; D, the Silvery Tay; E, Beach at Aberdeen; F, Princes Street, Edinburgh; G, the Cut, Greenock; H, Upper Falls of Moness, Aberfeldy.

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now employ the people of Peterborough, but its chief memory is that of Sir Isaac Newton, who was born in 1642 at Woolsthorpe, seven miles distant.

There are few finer examples of Norman buildings



The Bridge Over Regatta Course at Henley-on-Thames, England.

in England than the Minster at Southwell, which was raised to the rank of cathedral in 1884. The ruin of the archepiscopal palace, erected 600 years ago, is now the portion of a dwelling house.

The tour next enters the Sherwood forest, once the scene of Robin Hood's exploits. His abiding place is divided into numerous handsome estates, known as Dukeries. Chief among these may be mentioned Thoresby hall and Welbeck abbey, although these are not passed on the way to Mansfield, the night stop. A preferable method of visiting these mansions is held to be by carriage, employing a local guide at Mansfield.

Leaving the valley of the Trent and Sherwood forest, the way leads into Sheffield, on the Humber, of particular interest to Americans, because of the specially high grade cutlery steel produced there. Horace Walpole wrote of Sheffield: "It is one of the foulest towns of England in the most charming situation." Much of this smoke and dirt is due to the steel manufacture.

From the high hills in the neighborhood of Fountains Dale there is a magnificent view of the plain of York. The city itself is a venerable settlement, originally the Caer Evrauc of the Britons, and later called Eboracum by the Romans. It is now the capital of a county, exceeding in extent many kingdoms and principalities in Europe. Existing long before the Christian era, York was one of the first towns captured by the Romans during the first century. Portions of the old Roman wall still remain, among them being the Multangular tower. Not far away are the delapidated ruins of St. Mary's abbey, once one of the wealthiest and proudest religious houses in the north of England.

At Darlington, in 1825, the first passenger line in England was opened, and the first locomotive used on the line is preserved on the platform at Bank Top station. Durham is in the centre of the coal and iron region, with mines and furnaces in abundance. The cathedral was founded in 1093, to guard the relics of St. Cuthbert, who was famous for the severity of his mortification and his abhorrence of women. At his shrine, it is said, none of the gentler sex might worship; they were admitted to the church, but not even a queen could lodge in the priory. It is recorded that Queen Philippa once was admitted there as a guest, but was forced to flee half dressed to the castle.

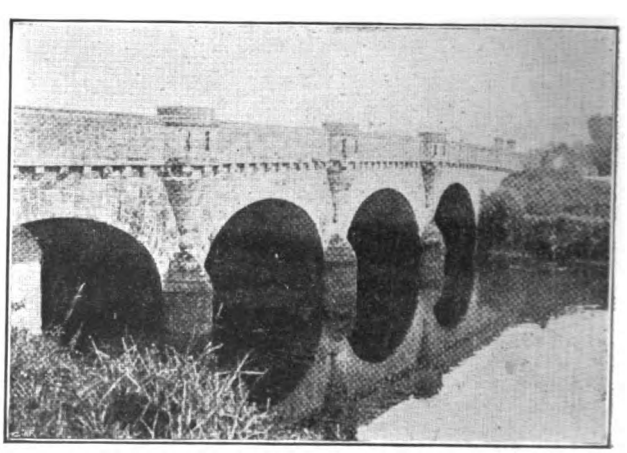
St. Cuthbert's grave was at Chester-le-Street, the site of the Roman city of Condercum, but which was destroyed by the Danish invasion. In the old Church of St. Mary and St. Cuthbert, is the rude effigy of the saint which once surrounded his tomb, as is also the "Aisle of Tombs," a chain of 14 monumental effigies of the Lumleys, dating from Elizabeth's reign.

After the Norman conquest, Robert Curthouse, eldest son of William the Conqueror, came to the junction of the Wear and Tyne rivers, building the "New Castle," from which the name Newcastle-on-Tyne is derived. Nothing is left of this structure, the present ruin being that of the keep, dating from 1172. This has walls 12 to 18 feet thick, and rises 85 feet above the rock, the turret being over 100 feet high.

The ancient Belsay castle is located in a park near Belsay. This has a large peel tower, said to be the finest in the country. Otterburn is near the battlefield of Chevy Chase, 1388. Jedburgh is a picturesque border town, with a stormy history. The abbey was founded by David I in 1118, and presents one of the finest ruins in Scotland. Two miles further along is Ferniherst castle, dating from the 16th century.

The road now enters the moorlands. At Melrose may be seen the splendid ruins of Melrose abbey, founded in the 12th century by David I, destroyed by Edward II, rebuilt by Bruce in the 14th century, destroyed again and rebuilt 100 years later. Abbotsford, two miles away, and within easy driving distance, possesses the picturesque home of Sir Walter Scott, who in 1811 bought a small farm house, now the site of the fine mansion home of Abbotsford. Southeast of Melrose are the ruins of Dryburgh abbey, where Scott is buried.

Edinburgh consists of Old Town, made famous by Scott's novels, and New Town, which contains some very fine massive buildings. Old Town once was the



Fine Example of Stone Bridge Construction on the Way to Edinburgh, Scotland.

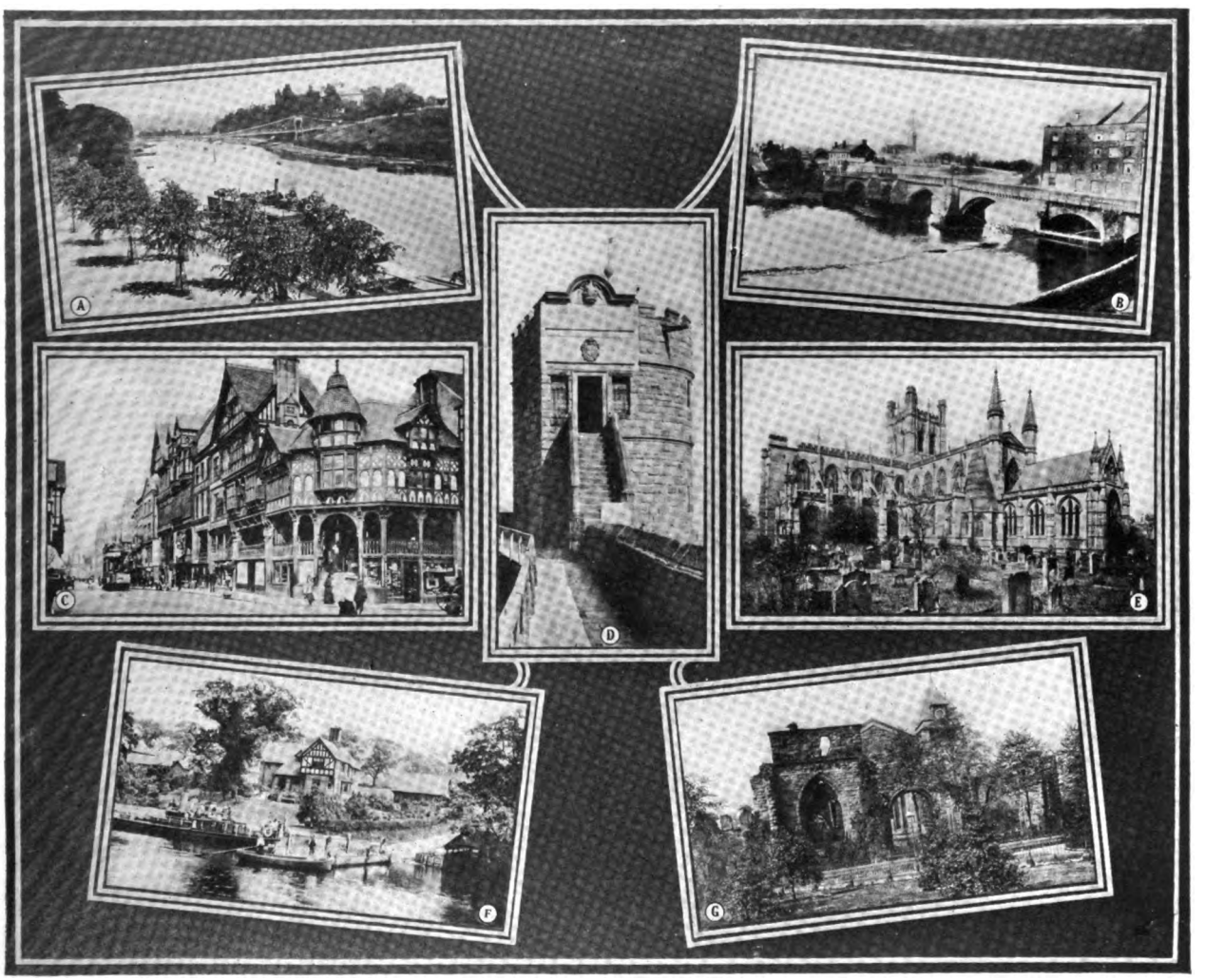
fashionable quarter, but it was destroyed by fire in the 16th century, and since rebuilding has been given over to the poorer class. Princes street is considered the finest in Europe. In Princes Street Park is a splen-

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did monument to Scott. Space forbids a full description of the numerous notable places and interesting spots in and about the city.

It is possible to visit the highlands by motor car from Edinburgh, although it is considered far more practical to take the route as outlined across the lowlands to Glasgow, and from thence to Helensburgh, where steamships take the tourist to Loch Lomond and Loch Katrine, made famous by Scott's "Lady of the Lake." It is possible to visit this country by boat in university, founded in 1451, is of particular interest because of its fine 17th century gateway.

Near Bothwell are the ruins of Bothwell castle, home of the Earl of Bothwell, husband of Mary, Queen of Scots. At Hamilton is the magnificent seat of the Earl of Hamilton, and the ruins of Cadzow castle, with grand oaks and a herd of wild white cattle. Then follows the country made famous by the exploits of Wallace during the 13th century. The falls of the Clyde near Lanark are well worth seeing.



Interesting Scenes in the Vicinity of Chester, England: A, View from the City Wall; B, Dee Bridge; C, Eastgate Street, a Typical English Thoroughfare; D, King Charles' Tower; E, Chester Cathedral; F, Eccleston Ferry; G, Ruins of St. John's Priory.

one day, but a much better plan is to utilize two at least. As outlined, this itinerary anticipates it will take the tourist six days to reach Helensburgh, and five to return to London, so that ample time is allowed for two days spent among the lakes and mountains, and still complete the tour within two weeks.

Glasgow is the principal commercial city of Scotland. The harbor and docks are very extensive, having cost over $35,000,000. The cathedral dates from the 12th century, and High street, leading thereto, was the chief thoroughfare of the old city of St. Mungo. The

Scotland is left behind wtih Gretna Green, and the first town in England is Carlisle, once a border stronghold. In the cathedral here Walter Scott was married in 1797. The ruins of Scaleby castle present the result of the terrific battering received when it resisted Cromwell's forces. Sufficient of historic interest may be found here to hold the tourist for days.

The route next lies through the English lake district, starting at Bassenthwaite and ending at the foot of Windermere. Bassenfell is at the head of the former, while Keswick is on Derwentwater, considered the

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most beautiful of all. Greta hall, the home of Southey and Coleridge, stands at the foot of Skiddaw, the bare craigs of whose summit are elevated over 3000 feet. Behind this mountain are the hills and moors of Skiddaw forest, with Scruffel hill beyond. Derwentwater may be encircled over a very pretty road, by adding 10 miles to the day's run.

Grasmere is beautifully situated at the head of the lake by that name. Wordsworth lived at Dove cottage here from 1799 to 1808, and lies buried in the churchyard. Grand views of the surrounding hills are to be obtained from this point. At Ambleside, time should be taken to visit the Church of St. Mary, which has a stained glass window in memory of Wordsworth.

Windermere is the largest English lake, having 14 small islands, which add much to its beauty. At Kendal may be seen the ruins of Kendal castle, a relic of Norman days and long since crumbled into decay. Opposite are the ruins of Castle How, and not far away the quaint appendage known as Castle Dairy, replete with heraldic carvings.

Lancaster occupies the site of a Roman camp in the first century. It stands on the slope of an eminence rising from the Lune river, and the castle towers crown the summit, the fortress being spacious, with a large courtyard. The keep is square, enormously strong, and defended by two semi-octagonal towers. This is called "John of Gaunt's Chair," and commands a fine view of the surrounding country and far away across the sea to the distant outlines of the Isle of Man. The Duchy of Lancaster is still attached to the crown. If desired, a side trip to the Isle of Man may be included in the itinerary.

The next day's route lies through the cotton manufacturing centre of Great Britain to Liverpool. Preston is a very old town, formerly the scene of many wars between the English and Scotch. Ormekirk contains an old church with high embattled towers. Liverpool is the second city of importance and the principal seaport in England. Some very fine buildings surround St. George's hall, which is in itself a splendid piece of architecture. If desired, arrangements may be made for returning to America from this point, dismissing the remainder of the tour.

Chester is the most quaint town in all England, care having been taken, even in making modern improvements to retain the old features of the place. Then follows a little of Wales, through Wrexham and Ellesmere to Shrewsbury, the scene of the War of the Roses. The town is on a fine peninsula, almost encircled by the Severn, and the castle stands facing the mainland. Only the square keep and a portion of the inner walls remain. In the vicinity are the ruins of the Roman city of Uriconium, said to have been destroyed by the Saxons in the sixth century.

Bridgenorth is an ancient town planted on a steep hill, full of quaint houses and having a covered market where the people gather on Saturday. The most prized relic is the foundry and blacksmith shop standing by the river. It was in this building that Bishop Percy, author of Reliques, was born. On a promontory of sandstone, about 160 feet above the river, are the ruins of Bridgenorth castle, built 800 years ago.

Worcester, the night stop, still retains the plan of the original Roman camp. Before Roman times, it was known as the Caer Guorangon of the Britons. The most conspicuous building is the cathedral, dedicated to "Christ and the Blessed Virgin Mary." Its western front overlooks the Severn, and the ground plan is an elongated double cross with short transepts.

Tewkesbury is at the confluence of the Avon and Severn. The ruins of the abbey, founded in 715, rise above the foliage and orchards, and the immediate vicinity is noted for its rich meadows. Gloucester was considered a point of great military importance by the Romans. It is located at the foot of the Cotswold hills, with the hills of the Forest of Dean rising on the western horizon.

For 10 miles along the chalk ridge about Wantage may be traced an old grass grown Roman road, and from this breezy height the tourist has a grand outlook over the Vale. Down in the valley is Faringdon, the place of residence for the Saxon kings. Alfred the Great was born at Wantage in 849. The return to London is by way of Wallingford, Henley-on-Thames and Maidenhead.

Obviously, in the limited space available in an article of this nature it is not possible to set forth all the attractions which would occupy the attention of the tourist for two weeks on a journey covering so large a portion of the country. The best that can be done is to offer a hint here and there as to what may be seen, but the American who decides to take this tour will find his time well spent throughout its entire length.

ITINERARY.

London — Huntingdon — Mansfield — York — Newcastle-on-Tyne — Helensburg — Carlisle — Lancaster — Liverpool — Worcester — London.

Eleven Days, 1007 Miles.

First Day, London to Huntingdon, 76 Miles.

London to	Miles to	Total Miles
Edmonton	9	9
Chesthunt	8	17
Hoddesdon	5	22
Ware	4	26
Buntingford	10	36
Royston	7	43
Melburn	3	46
Harston	5	51
Trumpington	3	54
Cambridge	3	57
Fenstanton	10	67
St. Ives	3	70
Huntingdon	6	76

Second Day, Huntingdon to Mansfield, 88 Miles.

Huntingdon to	Miles to	Total Miles
Alconbury Hill	5	5
Norman Cross	8	13
Peterborough	6	19
Wansford	8	27
Stamford	6	33
Stretton	8	41
Colsterworth	5	46
Grantham	8	54
Foston	6	60
Newark	8	68
Kelham	2	70
Southwell	6	76
Edingley	3	79
Rainworth	5	84
Mansfield	4	88

Third Day, Mansfield to York, 83 Miles.

Mansfield to	Miles to	Total Miles
Cuckney	7	7
Worksop	6	13
South Auston	6	19
Sheffield	12	31
Rotherham	7	38
Doncaster	12	50
Askern	7	57
Hut Green	6	63
Selby	6	69
Escrick	8	77
York	6	83

Fourth Day, York to Newcastle-on-Tyne, 80 Miles.

York to	Miles to	Total Miles
Shipton	5	5
Easingwold	8	13
Thormanby	4	17
Thirsk	6	23

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Northallerton	9	32
Entercommon	8	40
Darlington	8	48
Aycliffe	5	53
Ferryhill	7	60
Croxdale	3	63
Durham	3	66
Chester-le-Street	6	72
Newcastle-on-Tyne	8	80

Fifth Day, Newcastle-on-Tyne to Edinburgh, 109 Miles.

Newcastle-on-Tyne to	Miles to	Total Miles
Ponteland	7	7
Belsay	6	13
Otterburn	17	30
Rochester	5	35
Byrness	4	39
Carter Bar	6	45
Jedburgh	11	56
Bridgend	3	59
St. Boswell's	6	65
Melrose	4	69
Galasheils	4	73
Lauder	7	80
Soutra Hill	9	89
Pathead	6	95
Dalkeith	5	100
Lasswalde	2	102
Gilmerton	2	104
Edinburgh	5	109

Sixth Day, Edinburgh to Helensburgh, 67 Miles.

Edinburgh to	Miles to	Total Miles
Corstorphine	4	4
Broxburn	7	11
Uphall	2	13
Bathgate	6	19
Armadale	2	21
Caldercrux	8	29
Airdrie	4	33
Coatbridge	2	35
Glasgow	9	44
Clydebank	7	51
Bowling	5	56
Dumbarton	3	59
Helensburgh	8	67

Seventh Day, Helensburgh to Carlisle, 118 Miles.

Helensburgh to	Miles to	Total Miles
Dumbarton	8	8
Clydebank	8	16
Glasgow	7	23
Uddingston	7	30
Bothwell	2	32
Hamilton	2	34
Larkhall	4	38
Douglas Mill	14	52
Abington	9	61
Crawford	3	64
Beattock	16	80
Lockerbie	14	94
Ecclefechan	6	100
Kirkpatrick	6	106
Gretna Green	3	109
Carlisle	9	118

Eighth Day, Carlisle to Lancaster, 79 Miles.

Carlisle to	Miles to	Total Miles
Thursby	6	6
Red Deal	6	12
Bothel	2	14
Bassenfell	5	19
Keswick	8	27
Wythburn	9	36
Grasmere	4	40
Ambleside	4	44
Windermere	5	49
Kendal	8	57
Endsmoor	6	63
Burton	5	68
Carnforth	4	72
Lancaster	7	79

Ninth Day, Lancaster to Liverpool, 70 Miles.

Lancaster to	Miles to	Total Miles
Galgate	4	4
Garstang	7	11
Preston	11	22
Blackburn	9	31
Chorley	10	41
Rufford	11	52
Ormskirk	6	58
Aintree	7	65



Much Wenlock	6	68
Bridgenorth	8	76
Alvely	7	83
Kidderminster	7	90
Crossway Green	5	95
Ombesley	3	98
Worcester	6	104

Eleventh Day, Worcester to London, 133 Miles.

Worcester to	Miles to	Total Miles
Kempsey	4	4
Earl's Croome	5	9
Liverpool	5	70

Tenth Day, Liverpool to Worcester, 104 Miles.

Liverpool to	Miles to	Total Miles
Birkenhead	2	2
Eastham	6	6
Blackford	6	14
Chester	3	17
Rossett	6	23
Wrexham	5	28
Marchweel	2	30
Overton	5	35
Ellesmere	5	40
Middle	8	48
Hammerhill	2	50
Shrewsbury	6	56
Cound	6	62
Tewksbury	6	15
Coombehille	4	19
Gloucester	7	26
Birdlip Hill	6	32
Cirencester	11	43
Easington	4	47
Fairford	5	52
Lechdale	4	56
Faringdon	6	62
Wantage	9	71
Harwell	6	77
Didcot	2	79
Wallingford	6	85
Henley-on-Thames	11	96
Hurley	4	100
Maidenhead	5	105
Slough	6	111
Hornslow	11	122
London	11	133

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MOTORING IN THE ALPS AND PYRENEES.

Splendid French Roads Give the Automobilist Abundant Opportunity to Enjoy Europe's Wonderful Mountain Scenery Under Ideal Conditions.

MOUNTAINOUS Europe long has held a peculiar charm for the American. Those who have not beheld the Alps have never really toured abroad. Not only have these peaks played a prominent part in the history of the world, but their majestic grandeur possesses a distinctive beauty all its own. Many portions are not easily accessible for the automobile, but that section known as the French Alps has been supplied with some very excellent ways, over which there is little difficulty in driving during a greater portion of the year.

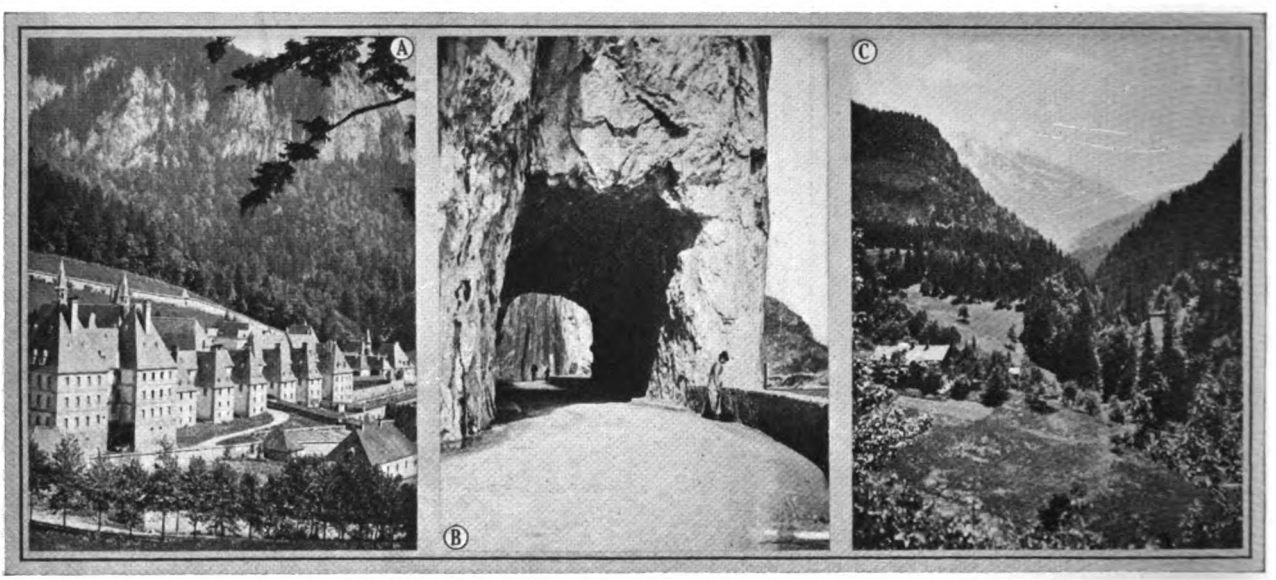
The Swiss cantons may have deemed it inadvisable to court the favor of motorists, but France looks at this matter in a very different light. As a result large sums have been expended in laying out and maintaining roads that make it comparatively easy to visit some of the most interesting points within this district. And yet, conditions are such as to add a particular zest to the journey. No American car will find it impossible to reach the heights, as indicated in some of the photographs accompanying this article.

The same may be held to apply with equal force to the Pyrenees, on the border line between France and Spain. While the roads may not be in quite the good condition of those in the Alps, the mountains are not as high and the effort is not so great for the car. The views are somewhat less grand and awe inspiring, but still possess sufficient of interest for the tourist.

The accompanying itinerary includes both. Portions of it may be used in combination with other trips on the continent. For example, it would be possible to make Geneva the headquarters from which to continue the journey through Switzerland to Germany, and thence back to the seaboard in the latter country, Holland or Belgium. From Digny or Aix it would be possible to take a run along the Riviera into Italy. At Perpignan or Lourdes, one might venture across the border into Spain and Portugal. In the latter instance, it perhaps would be better to reverse the tour from Paris.

As has been brought out elsewhere herein, the Michelin-Guide, 88 Boulevarde Pereire, Paris, will be glad to supply all necessary information for carrying out these possibilities. In addition the Michelin Tire Company, the American branch of which is located at Milltown, N. J., publishes exceedingly valuable guides, not only to France and Great Britain, but to Germany, Spain and Portugal, and the sunny countries, the latter including Algeria, Tunis, Egypt and Italy. The American contemplating a tour abroad is advised to communicate with this concern.

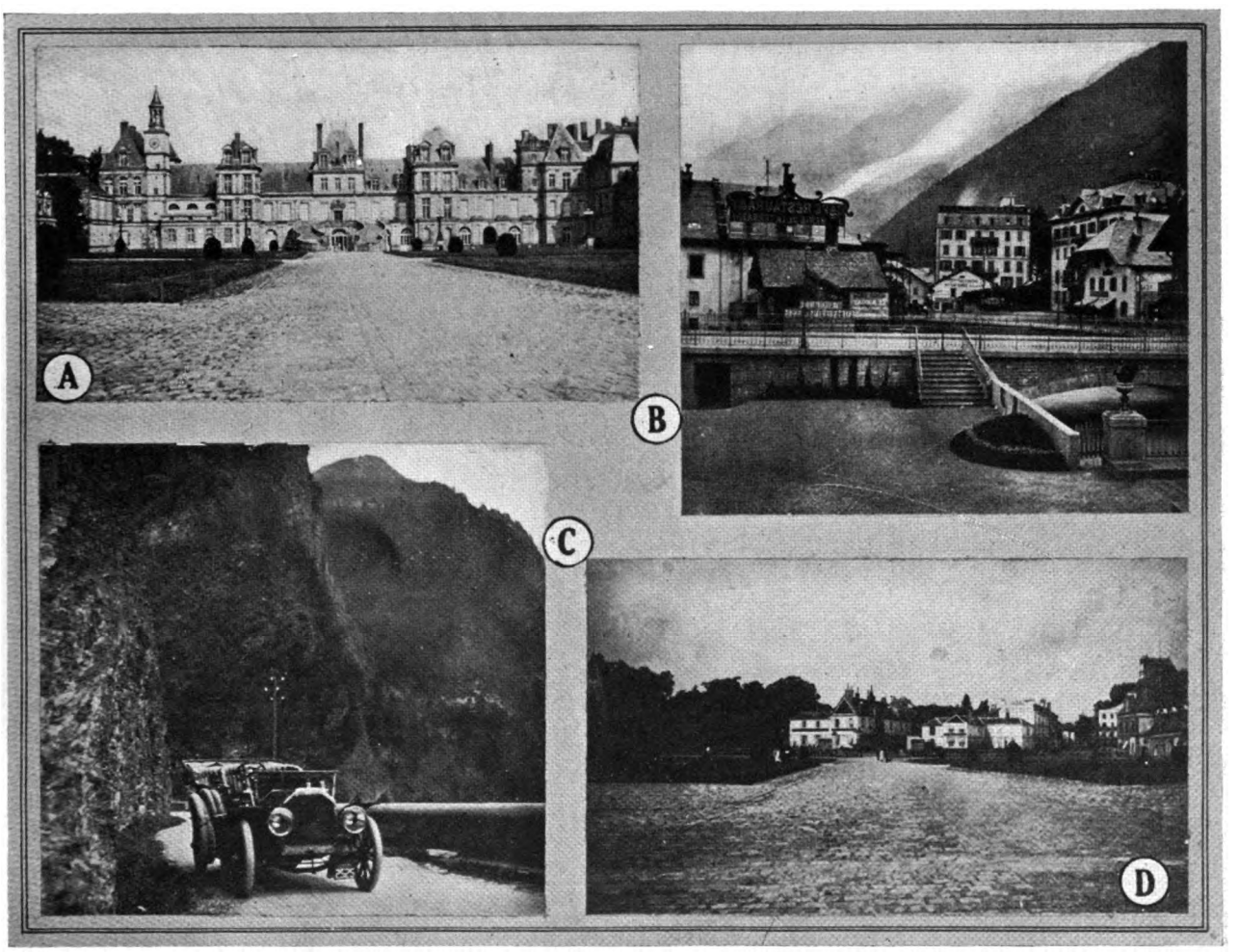
As is true of the British tour outlined previously, this itinerary is by no means confined to the tourist who owns a car. Ample opportunity is afforded those who desire to engage a chauffeur and machine abroad and thus enjoy this modern method of visiting the mountains of Europe. While these arrangements may be made after arrival in France, it is much more satisfactory to complete the details before leaving home. This may be done through a number of American agents, among whom may be mentioned the Raymond & Whitcomb Company, 225 Fifth avenue, New York City. Under this plan all delays are avoided.



High Among the French Alps: A, Monastery of La Grande Chartreuse, Near Grenoble; B, Along the Corniche Road; C, Coldes Aravies, in Haute Savoie. —Photos Copyrighted by Underwood & Underwood.

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Leaving Paris the first day, the tour enters the forest of Fountainebleau at Melun, stop having been made there, it is presumed, to inspect the church of Notre Dame, built in the 11th century, and that of St. Aspa, constructed 300 years later. This handsome forest is one of the largest and finest in France, and the tourist easily may fancy Napoleon riding over to his place at Fountainebleau from the capital. This structure is well known to students of history, and is surrounded by magnificent gardens. The public is admitted freely to the latter, but there are some portions of the palace to which they are not welcome. The decorations of that part which is open to visitors



Scenes on the Outward Journey: A, Palace of Napoleon at Fontainebleau; B, Mt. Blanc, Monarch of the Alps, Seen from Hotel at Chamonix; C, Splendid Road Leading from Geneva to Chamonix; D, Gateway to the Gardens at Fontainebleau.

are superb. A visit to Fountainebleau should serve to renew the American's interest in French history with a better knowledge of Napoleon.

Sens is one of the oldest and most interesting of the cities developed from sites antedating the Roman period. It was formerly Argendincum and the capital of Senones, who took part in the invasion of Italy and the capture of Rome, B. C. 396. The Cathedral of St. Etienne was built on the site of a pagan temple, and was begun in 1124, although it has been restored and remodelled several times since that date.

Tonnerre, the night stop, also is of Roman origin. There are several noted buildings, one of which is the hospital, containing the tomb of Marguerite de Bourgogne, Queen of Sicily. It dates from the 13th century, and besides the library and musee, comprises a chapel with a remarkable roof of wood. The church of St. Pierre is another structure that should be seen.

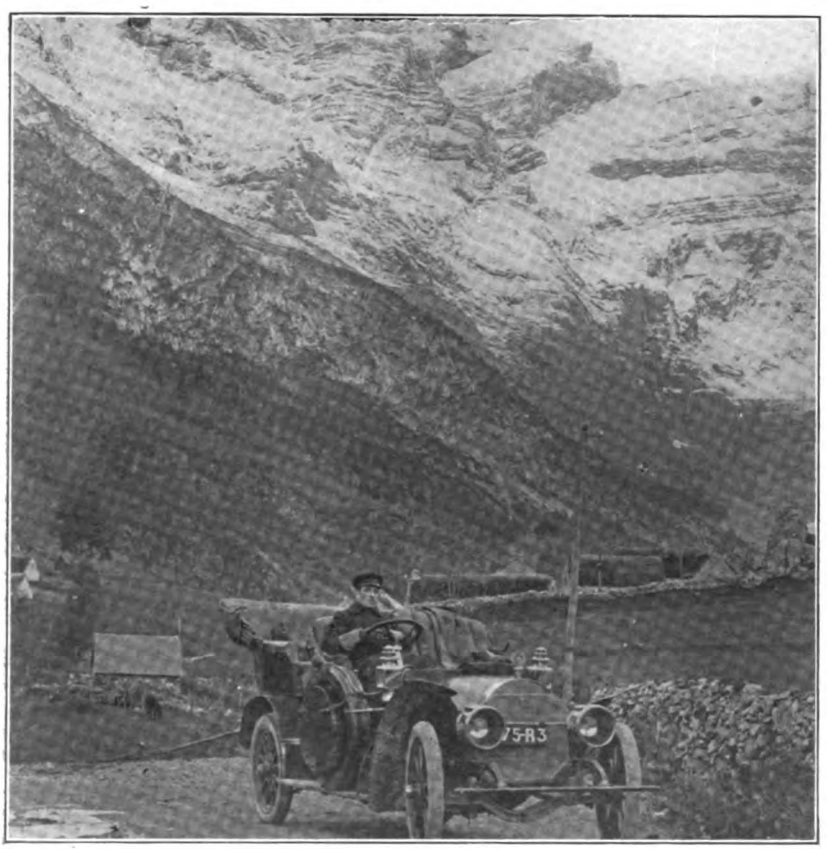
At Ancy-le-Franc is a pretty chateau, the decorations of which are by celebrated masters of painting. At Dijon is a botanical garden, boasting a black poplar tree, said to be 500 years old, 130 feet in height and 40 around at a point three feet above the ground. The town was decidedly prominent during the religious wars, and is noted for its many specimens of early architecture. Auxonne contains an interesting cathedral while Dole, capital of the former dukedom of Burgundy, is ripe with historic lore.

The night stop is Poligny, from which point it is an easy day's drive to Geneva, over one of the routes nationale. These French highways in the Alps region are constructed of white flint. When damp this has the appearance of marble, but when dry there is.

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a fine dust, not unlike flour. There is a certain elasticity about the road between Poligny and Geneva, which tempts the motorist to get the utmost speed from his car. This tour crosses Switzerland in the so-called free district, and it is only necessary to present the triptyque to comply with the customs formalities.

It undoubtedly would be possible to make the entire distance into Chamonix in one day, but it is anticipated that the tourist will desire to spend some time in Geneva, the most interesting of all the Swiss cities and undoubtedly the best known. As already indicated herein, it is possible to make this the starting point for a tour throughout Switzerland and Germany, or it may be made the headquarters from which to visit all sections of the Alps and southern Europe.



The Valley of Gavarnie in the Pyrenees, Between France and Spain.

The road from Geneva to Chamonix is that most frequented by motorists. It is one of the most delightful rides that can be enjoyed from the standpoint of scenic beauty. The way leads through Haute Savoie, over excellent surface, between precipitous cliffs and mountains that rise thousands of feet into the air. In many places tunnel-like cuttings have been made, where spurs of rock jut from the mountain side into space. Frequent glimpses of Mt. Blanc are to be had, long before Chamonix is reached, but it is at the latter town that the famous peak is seen best.

The tourist leaves Chamonix for the real experience with Alpine roads, At times they descend steep grades, while at others they run high above deep valleys, beside glaciers and through tunnels. Always, there are magnificent views of the mountains. On the way to Grenoble, just before reaching Domene, in the valley of Isere, the heights of Chartreuse and Belledonne are to be seen.

Between Grenoble and Gap there are many interesting lake and river prospects, to combine with the mountains. This is particularly true beyond Vizille, where the windings of the Romanche river are best noted. On the way to La Mure, the road passes three or four very picturesque lakes. Then follows two or three somewhat steep grades, until just before reaching Corps, the Drac river begins to narrow and the scenery is very beautiful. The road from Corps to Gap is through the Bayard pass.

Leaving Gap, the valley of the Laye is bordered on the right by wild, rocky slopes, as far as Chorges from which point the way leads into the valley of the Durance, past jagged rocks and marble quarries. Then comes the tunnel to Colliers. Beyond Seyne, it skirts Grand Guy and descends into the valley of the Bes, only to reascend into a beautiful forest above a deep ravine. The valley of the Arigeol presents some interesting grassy plains and numerous wild gorges with precipitous rocks. After leaving La Javie, there is a dangerous turning, before entering the Bleone valley.

The route from Digne to Aix is a succession of descents, with many crossings of bridges and plenty of interesting scenery. Two days are given over to crossing southern France, much of the time in full sight of the Gulf of the Lion. It must not be supposed that these cities and towns do not offer much that is interesting and worthy of a visit. The comparatively level country and better road surfaces will present a welcome relief for the driver, while the change in scenery will be appreciated by the other members of the party.

From Perpignan, the road leads up into the Pyrenees. At first the mountains are small, and appear somewhat insignificant in comparison to those left behind. At Quillan, there begins an ascent by wide curves into Puivert, and shortly afterward a descent into the valley of the Hers, from which point excellent views of the peaks are obtained. Another down grade into a forest brings the tourist to Lavelanet. Foix is at the end of a wild valley and amid interesting scenery.

The ledge road above the Argel leads through the valley, alternately green and rugged to St. Girons. It next enters a narrow defile to St. Lizier, and thence to Montsaunes through the valley of the Salat, bordered on either side by wooded hills. The night stop is St. Gaudens, from which city many excellent views of the surrounding country are to be obtained.

The next day's route takes the traveller even

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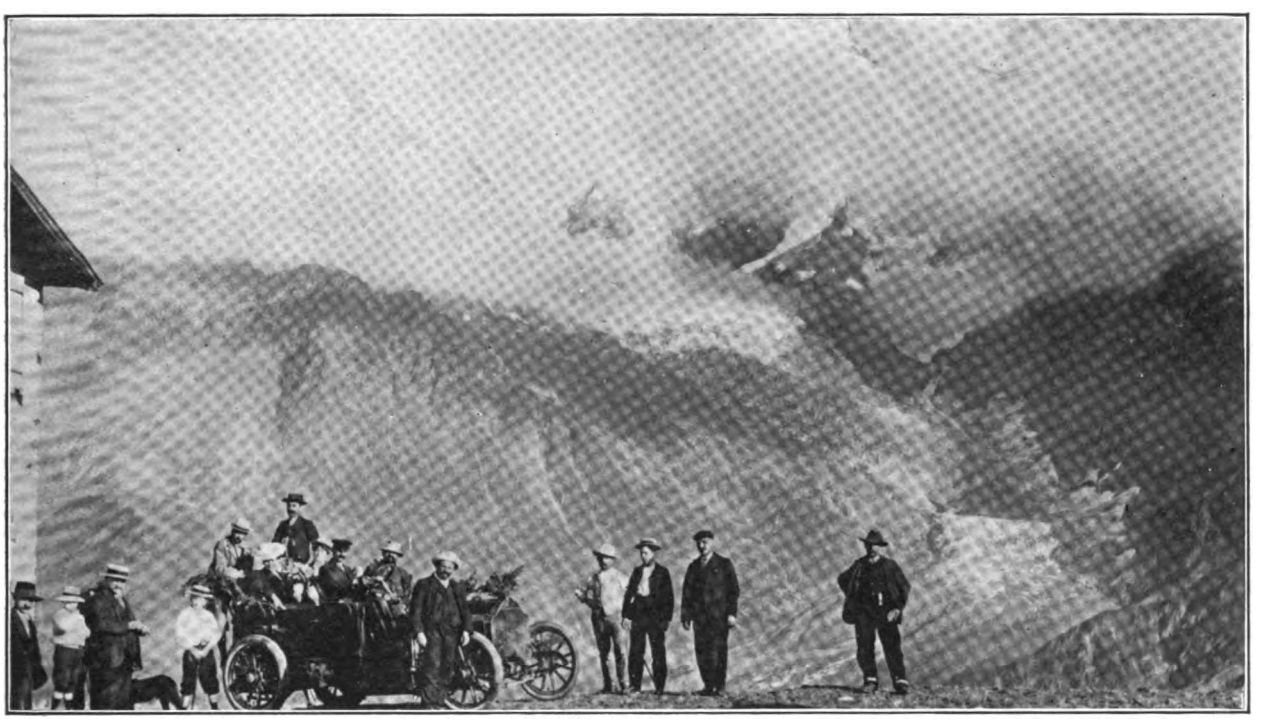
nearer to Spain before turning northward at Lourdes. Snow capped peaks are to be seen on either side through Montrejeau and Capvern to Bagneres de Bigorre, after which the remainder of the ride into the night stop through the smiling and cultivated valley of the Adour offers a decided contrast.

This fertile plain continues on the way to Tarbes, and after that comes the valley of the yellow Gers to Auch, and the broad Garonne to Agen, the centre of the bottled plum industry. Numerous odd little ranges are encountered on the way to Villeneuve-sur-Lot, and here and there are to be noted picturesque rocky glens. Villeneuve is a very old, crowded, fortified town, with an arcaded square that might have been transplanted bodily from southern Spain.

Bergerac is on the big Dordogne, and presents a somewhat curious mixture. A brand new church, particularly ugly streets, a heavy and more or less modern bridge, a wide rushing river and some of the oldest, quaintest and most picturesque houses are to be seen. Tourists visit Perigueux, the night stop, for a glimpse of the most perfect Byzantine cathedral in all western Europe. It is also at this place that the famous Perigord pies are made.

The last two days are spent among the chateaux of the Loire. At Chalus is to be seen the remnants of the great fortress, in attacking which Richard Coeur de Lion received his fatal wound. Between this point and Limoges is the western extremity of the Auvergne mountains, the best known peaks of which are the Puy de Dome and the Cantal, both of which ought to be visible from the road.

The night stop is at Chateauroux. The principal point of interest on the last day's ride is Orleans, the home of Jean d'Arc, who delivered the city from the siege of the English in 1428. The house occupied by her is one of the show places. Others include the handsome cathedral of St. Croix, and the old town hall, built in the 16th century. Tourists will find the roads of the best throughout the day's run.



Climbing Mt. Prarion in Switzerland, Near Mt. Blanc, Indicating That an Automobile Is Able to Scale the Heights.

ITINERARY.

Paris — Tonnerre — Poligny — Geneva — Chamonix — Grenoble — Gap — Digne — Aix — Montpelier — Perpignan — Foix — St. Gaudens — Lourdes — Agen — Perigueux — Chateauroux — Paris.

Seventeen Days, 1513.1 Miles.

First Day, Paris to Tonnerre, 113.2 Miles.

Paris to	Miles to	Total Miles
Maisons-Alfort	3.1	3.1
Villoneuve	5.0	8.1
Montgeron	1.8	9.9
Lieusant	6.2	16.1
Melun	8.0	24.1
Fontainebleau	8.7	32.8
Vulaines	4.3	37.1
Montereau	9.3	46.4
La Petit Fossard	3.1	49.5
Villeneuve	4.3	53.8
Pont-sur-Yonne	7.5	61.3
Sens	7.4	68.7
Malay-le-Petit	4.3	73.0
Cerisiers	6.8	79.8
Arces	6.2	86.0
St. Florentin	9.9	95.9
Flogny	8.0	103.9
Donnemoine	5.6	109.5
Tonnerre	3.7	113.2

Second Day, Tonnerre to Poligny, 126 Miles.

Tonnerre to	Miles to	Total Miles
Lezinnes	6.8	6.8
Ancy-le-Franc	5.0	11.8
Nuits	4.9	16.7
Aizy	4.9	21.6
Montbard	6.2	27.8
Les Laumes	6.9	34.7
Vitteaux	10.2	44.9
Sombernon	11.7	56.6
Plombieres	14.3	70.9
Dijon	3.1	74.0
Neuilly	3.7	77.7
Genlis	6.8	84.5
Auxonne	9.3	93.8
Dole	9.9	103.7
Poiset	1.2	104.9
Mont-sous-Vaudrey	10.5	115.4
Aumont	5.0	120.4
Poligny	5.6	126.0

Third Day, Poligny to Geneva, 68.7 Miles.

Poligny to	Miles to	Total Miles
Le Feuilla	6.8	6.8
Champagnole	6.8	13.6

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St. Laurent	13.6	27.2
Morez	7.5	34.7
Les Rousses	7.4	42.1
La Faucille	9.9	52.0
Gex	6.8	58.8
Ferney	6.2	65.0
Geneva	3.7	68.7

Fourth Day, Geneva to Chamonix, 54.5 Miles.

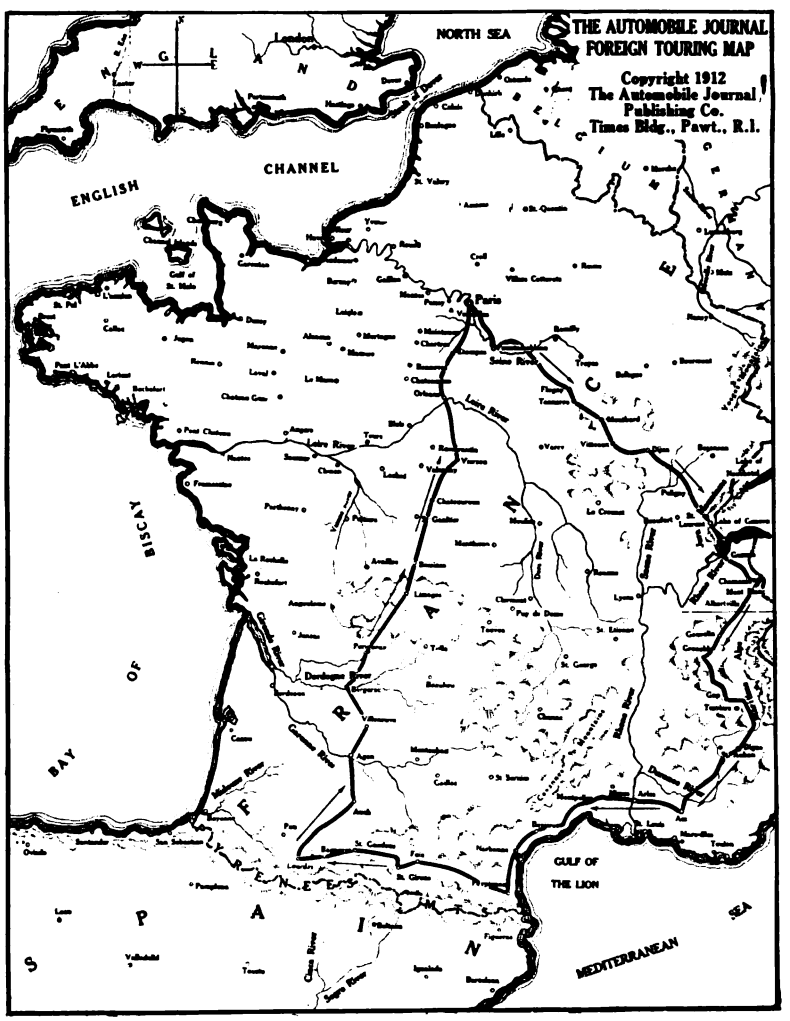
Geneva to	Miles to	Total Miles
Chene	1.8	1.8
Annemasse	3.1	4.9
Findrol	5.6	10.5
Bonneville	6.2	16.7
Cluses	10.5	27.2
Sallanches	9.9	37.1
Le Fayet	5.0	42.1
Chamonix	12.4	54.5

Fifth Day, Chamonix to Grenoble, 86.6 Miles.

Chamonix to	Miles to	Total Miles
Servoz	8.1	8.1
St. Gervais	5.5	13.6
Megeve	6.2	19.8
Albertville	14.3	34.1
Grigon	1.8	35.9
Pont d'Aiton	11.1	47.0
Bourgneuf	2.5	49.5
La Rochette	7.4	56.9
Allevard	5.6	62.5
Goncelin	6.2	68.7
Domene	11.7	80.4
Gieres	2.5	82.9
Grenoble	3.7	86.6

Sixth Day, Grenoble to Gap, 56.9 Miles.

Grenoble to	Miles to	Total Miles
Eybens	2.5	2.5
Vizille	9.9	12.4
La Mure	11.7	24.1
Corps	15.5	39.6
Chauffayer	6.8	46.4
Gap	10.5	56.9



Seventh Day, Gap to Digne, 59.4 Miles.

Gap to	Miles to	Total Miles
La Batie Neuve	6.2	6.2
Chorges	4.3	10.5
Grand Pre	5.5	16.0
Celliers	5.6	21.6
Seyne	12.4	34.0
La Javie	15.5	49.5
Le Blusquet	3.7	53.2
Digne	6.2	59.4

Eighth Day, Digne to Aix, 66.7 Miles.

Digne to	Miles to	Total Miles
Les Mees	14.8	14.8
Peyruis	2.5	17.3
La Brillane	8.1	25.4
Manosque	8.7	34.1
Las Bastide	9.8	43.9
Pertuis	10.4	54.3
Gare-de-Vennelles	8.1	62.4
Aix	4.3	66.7

Ninth Day, Aix to Montpelier, 92.5 Miles.

Aix to	Miles to	Total Miles
St. Cannal	9.9	9.9
Pelissame	8.6	18.5
Salon	2.5	21.0
Merle	5.0	26.0
St. Hippolyte	14.8	40.8
Raphele	1.2	42.0
Arles	4.9	46.9
Gare-de-la-Camargne	6.8	53.7
St. Giles	4.9	58.6
Vauvert	11.1	69.7
Aimargus	3.7	73.4
Luviel	4.3	77.7
Montpelier	14.8	92.5

Tenth Day, Montpelier to Perpignan, 113.2 Miles.

Montpelier to	Miles to	Total Miles
Mireval	8.1	8.1
Frontignan	5.6	13.7
Cette	4.3	18.0
Meze	11.7	29.7
Montagnac	7.4	37.1
Pezenas	3.7	40.8
La Rogue	6.8	47.6
Beziers	7.4	55.0
Coursan	12.4	67.4
Narbonne	4.3	71.7
Sigean	13.0	84.7
Salces	19.8	104.5
Perpignan	8.7	113.2

Eleventh Day, Perpignan to Foix, 81.6 Miles.

Perpignan to	Miles to	Total Miles
Le Vernet	1.9	1.9
Estagel	11.7	13.6
Maury	6.2	19.8
St. Paul-de-Fenouillet	3.7	23.5
Candies	6.8	30.3
Axat	7.4	37.7
Quillan	6.2	43.9
Puivert	9.9	53.8
Lavelanet	11.7	65.5
Montgailland	13.6	78.1
Foix	2.5	81.6

Twelfth Day, Foix to St. Gaudens, 58.5 Miles.

Foix to	Miles to	Total Miles
St. Martin-de-Caralp	2.5	2.5
La Bastide-de-Seron	9.9	12.4
Lescure	11.1	23.5
St. Girons	4.9	28.4
St. Lizier	1.2	29.6
Montsaunes	13.4	43.0
St. Martory	3.7	46.7
Gaudines	5.6	52.3
St. Gaudens	6.2	58.5

Thirteenth Day, St. Gaudens to Lourdes, 48.8 Miles.

St. Gaudens to	Miles to	Total Miles
Villeneuve-de-Riviere	3.1	3.1
Montrejeau	5.5	8.6
Lannemezan	10.5	19.1
Capvern	3.7	22.8
Courreges	4.3	27.1
Bagneres-de-Bigorre	8.1	35.2
Pouzac	1.8	37.0
Loucrup	3.1	40.1
Lourdes	8.7	48.8

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Fourteenth Day, Lourdes to Agen, 107.2 Miles.

Lourdes to	Miles to	Total Miles
Tarbes	12.9	12.9
Rabastens	12.9	25.8
Mielan	9.9	35.7
Mirande	11.1	46.8
St. Jean-de-Comtal	9.9	56.7
Auch	6.2	62.9
Montestruc	11.1	74.0
Fleurance	4.3	78.3
Lestoure	6.2	84.5
Ste. Mere	7.4	91.9
Astaffort	4.3	96.2
Layrac	4.9	101.1
La Capelette	4.3	105.4
Agen	1.8	107.2

Fifteenth Day, Agen to Perigueux, 90.8 Miles.

Agen to	Miles to	Total Miles
Faulet	3.1	3.1
La Croix Blanche	4.3	7.4
Villeneuve-sur-Lot	10.5	17.9
Soubirons	4.9	22.8
Cancon	11.1	33.9
Castillonnes	8.8	42.6
Bouniogues	8.1	50.7
Bergerac	7.4	58.1
Lembras	3.1	61.2
La Monzie Montastruc	4.3	65.5
Clermont-de-Beuregard	4.3	69.8
Vergt	8.1	77.9
Eglise Neuve	4.3	82.2
De Sanillac	3.7	85.9
Perigueux	4.9	90.8

Sixteenth Day, Perigueux to Chateauroux, 137.3 Miles.

Perigueux to	Miles to	Total Miles
Trelissac	3.1	3.1
Sorges	11.1	14.2
Thiviers	8.7	22.9
La Coquille	6.8	29.7
Chalus	8.1	37.8
Aixe	14.2	52.0
Limoges	8.1	60.1
La Maison Neuve	9.9	70.0
Razes	5.6	75.6
Bessines	6.2	81.8
Gros Dognon	8.6	90.4
Lallee-de-Rhode	11.1	101.5
Argenton	17.9	119.4
Lhotiers	9.3	128.7
Chateauroux	8.6	137.3

Seventeenth Day, Chateauroux to Paris, 151.2 Miles.

Chateauroux to	Miles to	Total Miles
Deols	1.8	1.8
Vatan	16.7	18.5
Massay	9.9	28.4
Vierzon	6.2	34.6
Salbris	13.0	47.6
Nounan	7.4	47.6
Lamotte Beuvron	4.9	59.9
La Ferte St. Aubin	9.3	69.2
Olivet	10.3	79.5
Orleans	2.5	82.0
Le Petit Sougis	3.7	85.7
Artenay	9.9	95.6
Toury	7.4	103.0
Angerville	8.7	111.7
Etampes	11.1	122.8
Etrechy	3.7	126.5
Arpajon	8.6	135.1
Montlhery	3.1	138.2
Longjumeau	4.3	152.5
Paris	8.7	151.2

ONTARIO TOURING REGULATIONS.

Because of not being properly informed concerning the laws, many American motorists who visit Canada each year are put to much inconvenience and annoyance soon after crossing the border. In order to foster international touring of this nature the Province of Ontario has prepared a brief summary of the principal regulations as follows:

1—The driver must be at least 18 years of age, and in no way intoxicated.

2—Any person operating an automobile for gain or hire must be licensed to do so, and no person may employ another for that purpose unless so licensed.

3—No automobile is allowed on the public highway unless provided with a provincial license and number, which cost $4 for a calendar year.

4—At all Canadian ports of entry will be found a custom house broker who provides foreign tourists with automobile licenses. Ordinarily this broker is the representative of a bonding company, and will bond cars against interference by the customs for six months, for which the deposit is $10. The tourist is given a copy of this bond, and upon finally returning out of the country, he should have the customs at outgoing port certify that fact upon the copy. This copy should then be sent to the issuing broker, who sends the release of bond obligation and $5, keeping the other $5 for his services.

5—The automobile must be provided with a gong or horn and suitable lamps.

6—No other number than that of the provincial license may be exposed, and must be kept clear and plainly visible. No searchlights are permitted.

7—The maximum speed within city limits is 15 miles an hour; in country, 20 miles. But drivers are enjoined to slow down whenever the exigencies require it. Upon passing a team, slow down to seven miles an hour, and when going in same direction sound the gong and give driver an opportunity to turn aside. Upon meeting a funeral, turn aside as much as possible and stop until it passes.

8—If an accident occurs to any person on foot, horseback, or in a vehicle, owing to the presence of the automobile, the person in charge thereof must go back to the scene of the accident and give in writing to the person sustaining loss or injury the name and address of the owner of the motor vehicle and number of license.

9—In case of injury or damage the onus of proof that the same did not arise through the negligence of the driver of the automobile rests upon the owner or driver thereof.

10—Violations of any of these regulations are punishable by fine or imprisonment, or both. Any police officer may in good faith make arrests without a warrant; and "every person may arrest without a warrant any person whom he finds committing any such offense" above referred to.

FROM OCEAN TO OCEAN.

W. H. McKinnon of Oakland, Cal., one of the most enthusiastic motorists on the Pacific Coast, is about to start with his wife and two sons, William and George, on one of the most unique ocean-to-ocean tours ever attempted. Mr. McKinnon plans to dip his tires in the Pacific ocean at Los Angeles, Cal., travel down the west coast of Mexico to Panama, across the isthmus along the canal route, continue up the east coast of Central America and Mexico, through the states to New York City, and run his machine into the Atlantic ocean at Coney Island. Mr. McKinnon, who has large lumber and mining interests in California, has been accustomed to keeping several cars at various points for his use, and it is in one of these, a big Matheson, built by the Matheson Automobile Company with headquarters at 1886-88 Broadway, New York City, that he proposes to make the unusual run.

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SHIPPING THE CAR ABROAD FOR FOREIGN TOUR.

VERY few Americans realize the ease with which foreign tours may be made taking one's own car across and making the rounds of the scenes of Insular and Continental beauties in the old, familiar machine. While "Seeing America First" is strongly advised, there is no gainsaying the increased historical and scenic influence of many European countries. Considering that such touring is strongly on the increase, it will be the purpose herein to make the shipping of the car as easy and simple for the prospective tourist as is possible.

Such a task naturally divides itself into four or five parts, each one of which differs from the others, but all of which are needful. These are: The time when the tour will be made, that is the season of year, month, etc.; how to go, including the line on which to cross the ocean, the date of sailing planned to coincide nicely with the previous decision, the class, fare, berth and other reservations; the formalities

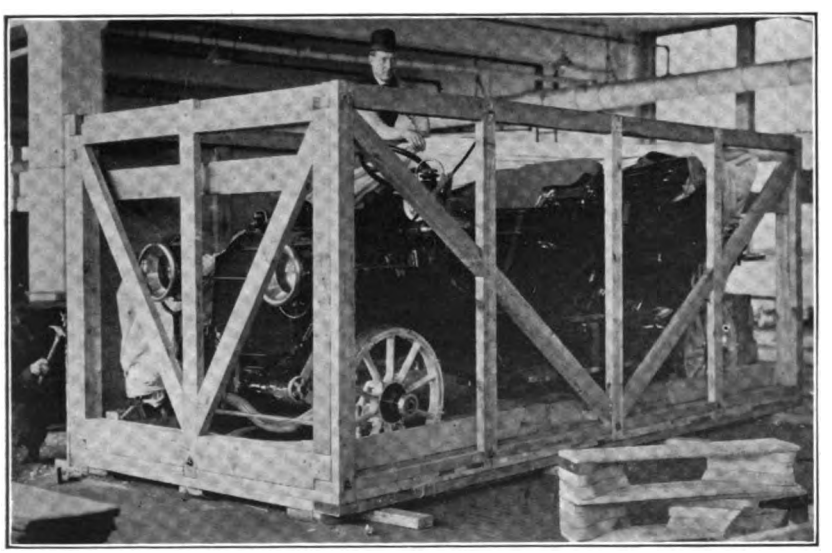


Fig. 1—The Initial Step in the Crating for Foreign Shipment, Constructing Framework About the Car.

needed to procure safe and speedy personal entrance and exit into the various countries to be visited, this being the customs end; the arrangements for the use of the car, including driving licenses, payment of foreign country fees, proof of ownership of the car, ability and right to drive in native country, etc.; actual preparation of the car, previous to shipment, overhauling, adjusting, etc., crating or boxing it, preparations after unshipping on the other side, and other items.

Considering the first, it must be settled first of all what the trip and tour are for. If to see mountain views, glaciers, enjoy good roads and the like, any time will do for southern Europe, while October to March, inclusive, are the best months. June to September, inclusive, are too hot for comfort. If Scotland, Ireland, Norway, Sweden, Finland and northern countries are to be visited, any month in the year can be utilized, the hot months being particularly advisable for the last three.

There are other reasons for selecting the time of year or month in which to go abroad; thus poor sailors always choose months in which the weather is normally good, or on the other hand, avoid the time of year when the water is known to be rough. In any case, it may be set down as an axiom that the tour should be planned many months in advance. For this purpose, it is well to secure and read a number of books of travel, foreign road guides, histories, Baedeker's and other works, so as to make the choice of country or countries to be toured through a long time ahead.

Second, it becomes necessary to make arrangements for personal passage, including fare across, berth and other items. In doing this, one must pick out the steamship line over which passage will be booked, the approximate week in which sailing is desirable, and thus, the ship. To assist travellers in this respect a table is presented herewith which gives all of the most important sailings for the touring season of 1912; that is, up to about Oct. 1. After that date, the times of departure and the boats are changed, so the companies should be consulted directly. This list is compiled from data furnished The Automobile Journal for this purpose by the Church Ticket Agency, 58 Exchange street, Providence, R. I. It should be remembered that all sailing dates are subject to change.

During the summer months, when the tide of travel is outward, it is often difficult and sometimes impossible to secure passage on the desired boat if less than a month be allowed for its purchase. This is one reason the planning must be done so far in advance. In the selection of the line to use, the destination will usually determine one or two between which a financial choice must be made. This latter cannot be commented upon except to say that the finances of each party will govern the line to be utilized. It might be added that of late years, the second cabin has been used more and more by those wishing to take a long trip on small means.

Seatings at the table, steamer chairs and other similar items are settled on the ship just before or after sailing with the ship's steward. In the matter of fares, the reader is referred to the Raymond & Whitcomb Company, New York City, or nearly any railroad office for information. In general, the variation is from $65 upward first class, and $47 upward for second, with the general average of the first at about $85 and the second at $60. This, of course, is for personal passage only and does not include the charges on the car, or anything beyond trunks and other personal baggage.

The third item of attention, taking them in order first laid down, although this is perhaps first in point of importance, is the matter of safe and speedy passage through the various customs and army departments. The first requisite includes passports for each

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member of the party, or if the makeup of the group is definitely settled, a passport including all. This is issued by the State Department, Washington, D. C., and the charge is $1 each. A man, wife and children under 21 years of age may be included in one paper.

To go with this, there should be taken a picture of the car, the owner and the driver, in case the two latter differ, as when a chauffeur drives the machine. Of these, from six to 12 unmounted prints of each should be carried. In taking the pictures and trimming the prints, it is advisable to take only a head and shoulders of the individuals, as many of the foreign customs regulations limit the size of the picture to 1.5 to 3.5 inches for the car and .875 by 1.25 inches for persons.

In addition, the possession of the car should be capable of rapid proof. This may be managed by securing a letter from the manufacturer or his nearest agent, giving make, maker's name, style of body, color of chassis, color of body, number of cylinders, horsepower, bore and stroke, engine number, wheelbase, tread, body number, make of tires, weight in both

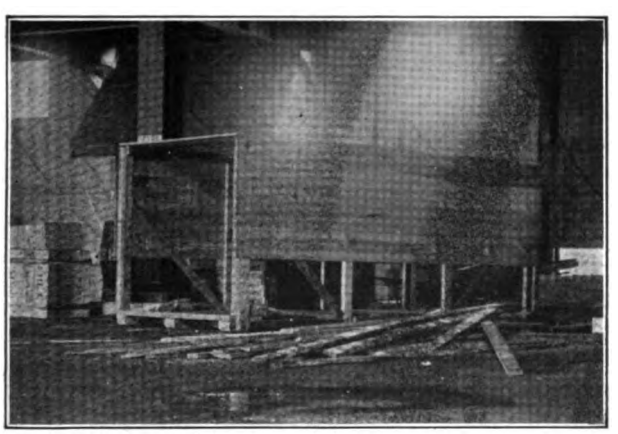


Fig. 2—Second Step in the Crating Process, Building Up the Side Posts and Putting on the First Boards.

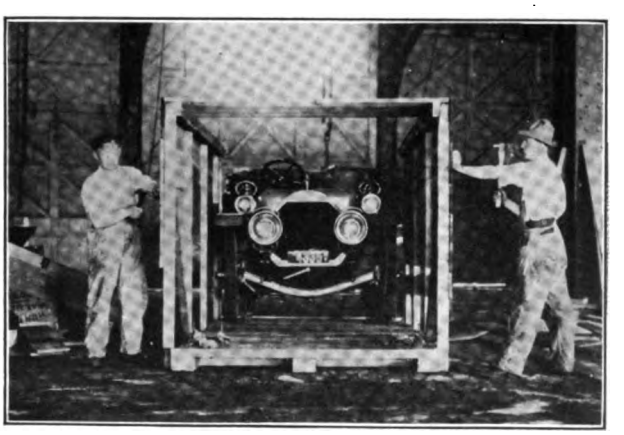


Fig. 3—Third Step in Housing the Vehicle, Putting on the Rest of the Boards After Pushing the Car In.

pounds and kilos, number of seats, equipment list, and value of the car. The latter is well certified to by carrying the dealer's receipt. All of this information in the manufacturer's letter will be in English, of course, but it is well to have a translation made into French and German, this being incorporated in copies of the letter.

Over and above this, the various customs formalities relative to leaving the home country and returning to it require that a full description of the car be given at the point of departure, and a customs receipt secured and preserved. An additional, similar description and customs declaration should be made to the United States consul at the port of return shipment. The latter declaration must include all equipment and similar description to the first declaration. In this connection, care should be taken not to purchase and add to the car a large number of foreign equipment items, as repairs made abroad or appurtenances added thereto to the amount of 10 per cent. of the value of the car, will cost the owner full duty on the entire car and equipment.

This is only in case the equipment is left on the car. It can be avoided by detaching from the vehicle, shipping separately, and paying duty individually upon all foreign-bought accessories. In the case of practically all foreign countries—except when the triptyque privilege is available—deposits covering the full amount of duty must be made. With a triptyque, the frontiers of nearly all European countries can be passed without duty deposits being made.

When a single country is visited, this deposit, varying with the country and size of the car must be made anyhow. It will be refunded on the return, providing all customs formalities have been complied with, otherwise there will be a deduction.

The triptyque papers are obtained by touring clubs for their members only, being in the nature of club passports, the club guaranteeing the payment of various fees and compliance with the different rules and regulations. This being the case club membership becomes a necessity, although American clubs are recognized to some extent. Thus American Automobile Association membership cards will be accepted by a number of foreign bodies as sufficient credentials to warrant election. Among these may be noted: Touring Club de France, 65 Avenue de la Grande Armee, Paris, France; Automobile Association, Fanum House, Coventry street, London, England; Motor Union of Great Britain and Ireland (now combined with one or two other bodies), 1 Albemarle street, Piccadilly, London, W.; Touring Club of Italy, 14 Via Monte Napolene, Milan, Italy; Touring Club of the Netherlands, and others.

The first named is the strongest, and by all means of the most use to the tourist, although if the British Isles are visited, one of the English clubs should be included also. Membership in the organizations costs as follows: A. A. A., $5; T. C. de F., six francs ($1.20); A. A. (England), £1 1s. ($5.25); Motor Union, the same; T. C. de I., 10 lire ($1.94), and Netherlands three gelder ($1.20).

As its name indicates the triptyque is in three parts or sheets, the first of which is attached by the customs official at the point of entry, the second by the customs on the final exit, and the third, duly signed and stamped by the customs officers for entry and exit, is retained by the tourist. A separate triptyque is issued and used for each country entered.

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After the country has been crossed, the third sheet, signed and sealed, is returned by the tourist to the club, which then refunds the original deposit less a small fee which is retained for services rendered.

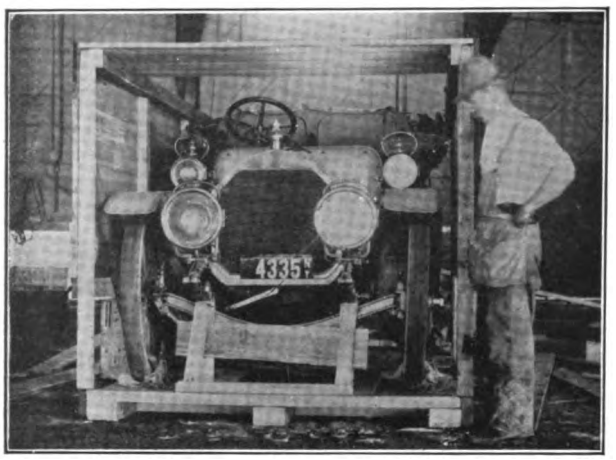


Fig. 4—Fourth Step, the Car in Place with Tires Off. Sometimes the Wheels Must Be Taken Off Also.

These papers are useful in the following countries, for the lengths of time indicated, and under the payment of the specified fees:

Country.	Available.	Deposits.

France—For one year, $6.90 a 100 pounds.
Germany—For one year, $1.70 a 100 pounds.
Holland—For one year, five per cent. of declared value.
Belgium—To Dec. 31 of year, 12 per cent. of declared value.
Italy—Three months from date, $120.
Switzerland—Six months from date, $3.55 a 100 pounds.
Spain—Four months from date, $250 to $400.
Austria—Two months from date, $11.14 a 100 pounds.
England, Scotland, Ireland and Wales—Unlimited; no import or export duties.

The advantages are: A single deposit in advance, a single prompt refund, no delays or worries, as in the securing of refunds in small frontier customs houses, and generally better satisfaction.

While this sounds formidable, much, if not all of it, can be avoided by placing the entire responsibilities with a reputable agent, as for instance, the Raymond & Whitcomb Company, previously mentioned, who will take the car description, photographs, and other materials, and attend to all formalities, including the shipment, the securing of triptyques, customs and

LIST OF SHIPPING DATES DURING TOURING SEASON.

London Direct—First Class Only.

(Atlantic Transport Line.)

July 13..... Minnewaska
July 20..... Minneapolis
July 27..... Minnetonka
Aug. 3..... Minnehaha
Aug. 10..... Minnewaska
Aug. 17..... Minneapolis
Aug. 24..... Minnetonka
Aug. 31..... Minnehaha
Sept. 7..... Minnewaska
Sept. 14..... Minneapolis
Sept. 21..... Minnetonka
Sept. 28..... Minnehaha

Liverpool via Queenstown and Fishguard.

(Cunard Line.)

July 17..... Campania
July 24..... Mauretania
July 31..... Caronia
Aug. 7..... Lusitania
Aug. 14..... Campania
Aug. 21..... Mauretania
Aug. 24..... Caronia
Aug. 28..... Lusitania
Sept. 4..... Campania
Sept. 7..... Carmania
Sept. 11..... Mauretania
Sept. 18..... Lusitania
Sept. 21..... Caronia
Sept. 25..... Campania

Liverpool via Queenstown.

(White Star Line.)

July 18..... Celtic
July 25..... Adriatic
Aug. 1..... Baltic
Aug. 8..... Cedric
Aug. 15..... Celtic
Aug. 22..... Adriatic
Aug. 29..... Baltic
Sept. 5..... Cedric
Sept. 12..... Celtic
Sept. 19..... Adriatic
Sept. 26..... Baltic

Southampton via Plymouth and Cherbourg.

(White Star Line.)

July 13..... Majestic
July 20..... Oceanic
July 27..... Olympic
Aug. 3..... Majestic
Aug. 10..... Oceanic
Aug. 17..... Olympic
Aug. 24..... Majestic
Aug. 31..... Oceanic
Sept. 7..... Olympic
Sept. 14..... Majestic
Sept. 21..... Oceanic
Sept. 28..... Olympic

Southampton via Cherbourg.

(American Line.)

July 13.....St. Louis
July 20.....New York
July 27.....St. Paul
Aug. 3..... Philadelphia
Aug. 10.....St. Louis
Aug. 17.....New York
Aug. 24.....St. Paul
Aug. 31..... Philadelphia
Sept. 7.....St. Louis
Sept. 14.....New York
Sept. 21.....St. Paul
Sept. 28..... Philadelphia

Glasgow via Londonderry.

(Anchor Line.)

July 13..... California
July 20..... Cameronia
July 27..... Caledonia
Aug. 3..... Columbia
Aug.10..... California
Aug. 17..... Cameronia
Aug. 24..... Caledonia
Aug. 31..... Columbia
Sept. 7..... California
Sept. 14..... Cameronia
Sept. 21..... Caledonia
Sept. 28..... Columbia

Antwerp via Dover.

(Red Star Line.)

July 13..... Lapland
July 20..... Kroonland
July 27..... Zeeland
Aug. 3..... Vaderland
Aug. 10..... Lapland
Aug. 17..... Finland
Aug. 24..... Zeeland
Aug. 31..... Kroonland
Sept. 7..... Lapland
Sept. 14..... Finland
Sept. 21..... Vaderland
Sept. 28..... Kroonland

Havre, Direct.

(French Line.)

July 13..... Chicago
July 18.....La Savoie
July 25.....La Provence
July 27..... Bordeaux
Aug. 1.....La Touraine
Aug. 3..... Rochambeau
Aug. 8.....La Savoie
Aug. 10..... Niagara
Aug.15.....La Lorraine
Aug. 17..... Chicago
Aug. 22..... France
Aug. 29.....La Provence
Aug. 31.....La Touraine
Sept. 5.....La Lorraine
Sept. 7..... Niagara
Sept. 12..... France
Sept. 14..... Rochambeau
Sept. 19.....La Provence
Sept. 21..... Chicago
Sept. 26.....La Savoie
Sept. 28.....La Touraine

Hamburg via Plymouth and Cherbourg.

(Hamburg-American Line.)

July 18...President Lincoln
July 25..... Cleveland
Aug. 1...Kaiserin Auguste Victoria
Aug. 8....President Grant
Aug. 15..... Amerika
Aug. 22..... Cincinnati
Aug. 29..Kaiserin Auguste Victoria
Aug. 31...President Lincoln
Sept. 7..... Cleveland
Sept. 12.... Victoria Luise
Sept. 18....President Grant
Sept. 19..... Amerika
Sept. 25..... Cincinnati
Sept. 26—Kaiserin Auguste Victoria

Rotterdam via Plymouth and Boulogne-sur-Mer.

(Holland-American Line.)

July 16....New Amsterdam
July 23..... Noordam
July 30..... Ryndam
Aug. 13..... Rotterdam
Aug. 20..... Potsdam
Aug. 27...New Amsterdam
Sept. 3..... Noordam
Sept. 10..... Ryndam
Sept. 17..... Rotterdam
Sept. 24..... Potsdam

Bremen via Plymouth and Cherbourg.

(North German Lloyd Line)

July—
13.....George Washington
16.....Kronprinz Wilhelm
23.....Kaiser Wilhelm II
25.....Koenigin Luise
27.Prinz Friedrich Wilhelm
30...Kaiser Wilhelm der Grosse
August—
6...Kronprinzessin Cecilie
10.....George Washington
13....Friedrich der Grosse
17..... Berlin
20.....Kronprinz Wilhelm
24.Prinz Friedrich Wilhelm
27.....Kaiser Wilhelm II
31..... Bremen
September—
3...Kaiser Wilhelm der Grosse
5.....George Washington
10...Kronprinzessin Cecilie
12.....Grosser Kurfuerst
17.....Kronprinz Wilhelm
19.....Friedrich der Grosse
21.Prinz Friedrich Wilhelm
24.....Kaiser Wilhelm II

Copenhagen via Christiania and Christiansand.

(Scandinavian - American Line.)

July 18.....Hellig Olav
Aug. 1.....Oscar II
Aug. 15.....United States
Aug. 29.....Hellig Olav
Sept. 5.....C. F. Tietgen
Sept. 12.....Oscar II
Sept. 26.....United States

Naples via Marseilles. (Fabre Line.)

July 19..... Venezia
July 27.....Santa Anna
Aug. 5..... Roma
Aug. 17..... Canada
Aug. 22..... Madonna
Sept. 5..... Venezia
Sept. 12.....Santa Anna
Sept. 18..... Roma

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triptyque deposits, etc. It is thus possible to turn the entire case, so to speak, over to an agent, and land on the other side with the necessary papers in

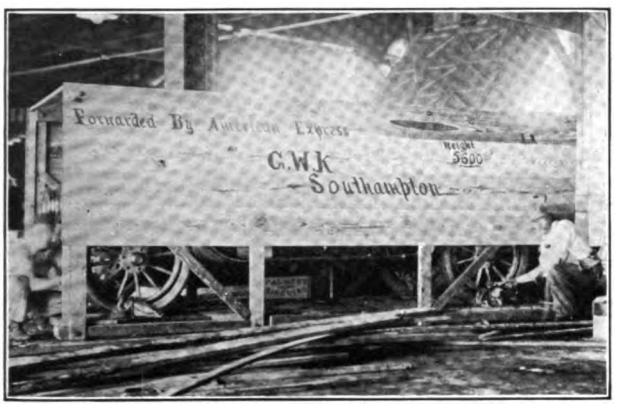


Fig. 5—Finish of the Enclosure, Boarding Up the Rest of the Sides and Top, Cleating with Two by Fours and Marking.

hand, ready to start out as soon as the car is unpacked.

The company handling this matter will also take care of the equally important one of boxing and shipping the car, should the owner desire to be relieved of this responsibility and work. This makes it possible to walk into the company's offices and forget the car until one disembarks abroad.

Next in order is the arrangement for a driving license, to enable the use of the car, after the desired country is reached. In general, there are three fees, the registration of the car, the owner's license and the driver's license. In some instances all three must be paid, in others two, and still others call for but one. England, for instance, calls for all three, the first costing a pound sterling, while each of the others amounts to five shillings, a total in American money of about $7.50. These papers are obtained by application to borough officers, arrangements being made in advance through the club. Two number plates are required, one front and one rear. An inland revenue tax of small amount must be paid by anyone using a car in the country for more than three months.

Other regulations are: That the driver must be more than 17 years old, red light must be shown in the rear at the right (instead of the left as here), illuminated at night, and two white lights in front.

In France, a driving certificate is secured on the payment of 20 francs ($4.00) and passing a short, partial examination as to competency. Club members may arrange to have an official waiting on the docks. Two front lights, left green in whole or part, right white, are required, also one rear light. A horn must be fitted, while sirens are forbidden in cities and towns. One rear number plate must be used, of a specified height. One peculiar French requirement is the fitting of a small brass plate to the dashboard, giving the name and address of the owner of the car, the absence of this being punishable by a fine. The car owner is also liable to be fined for emitting smoke from the exhaust pipe.

Switzerland can usually be gained by the presentation of the United States municipal or state driving license for indorsement. If for any reason, this be refused, the owner must make application on a printed form for driving certificate and circulation permit. Two front and one rear lights are specified, the former being green and white, as in France, and the rear, red. A Swiss peculiarity is that permanent address and next, temporary stopping place must be given upon request.

An American can drive in Italy for 15 days upon the presentation of his home license for indorsement by the customs official. A permanent or regular Italian driving and circulating license will be issued by the prefecture of police upon the submission of American license, an examination seldom being required. Horn and number plate are necessary, also green and white front lights and a rear lamp.

When the home license has been vised by a German consul, it will be accepted throughout Germany, but the same must be submitted to the police of the first large town or city visited. A tax is imposed for permission to travel, varying from 75 cents a day to $6.25 for 30 days. Lights, number plate and horn are required, the same as the others previously mentioned.

The other countries are practically the same as the foregoing, except that the Austrian time limit is three months, beyond which period, both car and driver are subject to a special examination. In Spain a circulation permit must be obtained from the civil government of the first province visited. No license is required in Belgium. Holland supplies an eight-



Fig. 6—Handling the Crate from a Lighter, Showing the Height and Power of the Shear Legs, Which Handle It.

day driving license fee; for a long stay, application must be made to the minister of commerce at The Hague.

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One or more of the following forms of insurance should be carried from the time the car is shipped from New York City, until the return, if not at other

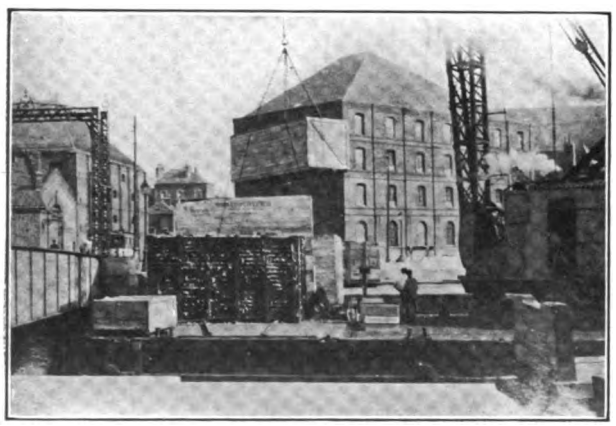


Fig. 7—Except for the Differing Aspect of the Docks, Cranes and Laborers, the Unshipping Process Abroad Is Just the Same. Scene in Havre Showing the Unloading of a Car.

times: Fire, burglar, theft and hazards of transportation; liabilities for injuries to persons; damages to car; damages to property of others; owner's insurance, and chauffeur's insurance. The fourth, in particular, is required in France and a number of other countries.

Coming finally to the car and its shipment, it must be crated or boxed and go as freight. As previously stated, all this bother and worry can be taken off the owner's hands by a good agent, who will attend to everything for him. Practically all of the express companies handle this class of business and are glad to get it. Notably, the Adams Express Company whose foreign representative, the Morris European Express Company, makes a specialty of this work. This concern is the official forwarder for the Automobile Club of America, and utilizes the Weinacht patented automobile case exclusively.

In this case, the car is packed as it stands; that is, without removing the wheels. Within the case, the car is held firmly by diagonals from the sills, as well as front and rear diagonals which prevent longitudinal motion. The arrangement of these diagonals is such that the weight is carried on the hubs, not on the wheels or tires. Each case is built in six sections screwed together. These crates are stored abroad and may be used for the return trip.

Freight charges on ocean steamships, at least on automobiles, do not go by the ton of 2240 pounds, but rather by the measurement ton of 40 cubic feet under "ship's option" privilege. This gives the ordinary automobile, unless another agreement is reached, a rating of 20 tons. An item often overlooked by those shipping to New York and other ports by freight, is the lighterage charges. In freight charges this is included, so an owner shipping to port by freight is entitled to free lighterage on a carload shipment.

Now as to the car casing, there are two ways, the crate with open sides and the case or box which is entirely enclosed. As the car will be in the hold of the vessel, it is only exposed to the elements while loading and unloading; a short time. This permits the open crate, if the owner desires. The box is much safer, however, as with an open side, a smaller crate or box placed close to it, may work in and do some damage.

Leaving that aside, the principal requirements are very stout, stiff corner timbers all around. Considering the average length of a car, the crate framework will approximate 15 feet long, and with a car weight of over two tons, there will be considerable stress upon it. No size smaller than four by four should be considered for all corners, sills and posts. Between these depending upon the total length, stringers of smaller section should be used, not smaller than two by four with the four-inch size in the direction of side stresses.

These will all have to be nailed up, diagonal nailing being preferable. It is well to go even further and set a corner piece into each junction of the four by fours, nailing this both ways to the larger timber. When all of the framework, excepting one end has been completed, the car may be run into this open end, after which it should be fixed in place with diagonals.

These should run from the axles to the end timbers in both directions, one pair being opposed to the other, and both being tight. Before these can be placed, however, the car should be jacked to position, and wedged there with a piece from above and below



Fig. 8—Sometimes Between Two Adjacent Countries the Car Can Be Shipped Without Taking Off Tires or Wheels, or Crating.

for each of the four hubs. When these and the diagonals have been set in position and fastened, the siding may be put on. When two by fours are used

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for middle bracing on the sides, diagonals of the same section may be be run from one corner to the upper opposite one, one on each of the six faces.

The siding may be of ordinary one-inch stock, hemlock, like the siding on houses being all right for the purpose, although matcned lumber, set into each other and cross nailed is even stiffer and stronger. Anyone can crate an automobile, who is skillful with a hammer and saw, but it should not be tackled by anyone not seeking for plenty of hard and heavy work. At a low estimate, it will take the ordinary amateur carpenter, after all lumber and supplies are on hand, two whole days of 10 hours each to crate a motor car properly.

Considering all this, as well as the additional expense of transporting the boxed or crated machine to the steamship dock, it seems best to advise those who can manage it to have the work done. When the amateur does his own work, he should find out first of all the maximum sizes of the crate which the company's ships will accept, as cases have been known of this work having been done twice, due to neglect of this simple precaution.

MAY HAVE TOUR NEXT YEAR.

Such has been the interest aroused by Indiana manufacturers each year in their Four-States tour that the manufacturers of Michigan, and particularly those of Detroit, impressed by their competitors' successes, have under consideration a similar trip for 1913. If the present plans of the Michigen men materialize, the manufacturers of the state will tour neighboring states, and perhaps carry out a programme on a much larger scale than has ever before been attempted, covering more than four states. It is proposed briefly, that the makers combine to show their entire lines on such a run, stopping long enough to demonstrate every car. With the number of manufacturers in Michigan, such a tour, it is estimated, should bring an entry list of 100 to 200 cars.

ANNUAL OUTING FOR ORPHANS.

The Automobile Club of Pittsburg recently held its annual outing for orphans, supplying 150 gaily bedecked cars for the use of the children. Inmates of all of the orphanages in the city were given rides, some of the machines making eight to 10 trips to the outlying country.

DAILY TOURS BY FLANDERS.

One of the most generally discussed events in the history of Louisville, Ky., is the series of tours recently arranged there by W. H. Beeson, local manager for the Studebaker Corporation, South Bend, Ind., and the Louisville Herald. The tours lasted for 15 days, and were held in connection with a convention of trade "boosters." Daily trips were taken into the country, all persons applying at the offices of the Herald or the Studebaker salesrooms being accommodated.

The parties left Louisville each morning at 8 and the return was between 6 and 7 each evening, Lexington being reached about noon every day. In the trips from Louisville to Lexington and return, the following towns were visited: Shelbyville, Frankfort, Lawrenceburg, Versailles, Harrodsburg, Danville, Stanford, Lancaster, Nicholasville, Richmond, Winchester, Mt. Sterling, Carlisle, Flemingsburg, Millersburg, Paris, Cynthiana, Williamstown, Falmouth and Georgetown.

WESTGARD TO SEATTLE.

A. L. Westgard, American Automobile Association field representative, who left New York June 11, to lay out three new transcontinental trips, made rapid progress to Chicago, arriving there six days after the start. On his way, Mr. Westgard took notes of the detours necessary at present, particularly those due to new construction and repair work in New York State.

From Chicago west he took complete road notes to be issued in the form of new strip maps covering that route in detail. After working his way from Chicago to Milwaukee, St. Paul and Minneapolis, he laid out a route across North Dakota, Montana and into Washington. He planned to reach Anaconda, Mont., in time for the good roads convention, July 9. From Anaconda he was to go to Seattle, which will complete the first leg of his long journey, and for the first time provide complete notes from New York to Seattle by the most direct route.

LENOX COMPANY NOT TO CHANGE.

The Lenox Motor Car Company of Boston, which for the past few weeks has been looking about for a new location for its factory, having had several sites in Boston, Everitt, South Boston and Stoughton, Mass., in view, has at last decided to continue its business at its present plant in Jamaica Plain. Considerable Brockton, Mass., capital is interested in the company, maker of the Lenox pleasure car, and practically all of the officers are from that city.

NEW LINE OF SPEEDWELLS.

The Speedwell Motor Car Company, Dayton, O., is planning a number of radical changes in its 1913 pleasure cars. The exact nature of these, the company is not ready to make public at present, but the new line will embrace both four and six-cylinder models of high power. The new car, the company asserts, will be even more generous in its line and the wheelbase will be longer than formerly. Some important improvements in mechanical designs are also promised. The working force of the Speedwell plant is being increased to carry forward rapidly the new pleasure car arrangements and to provide for the additional production of motor trucks.

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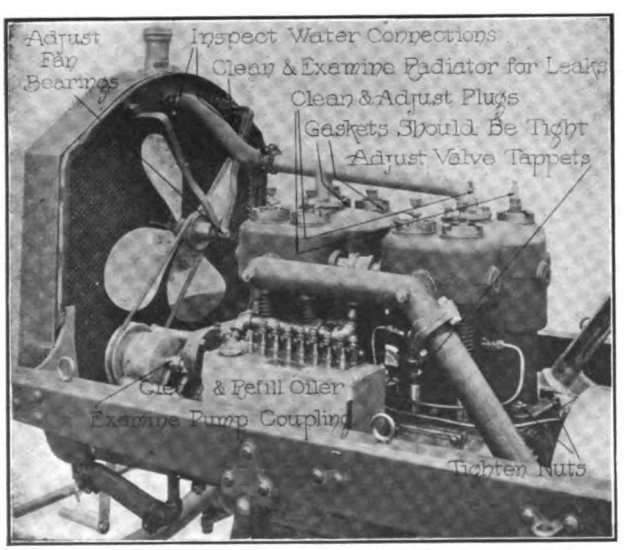
Overhauling the Motor Car for Touring



By C. P. Shattuck

NOTHING detracts so much from the pleasures of touring as to have trouble with the power plant, transmission or other components of the motor car. The failure of a part through wear or inattention may cause considerable delay to say nothing of the work and expense involved in the repair. Invariably this will occur in the most undesirable locality and where the services of the expert repairman are not obtained easily. If the break be a serious one it may mean abandoning of the tour, at least as originally planned.

Those about to make their first tour often fail to take into consideration the fact that in operating over



The Power Plant Should Be in the Best Possible Condition to Obtain Its Maximum Efficiency.

strange roads the car is subjected to stresses not encountered on highways where the driver is familiar with each hole and gully, and where rough and dangerous roads are traversed safely because of his knowledge of their location. Beautiful scenery will tempt the tourists to leave the beaten track and to explore new regions even though some parts of the roads do not permit of driving the machine on other than the low gear and require the frequent use of the brakes. Of course, this same argument applies with equal force to the other components of the chassis.

The successful completion of a tour depends largely upon the automobile and a moderate priced car is as capable of giving satisfactory service as a high powered machine provided, however, it is in a good operating condition and is given the proper attention both before and during the trip. While the new car will not need any attention other than grinding in the valves and a general inspection for loose nuts and bolts, the older vehicle and those which have been driven for some time since their overhaul, will require a partial if not complete renovation, this depending upon conditions. It must also be borne in mind that the automobile which appears satisfactory to the owner may develop weaknesses when subjected to the severe service demanded of it in the mountains, etc.

Although many will have this work performed at the repair shop or by the chauffeur there is a large number of owners who successfully complete this work and for the benefit of these and others the suggestions contained herein are made.

Inspection Should Be Thorough.

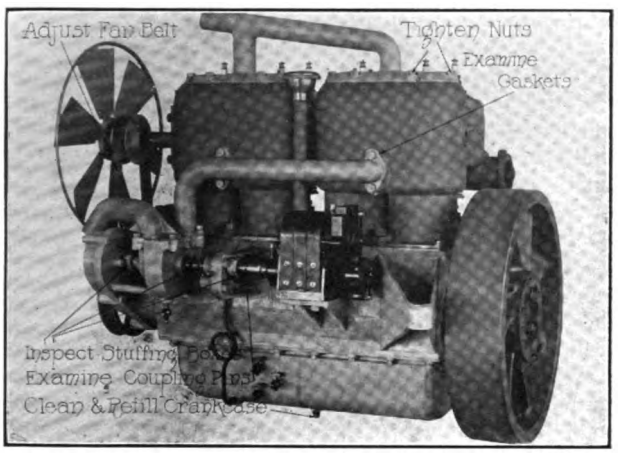
The inspection of all components should be thorough and if in doubt as to any part needing replacement through wear, a new one should be fitted. Makeshift repairs are unsatisfactory for although such may have withstood ordinary service it is poor economy to patch up a part which will undoubtedly break when subjected to a heavy stress. This applies particularly to the steering mechanism and brakes, and the motorist cannot be too careful in overhauling these and replacing any worn components. Driving conditions may be encountered which will severely test the material and construction and it is an excellent plan to forestall accidents.

The power plant should be placed in first class condition to obtain its maximum efficiency as this may be needed in negotiating long and steep grades which might not be climbed successfully on the second speed gear with the motor not in proper shape. Continued use of the low will test the cooling system and the radiator should be examined for leaks. If any exist the cooler should be removed and sent to an expert for repairs unless the owner is familiar with the work.

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Remove Carbon Deposits.

Starting with the motor, the first step is to remove all carbon deposits from the cylinders. It may



Depicting Magneto Side of Motor, Water Pump and Oiling System and Other Components Requiring Inspection.

be necessary to disassemble these to accomplish the work, and if so grinding in the valves will be made easier. After removing the valve springs they should not be mixed up as the intake and exhaust members are different on some motors and if not assembled properly the work must be repeated. After grinding and replacing the valves, springs and retaining members, the bearings should be examined for looseness which will necessitate the removal of the lower crankcase unless the members are accessible through inspection holes. In the former instance, the pan will have to be removed and it will afford an excellent opportunity of noting if the retaining bolts are in good condition or the shield in need of repairs. The connecting rod and main bearings should be adjusted if necessary and the wristpins given attention, taking care to set up nuts securely, and insert and fasten the indispensable cotter pin.

Retime Valves.

After replacing the cylinders, previous to which the piston rings are cleaned and set, the timing of the motor should be checked up by the marks on the flywheel. This work should be performed carefully and each valve adjusted separately to obtain the best results, after which the lock nuts should be set up hard. The crankcase is cleaned, replaced and refilled with fresh oil and the motor cranked to splash the lubricant to all working parts before switching on the ignition.

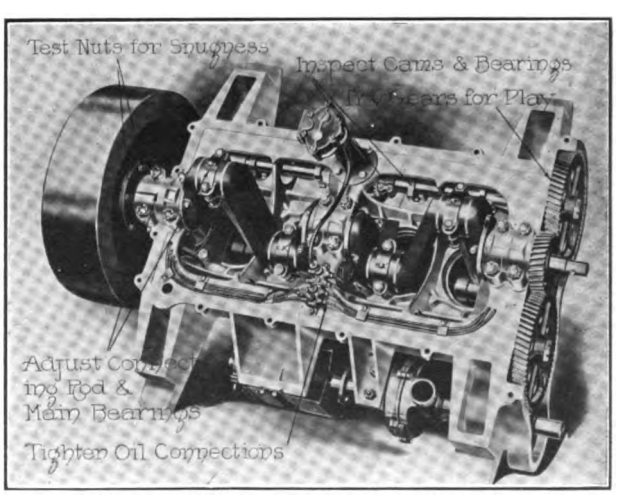
All gaskets, including the intake and exhaust members, as well as those utilized in connection with the circulating system, should be examined and if damaged replaced by new ones, and it is an excellent plan to paint those exposed to heat with graphite which will enable their removal without injury. In connection with this work it is suggested that extra members be made or purchased and stored in the tool kit in the event of trouble upon the road.

The general inspection of the power plant should include the water pump and coupling or key driving this member, as well as that actuating the magneto. If any retaining pins are loose they should be driven out and new ones fitted, taking care not to change the timing of the magneto in the operation. It is not advisable to tamper with the magneto and aside from lubricating according to the instructions of the maker, the amateur will do well to let this member alone. Any adjustments or repairs needed should be left to the expert.

Attention should be given to the spark plugs, both the battery and magneto, and these should be cleaned and the gaps adjusted and replaced, utilizing a little graphite on the threads which will prevent their sticking or freezing. Before leaving the power plant the bolts securing it to the frame should be gone over with a wrench and any loose members adjusted. The inspection should also include the starting handle and ratchet or pin.

Ignition and Carburetion.

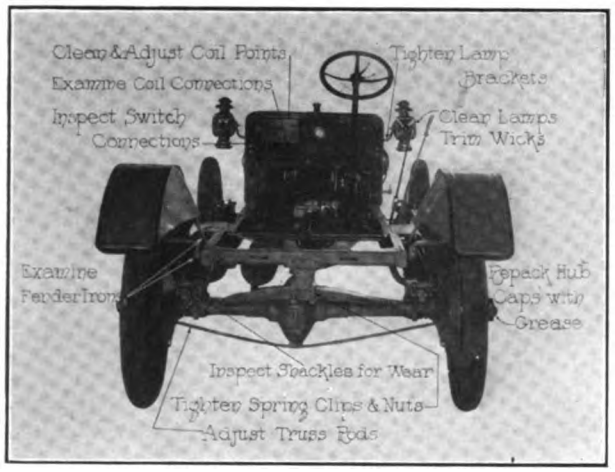
Although the magneto is used generally, it is surprising to note the large number of cars which are fitted with a timer or distributor, coil and battery system, depending upon auxiliary cells for reserve current. With such an equipment it is vitally important that the timer or distributor be in good condition and any play should be eradicated by the fitting of new bushings. It may be possible that the roller, contact blocks and fibre of the timer are worn uneven and require truing in a lathe. If in good condition no attention other than cleaning and lubricating will be necessary, although it is advisable to examine the terminals and leads, replacing worn wires with new. The ignition and throttle leads and connections should be inspected for wear and all play eliminated.



Test Main, Connecting Rod and Camshaft Bearings, Adjusting Loose Members and Oil Connections.

While on the subject of ignition it is an excellent plan to clean the platinum points of the coil and readjust the vibrators not overlooking the secondary

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Clean and Adjust Coil, Noting Whether Connections Are Secure, Also Look Over Truss Rods.

and primary wire terminals. The examination should also include the switch and the leads from the batteries. If storage batteries are utilized, either for ignition or lighting, they should be removed from the car, sent to the charging station and given a slow charge.

The carburetor will require but little attention if operating successfully although it is advisable to clean it thoroughly, taking care not to disturb the adjustments if possible.

Clutch and Transmission.

The type of clutch utilized will determine to a large extent the work of overhaul as that employed with the planetary transmission will require but little attention unless badly worn. The adjusting of the high speed member, low and reverse, is made easily where bands are employed.

It is well to examine the lining of the cone clutch and if it has been slipping and does not yield to the oil treatment it is best to fit a new leather. The multiple disc will need cleaning, which is accomplished easily by draining out the old oil and refilling the case with kerosene, engaging and disengaging the clutch several times, after which operation it should be refilled with a lubricant recommended by the maker. It may be possible that the discs will require a slight adjustment.

Next in order is the transmission. Broadly speaking there is but little to be done if the gears and bearings are in good condition, other than remove the old lubricant and refill with new. If any of the gears are worn badly and do not mesh easily, they should be replaced by new members. The mesh may be tested by changing speeds and noting the action of the pinions. While on the transmission the shifting forks should be examined and adjusted if necessary and the lever and quadrant gone over carefully to insure that the components are tight and do not stick or bind in their operation.

Universal joints are important and when these operate in grease packed in a boot, the latter should be taken off and cleaned. The universal members are next tested for wear and if play exists they should be removed and repaired, or new ones fitted. After completing the work the boots are replaced with plenty of lubricant.

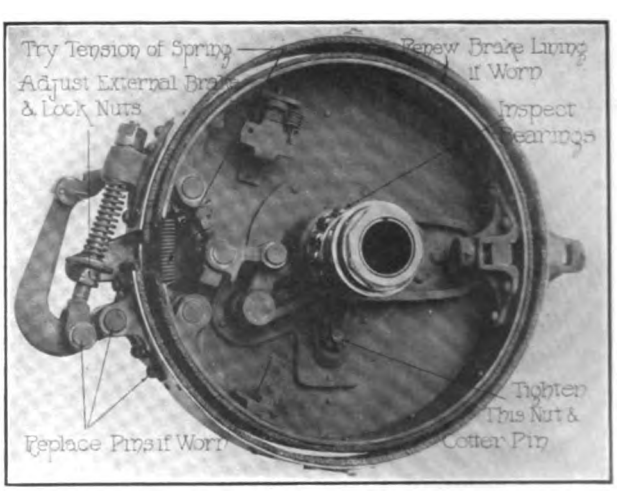
Differential and Rear Axle.

Coming next to the rear axle, the first step is to remove the old lubricant from the differential case, which will be an easy matter if the member is equipped with a detachable housing. After cleaning out the old grease and flushing the case with gasoline or kerosene, the mesh of the crown and pinion gears should be tested and the teeth of both members inspected for wear. When the gears have been noisy they may be readjusted, if means are provided. Any end play of the driving shaft ought to be eliminated by adjusting the end bearing which should be inspected carefully. If the balls or races are worn, new ones must be fitted. Before leaving the differential, examine its bearings, making such adjustments as are needed.

Rear Wheels and Bearings.

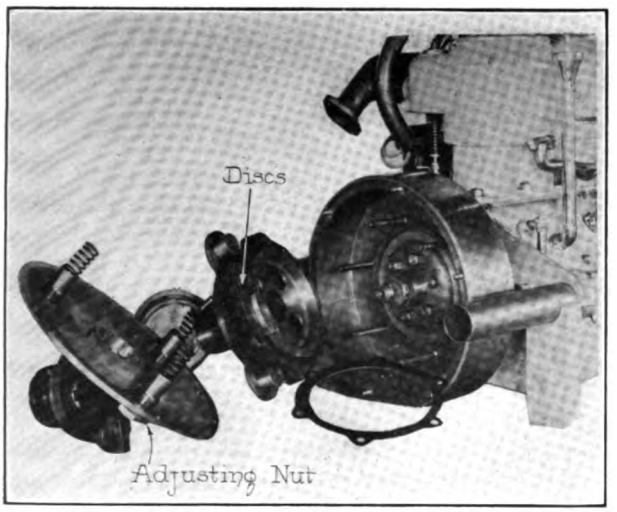
As the rear wheels are subjected to severe stresses it is important that no play exist in the bearings and that these members be in good condition. To test for play, jack up the rear wheels and note carefully if any looseness exist. If the bearings have not been examined for some time it is advisable to remove the wheel which may require the services of a wheel puller. If ball bearings are employed, the races, cones and balls should be cleaned and inspected, and if worn new ones procured. Ball bearings should be packed with a non-acid grease and care exercised in the adjustment so as not to have the bearings bind. A general rule is to tighten up until the bearings seize, then slack off about half a turn and relock securely. If the wheels are secured to the axles by keys, these and the keyways should be examined for wear.

Before replacing the wheels, the brakes must be



The Examination of Brakes Should Be Thorough as Much Depends Upon the Efficiency of These Members and Their Connections.

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Multiple Disc Clutch Disassembled to Outline Its Components and Their Relation to Each Other.

given attention. One cannot be too particular regarding these members as their serviceability will be severely tested on the tour. If the linings are worn new should be procured and fitted, and in attaching the friction material the rivet holes must be well countersunk to obtain good results. If metal to metal is employed and these are worn thin, new ones will have to be fitted.

The springs also require careful inspection and if they have lost their tension the new linings will drag, burning the material as well as decreasing the power of the car. After relining the brakes these members will have to be readjusted and while doing this work examine the brake rods, equalizer and other components of this group, replacing any part showing signs of undue wear. Lubricate all working parts and before leaving the brakes test their operating mechanism, making certain that none of the components bind.

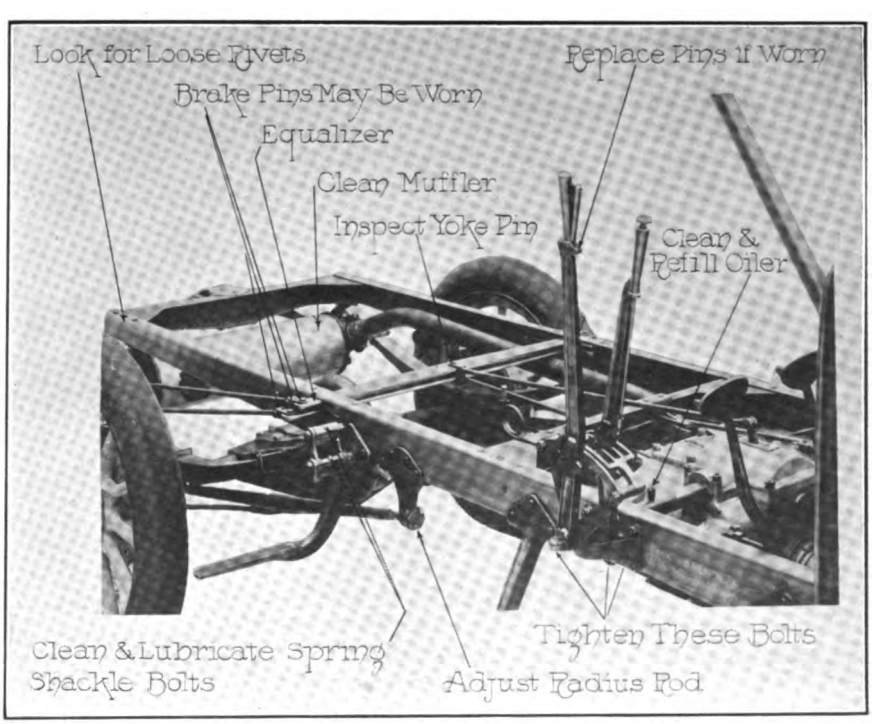
If the rear axle housing is fitted with truss rods, test for looseness and readjust. They should be snug, not too tight, the locking members set up hard and cotter pinned. The radius and torsion rods are important and irrespective of their design require careful attention and adjustment.

Before leaving the rear system, search for loose rivets in the housing and make sure that all nuts and bolts are tight, and that the spring clips and nuts are not loose. Springs, shackles and retainers should be gone over carefully and worn parts replaced with new. If the springs are rusty, pry apart the leaves, remove the dirt and lubricate with graphite and oil. It is surprising how much easier the machine will ride after the springs have been given this treatment. As many cars are equipped with shock absorbers these members should be given the attention recommended by the maker.

The frame and cross members should not be overlooked in the overhaul, especially if the machine has seen considerable service. Each rivet and bolt should be tried and if loose tightened up or replaced with a new member. The sub-frames carrying the motor and transmission should be included in the inspection and the bolts securing these units tightened. Go over the fenders and their irons carefully, taking up any play, and inspect the aprons as a loose bolt may be the cause of that annoying rattle.

Steering Gear and Front Axle.

The most important component of the chassis is the steering mechanism and the examination should be very through. Too much emphasis cannot be laid upon the necessity of disassembling the parts, inspecting each carefully and replacing any worn member with new. The reach rod and its connections should be gone over, tested for play and if not provided with means for adjustment, rebush the worn parts or replace with new. The tierod connections may also be worn creating considerable lost motion which may also exist in the spindles and pins. It may be necessary to procure new members or fit new bush-

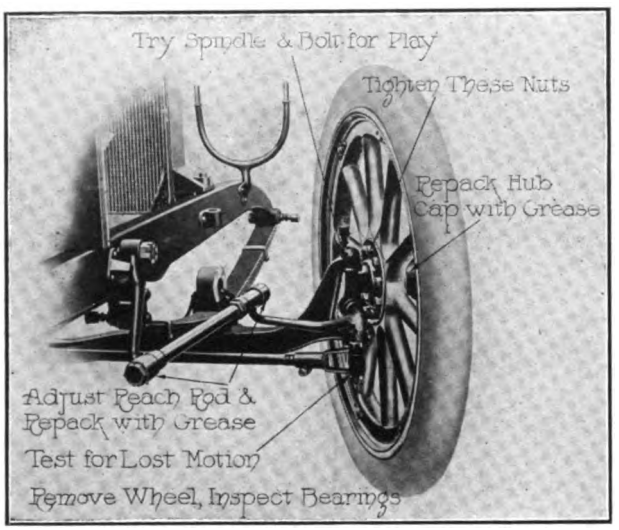


In the Overhaul the Gear Shift Lever, Transmission, Radius Rods and Frame Should Not Be Neglected.

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ings, this depending somewhat upon the design.

In reassembling these components plenty of lubricant should be utilized and before completing the



All Lost Motion Should Be Removed from the Steering Gear Connections and Bearings of Wheels Examined and Adjusted.

work, jack up both front wheels and turn the steering wheel in both directions, noting if the steering mechanism operates easily. If not, go over each part and readjust until the binding is eliminated. Leather boots are fitted to many of the connections and these should be refilled with fresh lubricant.

Front Wheels and Springs.

Having made sure that the steering gear is properly assembled and all parts locked securely, the front wheels and their bearings are next in order. The hub caps should be taken off and the old lubricant removed from these as well as from the bearings. Clean the latter with gasoline and inspect each ball, also the races and cones and locking mechanism. If the cones or races show signs of wear, purchase new ones, and in fitting these make sure that they are snug on the spindle and in the wheel hub. If any of the balls are pitted, replace with a new set. They are inexpensive and should be well packed with a suitable grease. In adjusting the bearings employ the same method as outlined with the rear wheels.

The front springs and their components should be treated in the same manner as the rear members, cleaning out all old lubricant from the oil or grease cups and refilling with new. The alignment of the wheels is important and should not be overlooked in the overhaul.

Before replacing the body, the tube and base supporting the steering column should be gone over and any loose bolt tightened, also those supporting the dash. As the muffler is accessible it is an excellent plan to remove it from the chassis and clean out all soot or carbon that may have collected. It will be surprising to note the amount of deposit the greater part of which may be removed by tapping the walls of the muffler with a wooden mallet.

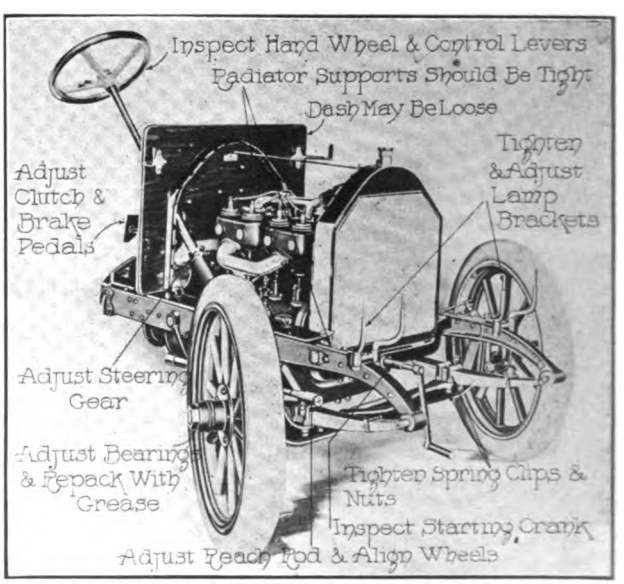
Having completed the work of the overhaul the subject of lubrication is next to be considered. As various parts require a different form of lubricant and some more frequent attention than others, this information is presented in the form of a chart in an accompanying illustration which depicts each component of the chassis and which will be of value to the motourist when touring.

Care of Car En Route.

It should not be taken for granted that because the machine has been overhauled and placed in first class condition it will not require any attention while on the tour. It is an excellent plan at the completion of each day's run to go over car, tightening any nut or bolt that may be loose and to examine the steering gear and its connections as well as the wheels. These precautions will prevent annoying delays upon the road and when the start is made in the morning the owner will have confidence in his machine, adding decidedly to the pleasures of touring.

OHIO STATE ASSOCIATION.

At the recent annual meeting of the Ohio State Automobile Association, Dr. C. L. Bonifield of Cincinnati was re-elected president, and Dr. A. B. Heyl, also of Cincinnati, secretary and treasurer. Dr. Bonifield, who for years has been a leader among the automobile enthusiasts of his home city and of the state, is also president of the Cincinnati Automobile Club. The Kenton Automobile Club acted as host for the con-



Tighten Spring Clips, Radiator and Dash Supports as These May Be Loose, Also Inspect Hand Wheel and Control Levers.

vention, members being highly complimented on every hand for the able manner in which they provided entertainment for the visitors.

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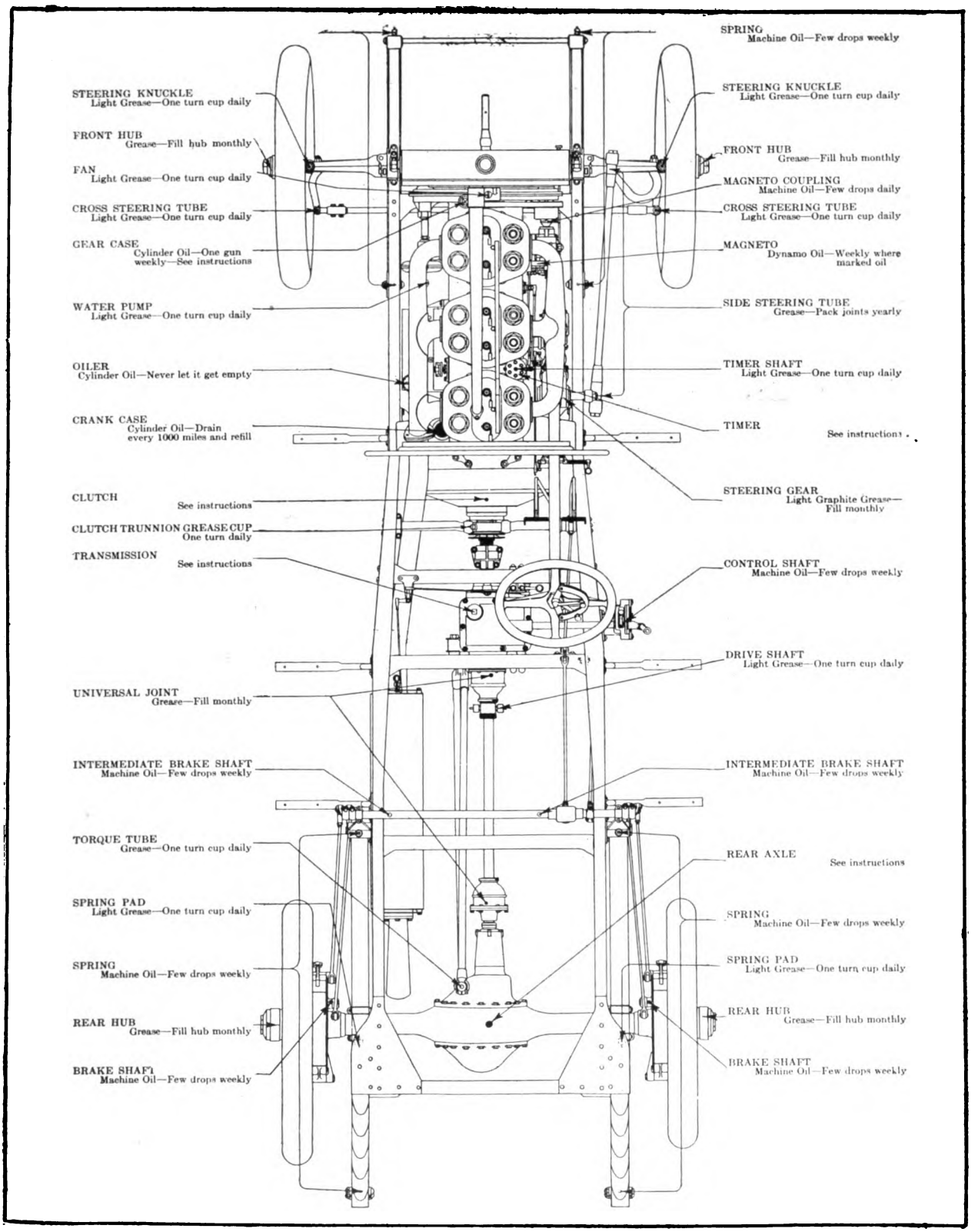
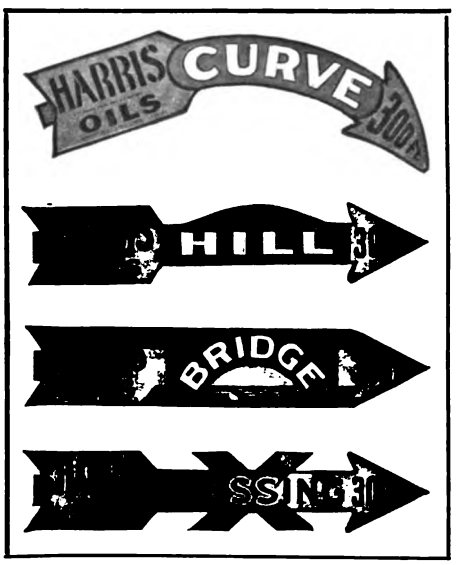


Chart of Entire Chassis Showing the Parts Which Require Lubrication, Proper Form and Time to Apply It.

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HARRIS OIL ROAD SIGNS.

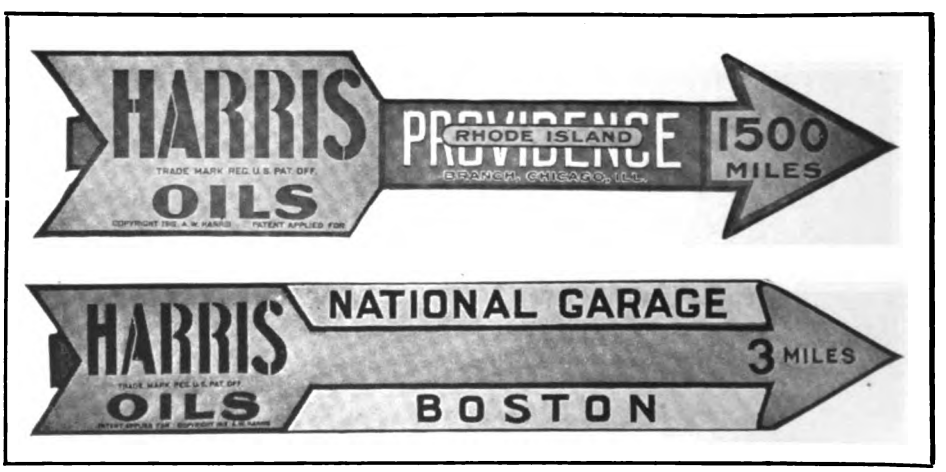
A road posting campaign, which is bound to result in decided benefit to motorists and all others concerned, has been inaugurated by the A. W. Harris Oil Company of Providence, R. I., maker of the famous Harris oils for all forms of automobile, motorcycle, motor boat, and aeroplane lubrication. The plan is so unique that it merits more than usual mention. Some of the signs are presented herewith, but as they are handsomely lithographed in red, yellow and black, on substantial metal, these black and white reproductions hardly do them justice.



Harris Oil Signs—Symbol Arrows for Warning Motorists of Danger.

As will be noted the entire set includes master arrows, dealer's arrows and symbol arrows. The Harris company has applied for a patent and the signs are all copyrighted. The working of the plan is very simple.

The dealer's arrow, or as it is termed, the local wedge arrow, bears the dealer's name and the town with the mileage, and is designed for the purpose of informing motorists where supplies may be obtained. The master arrow gives directions and mileage to the larger towns and cities on the route, while the symbol arrows will prove of decided assistance to motorists in giving ample warning of approach to dangerous spots along the road. Inasmuch as all the signs are of long wearing material, the service will be permanent and of an enduring character.



Harris Oil Signs: Above, Master Arrow; Below, Dealer's Arrow with Information as to Where Supplies May Be Secured.

This splendid advertising proposition is open to all dealers, the A. W. Harris Oil Company bearing the entire expense. Those dealers interested will be supplied with a sufficient number of signs to meet their requirements. The plan is decidedly comprehensive and should prove of material assistance to the motorist, the dealer and the Harris concern.

The arrows are now being sent out and the demand from dealers is growing rapidly. The reputation of Harris oils is well known, and it is anticipated that this new advertising plan will assist in bringing it to the attention of tourists. This is an exceptionally good time to begin the work of installing the signs along the roads travelled by motorists.

LONG ELECTRIC MILEAGES.

At a recent luncheon of the Electric Vehicle Club, of Boston, two men told some interesting stories of the long mileages they had obtained in electrics. One, J. E. Savill, stated that in 1903 he built an electric runabout with a battery which covered 108 miles on one charge, but that the speed was only eight miles an hour. The battery had thin lead and zinc plates. I. A. Kuhn, of the Babcock Electric Vehicle Company, reported that for some time he had been engaged in testing a number of sizes of electric roadsters and touring cars in Chicago and Boston. He stated that with a standard five-passenger touring car he had covered 175 miles at a speed of 15 miles an hour, over the boulevards of Chicago. At 21 miles an hour he covered 112 miles. Both times he carried the full complement of passengers. In Boston and over roads between that city and Marlboro he made 103 miles with a roadster, at a speed of 19 miles an hour, and used only 180 ampere hours out of the battery's capacity of 200. He contemplates making other mileage tests in the near future, covering roads of all sorts, and they will be watched by owners of electrics with great interest. An electric recently covered 975 miles in eight days, on one charge each night. This record was made in New York state.

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WOMEN'S MOTORING COATS AND BONNETS.

Garments Designed for Driving, or for Combination Purposes, of Substantial Materials and in Models That Have the Approval of Authorities on Dress.

THE woman who motors learns with experience what is best for practical use in the way of apparel, but there is a vast difference between choosing what can be worn and what had best be worn insofar as appearance, comfort and economy are concerned. It is not to be denied that for those who have no reason to consider difference in values the exclusive creations by women's tailors and modists will make the strongest appeal, and with such garments individuality is the keynote, but there are many thousands who must regard expense where there are few who do not, and it is for this class that these suggestions are made.

Considered from any point of view the motor woman has a wide range of choice in clothing. Each season the increasing use of motor cars and the necessity of garments adapted partly or wholly to driving has impelled an attention from the designers, the makers and the manufacturers of garments, so that there is to be found in practically all of the shops dresses, waists, skirts and all manner of coats and wraps, that are well made, have good appearance and have many, if not all, of the qualities that are desirable for automobile wear.

Relative to exclusive designs it is certain enough that these may be no more serviceable than those that may be worn generally, but as the possession of something that another cannot well obtain carries with it a prestige, it is not probable there is any argument that will prevail against desire to be attired in garments of this character. Of course when specially made clothing is regarded on the basis of service; that is, actual endurance, it no doubt has much to recommend it, but it would be a daring woman who would care to appear often in the same attire, and she would desire to change the effect so far as this could be done. Considered from this viewpoint, that much of the motor outfit cannot be worn more than a season without at least material changes, it is perhaps better to assume that the ready-to-wear garments that can be adapted for general purposes are economical in more ways than one.



Three-Quarter Length Motor Coat of Polo Cloth, Rose and White, Buttoned.

Questions of Economy.

It is a fact, however, that certain clothing may be worn for more than a single summer or autumn, provided that it is chosen with a view to serviceability rather than style, and with the requirements for warm, cool and cold weather a woman may accumulate a wardrobe of considerable proportions and yet not go beyond the bounds of prudence and economy.

The motorist whose driving is confined to afternoons or evenings and whose outings of this character are incidental rather than continuous, cannot well afford to spend a considerable amount in garments she may wear but casually, and if she is wise her wraps are such as may be appropriate to numerous occasions, or at least may be worn generally to some extent, because if limited to motoring alone she would hardly be justified in any expenditure. It is best where such a condition obtains to select what will be most useful and to confine one's self to what may be termed combination apparel.

In the selection of garments the motorist will find at many of the shops dresses and coats that may be made very useful and which may be appropriate for wear in the car and on the street. This does not mean that one is necessarily limited as to style, for it is possible to purchase decidedly pleasing models and in a great variety of fabrics. In fact, to examine the showings of the more pretentious stores is to be surprised at the attention given to motoring apparel, and at the designs that have been created especially for automobile use. But as a rule outer clothing is specialized, and this leaves to the purchaser a choice from any number of gowns that may be adaptable to wear while with the car.

Selection of clothing that will serve for the occasional drive, or the frequent ride for a day or evening,

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is not a difficult subject, for it can be safely said that a suitable hat or bonnet and a coat that will cover the gown is sufficient for ordinary requirements. The chief essential is protection of the dress and the hair, for it is assumed that any woman will safeguard her face and eyes against the burn of the wind and the sun and the ravages of dust as her own experience teaches her is best. So far as the dress beneath is concerned there is a wide range for choice because some women will drive an entire day and alight from the car as fresh and as free from evidences of travel as though they had not been in a car. Others will have the appearance of a constant battle with wind and sun and a generally dishevelled aspect that may be applied to every article worn. There is no question, however, that with care in dressing any woman may drive the entire day and reach a destination reasonably presentable, and without a soiled and travel crumpled gown.



Three-Quarter Length Motor Coat, of Polo Cloth, Blue and Plaid, Open.

The Matter of Packing.

The experienced traveller by automobile does not prepare for a motor tour as for a journey by any other conveyance. She realizes that she is decidedly limited as to number of garments she can conveniently carry unless a trunk is sent by express, and as luggage of this character must be looked after and packed and repacked each day, its care becomes more of a burden than it is a convenience. Not only this, a trunk cannot be well sent in this manner unless an itinerary is maintained, and this prohibits variances that might be especially desirable and go to make up much of the pleasure of automobile travel. And besides, few women would care to have really nice clothing crushed and crumpled from being packed for a considerable length of time.

There is no end of garments that might be appropriately worn, but there is little doubt that the simple tailored effects, in fabrics that will not fade from the sun, which will not be affected by a shower, which will resist the soil of dust and will retain their shape, will find the greatest favor. Light colors are delightful in appearance, but they soon show the stains of travel, and there is nothing more undesirable than a dress or coat of a color that will emphasize uncleanliness.

Concerning One-Piece Gowns.

There are simple one-piece gowns that may be worn with much satisfaction, or the skirt and coat that may be utilized with the shirt waist of differing materials, any of which may be approved, whether for the road or the more or less informal occasions to be met with at the hotels or with friends, because there is a license for travellers as to variety of wearing apparel. For wear in the car it is certain enough that the fabric should be selected that will not be too heavy or heating during the extreme heat of the day, and yet will be reasonably warm in the cool of the morning or the evening, because at the shore and in the mountains a considerable change in temperature may be expected.

Of course it is essential to supplement the dress by coats, which really establishes the light weight as the desirable in fabrics, and this may include the light weight serges, whipcords, diagonals, homespuns, knob-homespun, tweeds and fancy mixtures in the woolens; khaki, corduroy and some of the dependable silks. Of these, the serges, whipcords and homespuns make admirable skirts and coats, being sufficiently diversified as to color to meet the approval of all, and these may be made up to the idea of each individual in whatever effect may be desirable.



Three-Quarter Length Motor Coat, of Novelty Mixture, Silk Lined, Buttoned.

One of the qualities of the serges and fabrics of a similar character is that they may be cleaned readily if soiled and when they are properly shrunken before making they will not shrink when wet by rain. Not only this, a woolen garment will always resume its shape when pressed, and no matter how often it

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goes to the tailor it will always return appearing fresh and attractive. Brushing will remove all the dust and good material will not fade when worn in the sun. No matter how well one may be protected it is difficult to prevent dust from reaching one's clothing and so it is well to select that which will be the least affected by the usual causes for deterioration.



Full Length Motor Coat of Blue Diagonal Serge Trimmed with Robin's Egg Blue.

In making up the travelling wardrobe the gowns to be worn outside of the car should be of materials that will not suffer in appearance through packing. Cotton and linen will remain creased from folding, and the lines can only be obliterated by pressing, which treatment is not always practicable. It is exceedingly annoying for a woman to arrive at a destination for the day and find the garment she desired to wear so unsightly that its use is impossible, although it was packed with care and reasonable precaution taken. It is far better to rely upon gowns of foulard, of pongee silk, of Japanese silk, of rajah and tussah, for these may be rolled and placed in the auto trunk with a confidence that when taken out they may be shaken into shape and will have all their original freshness and charm. Dresses of pattern silk have all the practicality of the others and these may be sufficiently ornate to be serviceable at any ordinary function. Gowns of the materials suggested that are adapted to the use of the motorist may be bought at most of the good shops, and care should be taken to select models that are so trimmed that they will not suffer in appearance through packing. Where the gowns are made they should be designed with the same purpose in mind. In carrying out this idea self-trimming is to be recommended wherever possible.

In this connection it should be borne in mind that where one is touring one cannot expect to have more than two or three gowns at the most in the ordinary luggage, and light colors should be avoided on general principles for those that will better resist the evidences of use. In the event of a rainy day when one may be confined to a hotel or to the house it is well to have appropriate attire, unless one is willing to appear in the regular garments worn in the car. Necessity will develop the resourcefulness of the woman in dress, to be sure, but where provision can be made for such conditions as may be reasonably anticipated it is well to consider probabilities. It has been suggested that with two silk gowns that can be worn for differing occasions, a motoring dress and an extra skirt, a woman can make a tour of considerable length and make a satisfactory appearance, which would seem to indicate that good judgment in a choice of several garments is in every way more desirable than a selection of a considerable number.

Where the dress that is to be worn in the car is limited to a single suit, and perhaps an extra skirt, the belted coat with Norfolk effect may be regarded with approval, and if of tweed, or a mixture, or of serge, waists of linen or silk may be worn if desired, these being preferably of colors that will the least show wear, but the one-piece gown has an advantage in that it will not evidence use as will the waists, although it may not have the same effect. The single garment also eliminates the perishable collars unless lingerie effects are desired.



Combination Rain and Dust Motor Coat, of Cravenetted Worsted.

For those who desire effect white garments of woolen fabrics, such as serges, corduroys, broadcloths, and even linen may be worn, but these would hardly serve those who may travel hundreds of miles by car. They are striking when used for afternoon or evening wear, and they may be fairly protected, but a single day on the road would perhaps end their serviceability. The same comment may be made of the fabrics of delicate tones, which may be worn about the shore or in the mountains, and yet would be decidedly unserviceable for any extended or constant use.

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As to the colors that are permissible for gowns, that is a subject which can best be determined by the motorist herself. There are shades and tones that are the vogue, and yet the combination that can best be made is not to be determined by the judgment of another nor the effect obtained, although it is possible that the suggestions might be helpful. Yet striking and effective as garments may be it is not to be assumed that these will be given uniform approval.



Motoring Dust Coat of Gray Mohair, Double - Breasted, Desirable for Touring.

It is imperative, however, no matter what the opinion may be relative to dress, that the travelling coats and wraps be of a type that will not only be serviceable, but will afford every desired protection against the elements and the conditions to be met with during the motor journey. Incidentally these may serve equally well, no matter whether the drive shall be of a few hours or for several weeks. The requirements for all occasions do not differ greatly.

Sweater Coat Desirable.

One of the most useful garments that can be carried, which may be worn under an outer wrap is a sweater coat. These may be purchased in any desired quality, color or length, and of differing weights. While comparatively light they have a degree of warmth that makes them especially desirable when the air is chilly, and being snug fitting and elastic they are comfortable without bulkiness and conform to every movement of the body. Covered with a coat that will resist the penetration of the wind they are especially warm, and worn with a rain garment a sweater is really all that is needed for ordinary summer touring comfort. A sweater will endure all kinds of hard usage, it may be rolled or folded or stowed wherever circumstances will permit, and it will lose nothing in appearance. Sweaters may be tubbed and cleaned as often as desired, and they will always retain their shape.

Wool is one of the best of materials because of the warmth and its elasticity, but silk makes an ideal garment, and knitted coats of silk have endurance and elegance that highly commend them. The long sweater is the better for automobile service because it will give greater protection, and naturally the tones that will the least show the stains of use are to be preferred. One of the most desirable sweater coats is that knitted from silk and having three-quarter length, and these may be had with different collar designs, some being adapted for closing to the throat and giving a full protection, while others are more pretentious and perhaps not as practical.

It is not out of place to have one garment that has tone and dignity that may be both suited to the motor car and to more or less general wear, and such a coat may serve when going about between drives, when the atmosphere is chill, as may be experienced at the shore and the mountains. It may be packed with reasonable certainty of it retaining its shape and attractiveness, and it should be of fabric that may be cleansed readily. One of the really artistic garments, that may be worn by the majority of women, is a new three-quarter length motoring coat of polo cloth, this being a thick, but light and soft fabric of wool. This material is two faced and among those displayed at the stores of the Shepard Company, Providence, R. I., recently, were models of rose and white, lavender and white, black and white, navy and plaid and plain black, the lighter color being the inside of the garment.



Black and Gray Silk and Mohair Dust Coat, a Striking and Stylish Garment.

The coats are formed from a single piece of fabric and there are no seams, the shoulders being wide and loose with the collar wide and meeting the front edges to form a deep notch. The sleeves are long and are inset with deep lap seams, and are finished with deep cuffs showing the darker color. The revers and the collar are of the lighter

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tone so that when the collar is turned up and the coat closed at the throat only the outer color is seen. The patch pockets at the side are made with lap seams and there is a shield of the contrasting color turned over on the patch, giving a lapel effect. The coat is trimmed with silk braid at the edges and about the cuffs, which are rounded at the sleeve seam, this matching the front effect, where the corners are cut rounding. With the combinations with white and a contrasting color the silk braid is white, and with the navy and plaid, and the plain black, the braid is black. When closed the coat is buttoned with four large pearl buttons, stitched with four smaller buttons on the reverse, so as to bring no strain upon the fabric. In the back it falls full from the shoulders. When opened the collar is turned further onto the shoulders and the front has a soft roll that extends nearly to the knees. Two of these models are shown, the one of rose and white and the other of navy and plaid, the former closed and the latter open.



Handsome Motor Dust Coat of Black Mohair, with Yoke and Collar, to Be Worn Closed.

Novelty Mixtures.

Another particularly effective motor coat of the popular three-quarter length was also displayed by this firm, this model being of a fabric known as a novelty mixture, loosely woven, light in weight and yet exceedingly warm. This material is in combination color effects of gray and light blue, dark and light brown, dark and light tan, and dark and light navy blue, the first mentioned tone predominating in each instance.

Like the garments previously described the coat is formed of one piece of fabric and there are no seams, the front folding deeply so as to afford good protection at the throat. The corners at the front are more nearly square and the garment when buttoned has a complete bottom line about the figure. The shoulders are broad and the sleeves are inset so as to give perfectly easy fit, the sleeves being long and loose and finished with a very deep cuff. The collar is rather narrow and there is no notch, the revers being wide and formed with the collar.

This garment is lined throughout with satin of the darkest shade of the material and this lining is exposed when the collar is turned down and the coat is open. The coat is closed with five buttons, three close together below the waist line, one at the throat and the other at the bust. The wide right rever is buttoned across the throat, as is seen in the illustration. The patch pockets are deep and are finished with a square shield. The coat is loose and falls full from the shoulders, there being no restraint of the body in any position.

Combination Garments.

A third model that attracted decided attention was a combination motoring and street garment of light weight that was intended for protection of the gowns and to have a reasonable quality of warmth. This is of navy blue wide wale diagonal or serge, cut loose and full, and falling smoothly from the shoulders to the bottom of the skirt. The back is formed to have a loose, one-sided effect with a deep plait and is caught with two buttons at the waist line. There are three seams, one under each arm and a third forming the plait. The front fold is very wide and the corners are square. The collar fits snugly about the neck and this is faced six inches deep with robin's egg blue serge, the ends falling straight forward onto the bust and being finished with two large button holes at either end.



Motor Dust Coat of Light Tan Repp, an Extremely Serviceable and Durable Wrap.

The sleeves are loose and long and these are finished with deep cuffs of the same material as the collar, the cuffs being rounded at the sleeve seam and ornamented with a large tab lined with blue satin and buttoned on to the cuff. The shoulders of the coat are lined with the same material to afford additional protection. When the coat is

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closed it is buttoned with two buttons below the waist line, the revers being unusually long and wide. It may be closed at the throat with a third button, and the collar may be closely wrapped about the neck if this is desired. The buttons are large and are of smoked pearl.

An admirable model of a combination rain and dust coat was also shown, this being a handsome black and white checked, hard-finished, cravenetted worsted, cut loose and roomy to fully protect any gown that might be worn. This coat has the quality of not showing dust, may be perfectly cleaned by brushing, will shed rain, and while light has a warmth that will permit its use, with other garments, at all seasons. It is made with three seams, one under either arm and the other at the back. The back seam is finished with a long vent. The garment falls loosely from the shoulders and it is fashioned with a rather deep notched collar and wide revers. It has side vents for lifting the skirt and the two large side pockets have vertical vents. The long sleeves may be gathered about the wrists by tabs that are caught with buttons. The sleeves and the pocket vents are ornamented with black buttons, and six buttons are used to close the coat, the collar buttoning close and being caught tightly with a hook and eye.

A dust coat that is appropriate for all motoring, and which will amply protect the wearer, is of mohair and it may be obtained in navy blue, gray and tan, that which is illustrated being gray. Like garments of this character it is full and loose, hanging from the shoulders and reaching the bottom of the gown. It is made with a one-piece back and with a seam under either arm. It is fitted with a wide hand made notched collar that fits close to the throat, and may be hooked tightly if desired. The revers are long and wide and there is a generous fold at the front, the garment being closed with a double set of three buttons which are set at the right side, giving a double-breasted effect. The front facings are deep and the long sleeves are finished with a deep, square cuff, having a rounded corner. The patch side pockets are made with a square lapel effect.

Another dust coat that is decidedly serviceable is a loose, roomy garment of silk and mohair and it may be had in either black or gray. It is cut fairly full with two side and a centre back seam and falls straight from the shoulders to the hem of the skirt. The front fold is very wide and this gives unusual protection to the throat and the chest of the wearer. The sleeves are long and full and are finished with a deep cuff. The collar is close fitting and is very wide, with the loose ends falling at either side of the neck. The lapel is notched and there is a rever extending to the waist line where the coat is closed with four buttons that give a double-breasted effect when buttoned into the long buttonholes, which are reinforced with black taffeta. The patch side pockets have a square shield, that is unusually deep.

A striking motoring coat is of mohair and in black only, this being loose in fit and made with three seams, there being a deep vent at the back. The collar is deep and rounding and it covers a yoke that extends about the shoulders, with large tabs that fall over the upper part of the sleeves. The yoke is slightly curved over each shoulder at the back and circles the neck and is carried to the edge of the front, the collar being loose above it, yet closely fitting. The shoulders are wide and the sleeves full and long, having a large, deep cuff caught with a single button. The pockets are of the patch pattern and have a shield effect with a shield lapel. The coat is closed with three large celluloid buttons set below the waist line, and by two buttons at the throat, these buttoning the outer end of the yoke and the fold of the garment below it across the bust.

Another especially durable and pleasing dust coat is made of a light tan repp, this being a closely woven cotton fabric that is mercerized and is very smooth and soft, with sufficient weight to be warm and give considerable protection in the event of a sudden chill. This model falls freely from the shoulders, with two side and a centre back seam, with no vent. The collar is wide and heavy and it is made to fit closely about the throat and protect the gown beneath. It is deeply notched. The coat has a wide front fold and deep facings, and when it is open it has a long and graceful roll. The pockets are with vertical vents and the cuffs are plain and are fitted with dust protectors and finished with a tab for closing the sleeve closely about the wrists. The garment is lined across the shoulders and chest to the waist line.

With these models of coats are shown three types of motoring bonnets, the first of which is a helmet and is an imported creation of Paul Poiret of Paris, being intended to afford perfect protection for the hair and somewhat shield the eyes. It is extremely light and is formed of a thin patent leather in a deep bowl shape, the border being ornamented with white French hemp. In the centre of the front there is an ornament formed as a pompom with the lower portion of shirred white ribbon and with black feathers rising above the top of the crown.

Of the other two both are of practically the same type, being suited for the automobile or steamer wear. These are made in changeable taffeta silks, the combinations being blue and green, brown and tan, red and blue or black and green, these being of the envelope effect with a little cape at the back to protect the hair, or a longer streamer that falls at the back for the same purpose. There are sidefolds that may be brought closely under the chin and clasped with a snap button. There is a slight brim that protects the eyes, and the head and throat save the face is completely enclosed and shielded from the dust, the bonnet being light and extremely comfortable.

Ed. Note—The Automobile Journal is indebted for the above detailed descriptions and for the photographs to the Shepard Company, Providence, R. I., these being chosen from its ready-to-wear departments.

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NATIONAL CONTEST AND RACING NEWS.

Boillot Wins French Grand Prix---Bruce-Brown Disqualified for Taking on Gasoline---Second Annual Four-States Tour Starts---Knox Enters for Vanderbilt Cup---Results in Various Meets---Ford Wins Hill Climb.

For the first time since 1908, the French Grand Prix race was held over the Dieppe course, June 25-26. The distance was 956 miles, 20 laps, of a 47.8-mile course, 10 laps being covered the first day and 10 the second. David L. Bruce-Brown of America, driving a Fiat car, finished the first half of the contest in the lead, but was disqualified the second day, because he took on gasoline outside of the regular pit.

The race was won by Boillot of France in a Lion-Peugeot, his time being 13:58:02, or at the rate of 68.7 miles an hour. Second place went to Wagner of France in a Fiat in 14:11:08, averaging 67.8 miles an hour. Bruce-Brown was third, but the prize was awarded to Rigal of England in a Sunbeam, his time being 14:38:36. Bruce-Brown's time was 14:28:13.

In the light car class, three Sunbeams, driven by Rigal, Resta and Medinger, finished in that order, their respective times being 14:38:36, 14:39:51 and 15:59:41. The only other car to finish was an Excelsior of Belgium, driven by Christaens, his time being 16:23:38. Others were still running.

All three winning cars in the larger event were equipped with Bosch magnetos, a source of much gratification to the Bosch Magneto Company, New York City.

MAINE'S RELIABILITY CONTEST.

The three-day reliability tour covering 446 miles from Portland, Me., under the auspices of the Portland Sunday Telegram, last month, brought out nine cars, four of which finished the test with perfect scores. The first day's run was from Portland to North Conway, N. H., with night stop at Gorham, N. H.; the second, from Gorham to Skowhegan, Me., with night stop at Bangor; and the third, from Bangor to Augusta and return to Portland. The standing of the contestants at the finish was as follows: Mitchell 6, Jackson 7, Stoddard-Dayton 8 and Stearns-Knight 9, perfect; Jackson 3, 11 points; R-C-H 2, 31 points; American 10, 93 points; Oakland 4, 240 points.

NATIONAL STILL HOLDS RECORD.

After considering the Santa Monica road race and the races on the Los Angeles motordrome, May 4 and 5, the contest board of the American Automobile Association has issued the following statement: "The time made by various cars in both the Santa Monica road race and the motordrome events were not accepted and allowed as official records for the reason that the board has not yet been able to secure possession of the original printed ticker tape of the timing apparatus used to record the times in these two events." This means that the world's road record made by Harvey Herrick in a National car in the Santa Monica road race of 1911 still stands as official, despite the fact that Teddy Tetzlaff in a Fiat exceeded this mark very materially this year.

In connection with the matter of racing records, the board has failed to take into account the work done by De Palma's Mercedes in the recent 500-mile race and has adopted the following as official speedway records, regardless of class, created in that event:

Miles	Car	Driver	Time
100	Fiat	Tetzlaff	1:13:37.25
150	Fiat	Tetzlaff	1:49:52.84
200	Fiat	Tetzlaff	2:25:50.52
250	Fiat	Tetzlaff	3:07:13.94
300	National	Dawson	3:48:39.30
350	National	Dawson	4:25:15.27
400	National	Dawson	5:04:14.23
450	National	Dawson	5:44:04.54
500	National	Dawson	6:21:06.03

DEFEATED DRIVERS GET PRIZES.

It will be remembered that the management of the Indianapolis motor speedway offered 12 prizes for the 500-mile race of Memorial Day, but inasmuch as only 10 cars finished, it was anticipated that the 11th and 12th awards would revert to the speedway. It has been decided, however, that the 14 drivers who tried and failed should receive some recognition for their work. Accordingly the management has divided these two awards among these as follows: De Palma, Mercedes, $382.34; Burman, Cutting, $301.54; Dingley, Simplex, $222.87; Matson, Lozier, $211.34; Wishart, Mercedes, $176.76; Anderson, Stutz, $153.70; Liesaw, Marquette-Buick, $138.34; Disbrow, Case, $128.73; Marquette, McFarlan, $121.04; Herrick, Case, $103.75; Richenbacher, Firestone-Columbus, $82.62; Bruce-Brown, National, $49.95; Knight, Lexington, $13.46, and Ormsby, Opel, $13.46.

FORD WINS ALGONQUIN CLIMB.

The seventh annual Algonquin hill climb, held under the auspices of the Chicago Motor Club, June 20-21, was won by Frank Kulick in a Ford, made by the Ford Motor Company, Detroit. Two grades were utilized, the first being that known as Algonquin hill

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proper and the other Phillips hill. The latter is exactly .5 mile in length. The summary follows:

Car	Driver	Algonquin Time	Phillips Time	Total
Stock, $1201-$1600.				
Bergdoll,	Monsen	0:43:0	0:58.0	1:01.0
Non-Stock, Under 161 Inches.				
Herreshoff,	Wordingham	0:38.8	0:47.8	0.86.6
Non-Stock, 161-230 Inches.				
Mason,	Duesenberg	0:18.0	0:31.0	0:49.0
Ford,	Kulick	0:17.6	0:31.8	0:49.4
Non-Stock, 231-300 Inches.				
Mercer,	Schillo	0:18.0	0:31.0	0:49.0
Case,	Nikrent	0:20.0	0:30.4	0:50.4
Colby,	Ogren	0:25.4	0:40.8	0:66.2
Non-Stock, 301-450 Inches.				
Ford,	Kulick	0:51.6	0:28.2	0:43.8
Stutz,	Moore	0:21.8	0:32.0	0:53.8
National,	Schetnitz	0:25.0	0:36.0	0:61.0
Non-Stock, Under 600 Inches.				
Ford,	Kulick	0:15.4	0:27:2	0:42.6
Mason,	Duesenberg	0:18.2	0:29.8	0:48.0
Case,	Nikrent	0:18.2	0:30.2	0:48.4
Stutz,	Anderson	0:22.0	0:34.4	0:56.4
Colby,	Ogren	0:24.6	0:41.4	0:66.0
Non-Stock, Free-for-All.				
Ford,	Kulick	0:15.8	0:28.4	0:44.2
Mason,	Duesenberg	0:18.0	0:30.0	0:48.0
Mercer,	Schillo	0:18.4	0:31.0	0:49.4
Colby,	Ogren	0:22.2	0:35.2	0:57.4

TWO NEW SPEEDWAYS COMING.

The Dallas Motor Speedway Company has been organized in Dallas, Tex., with capital of $250,000. The aim of the company is to construct a two-mile speedway which shall be even superior to that at Indianapolis, Los Angeles, Atlanta or Cheyenne.

The Metropolitan Motor Speedway Association, with capital of $1,500,000, has been incorporated in New York City. It is announced that the concern has taken over 300 acres on the Jersey meadows near Newark, and that ground will be broken in the near future for the construction of a motor speedway. It is planned to hold a 500-mile race as an opening event, July 4, 1913. It is understood that included among the stockholders are A. R. Pardington, Fred J. Wagner, E. E. Hoyt, Theodore F. Keer and W. H. Osborne.

ANNUAL FOUR-STATES TOUR.

Some 35 cars left Indianapolis, Ind., July 9, on the second annual Four-States tour of the Indiana Automobile Manufacturers' Association, which will include visits to the principal cities in Indiana, Kentucky, West Virginia and Ohio. The tour is not in the nature of a contest, as such events usually are considered, but is intended as a means for introducing the product of Indiana makers to the people of the section covered. Ample opportunity will be offered for demonstrations en route, following the plan inaugurated a year ago.

The entries for the 1912 event were as follows:



Great Western Pathfinder and Pilot Car in the Indiana Four-States Tour, Heading the Parade for Second Annual Event in Indianapolis.

Nyberg Auto Works, Anderson, three Nyberg pleasure cars and one Nyberg truck; Maxwell-Briscoe Motor Company, Newcastle, three Maxwell cars; Henderson Motor Car Company, Indianapolis, one Henderson; American Motors Company, Indianapolis, three American cars; Service Motor Car Company, Wabash, two Service trucks; Great Western Automobile Company, Peru, two Great Westerns; Motor Car Manufacturing Company, Indianapolis, two Pathfinders; Marion Motor Car Company, Indianapolis, two Marmons; Premier Motor Manufacturing Company, Indianapolis, two Premiers; Nordyke & Marmon Company, Indianapolis, two Marmons; McFarlan Motor Car Company, Connersville, two McFarlans; Haynes Automobile Company, Kokomo, two Haynes cars; De Tamble Motors Company, Anderson, two De Tambles; Cole Motor Car Company, Indianapolis, two Cole cars; Double Fabric Tire Company, Auburn, one car.

A Cole and a Premier were selected as official press

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cars. These will occupy much the same position as an advance agent, preceding the other contestants and making arrangements for demonstrations, etc. The Great Western, which laid out this year's route, is acting as pilot car for the tour.

KNOX FOR VANDERBILT CUP.

The first entry for the 1912 Vanderbilt Cup race has been filed by Ralph Mulford, who will drive the Knox machine, made by the Knox Automobile Company, Springfield, Mass., and driven by him in the recent 500-mile race on the Indianapolis speedway. Now that the entry blanks have been issued and the dates have been selected, it is expected that the list will increase rapidly.

The dates are as follows: Grand Prize, Sept. 17; Pabst and Wisconsin challenge trophies, Sept. 20; Vanderbilt cup, Sept. 21. All events will take place on the so-called Greenfield course, under the auspices of the Milwaukee Automobile Dealers' Association.

RESULTS AT NARBERTH.

Several withdrawals marked the meet at Narberth, Penn., June 29, as evidenced by the fact that although there were 10 entries for the 50-mile race, only four started. The summary follows:

Five Miles, 161-230 Inches.

Car Driver	Time
Buick, Bauer	6:02.4
Cartercar, Baker	.....
Empire, Smith	.....

Five Miles, 231-300 Inches.

Bergdoll, Homan	6:00.8
Mercer, Morton	.....
Mercer, Ringler	.....

Ten Miles, 301-450 Inches.

Kline-Kar, Menker	9:55.0
Stutz, Blocksom	.....
G. J. C., Millchap	.....

Fifty Miles, Free-for-All.

Kline-Kar, Menker	53:39.0
Stutz, Blocksom	.....

Ten Miles, Handicap.

Fiat, Frietag	10:50.0
Empire, Smith	.....
Schacht, Gray	.....

Ten Miles, Consolation.

Empire, Smith	5:39.0
Schacht, Gray	.....
Mercer, Ringley	.....

BOSCH IN ALPINE TOUR.

Twenty-two cars finished the strenuous 1445-mile Alpine tour of the Vienna Automobile Club in Austria, June 23, with perfect scores, and of these, 21 were fitted with Bosch magnetos, according to the Bosch Magneto Company, New York City.

ENTERS FOR GALVESTON BEACH.

Neil Whalen has made the first entry for the beach carnival meet at Galveston, Tex., Aug. 8-10. He will drive the same National car, made by the National Motor Vehicle Company, Indianapolis, Ind., with which Leonard Zengel won the Elgin trophy last year. It is now owned by Fred Cummiskey of New York City.

BURMAN REGAINS BRASSARD.

After holding the Remy grand brassard for one week and drawing the weekly salary accompanying it but once, Louis Menenghetti lost the award to Robert Burman in the meet at Laurel Park, Washington, D. C., June 28-29. The results follow:

FRIDAY, JUNE 28.

Three Miles, Remy Brassard.

Car Driver	Time
Benz, Burman	3:20.0
Benz, McDonald	.....
Warren, Barber	.....

Twenty-Five Miles, 600 Inches.

Cutting, Burman	27:32.0
Ohio, Raimey	.....
Lozier, French	.....

Five Miles, 161-230 Inches.

Warren, Barber	6:15.0
Reo, Stewart	.....

Five Miles, 231-300 Inches.

Ohio, Raimey	5:37.0
Kline-Kar, Fairman	.....

Five Miles, 451-600 Inches.

Cutting, Burman	5:22.0
Kline-Kar, Menker	.....
Lozier, French	.....

Five Miles, Free-for-All.

Benz, McDonald	5:14.5
Kline-Kar, Fairman	.. ..
Lozier, French	... .

SATURDAY, JUNE 29.

Five Miles, 161-230 Inches.

Warren, Barber	6:07.6
Reo, Stewart	.....
Warren, Blair	.....

Five Miles, 450 Inches.

Ohio, Raimey	5:55.0
Warren, Barber	.....
Mercer, Blair	.....

Five Miles, Special.

Mercer, Blair	6:04.5
Warren, Barber	.....
Reo, Stewart	.....

Three Miles, Remy Brassard.

Benz, McDonald	3:11.2
Benz, Burman	.....

Five Miles, 600 Inches.

Benz, Burman	5:34.0
Ohio, Raimey	.....
Warren, Barber	.....

Five Miles, Free-for-All.

Benz, McDonald	6:05.5
Warren, Barber	.....
Ohio, Raimey	.....

Eight and One-Half Miles, Pursuit.

Benz, Burman	8:19.2
Ohio, Raimey	.....
Warren, Barber	.....

Three Miles, Remy Brassard.

Benz, Burman	3:06.2
Benz, McDonald	.....
Mercedes, Menenghetti	... .

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MEETING EMERGENCIES ON THE ROAD.

THOUSANDS of automobilists now undertake successfully long tours with no other knowledge of the motor car than of operation, fuel and lubrication. This has been made possible by the perfected product of the manufacturer and the owner of the modern machine starts on his journey confident that he will reach his destination in scheduled time. There are, however, many motorists whose means are limited and who invest in a second hand car, which, although apparently may be in good condition may be subject to those weaknesses which have been overcome in later models. It is not to be assumed that if the car has been overhauled properly weaknesses will develop on the tour, but minor mishaps such as ignition, carburetion, etc., are probable, and for the benefit of those lacking in experience the suggestions contained herein are made. Lack of space prevents detailed instructions and those given are of a general nature calculated to aid the owner when in difficulty and where the services of the expert are not obtainable.

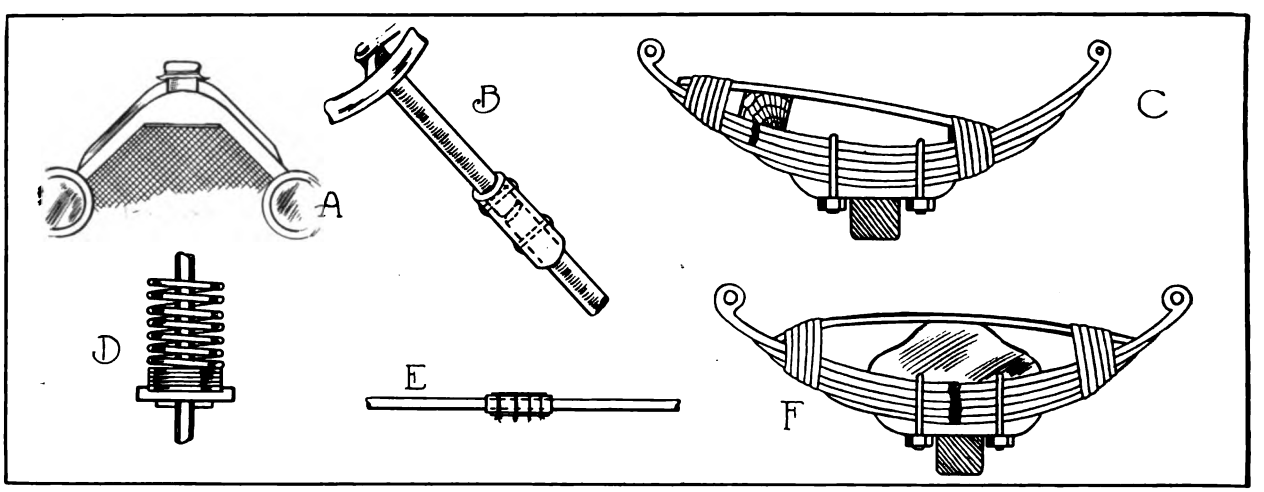


Fig. 1—Some Suggested Emergency Repairs: A, Fitting Chamois to Replace Lost Radiator Cap; B, How to Repair Broken Steering Column, Tie or Reach Rod; C, Method of Mending Spring Broken Near Its End; D, Building Up Broken Valve Spring; E, Splicing Broken Fuel Pipe; F, How to Repair Spring Broken in Centre.

Ignition Troubles.

With the general utilization of the magneto the motorist seldom experiences ignition troubles other than with the plugs and when these members fail to perform their function it is due usually to excessive lubrication or too rich a mixture. Magnetos operate satisfactorily for thousands of miles without any other attention than lubrication and should not be tampered with as very few drivers are capable of repairing these instruments. The general instructions of the maker should be adhered to and aside from adjusting or cleaning the contact points the device should be left alone.

It may happen that a cylinder will miss occasionally and if current is supplied by a high-tension magneto or one utilizing a step-up coil, the spark plugs will have to be short circuited, one by one, until the faulty member is located. This may be accomplished by taking a screw driver with an all-wood handle and making a connection with the metal blade between the terminal of the plug and cylinder. This will cause the current to flow through the screw driver instead of the electrode of the plug. By noting the explosions of the motor it may be determined if the plug being tested is at fault. If not the remaining members may be examined similarly.

If the plug appears to be at fault and a new one does not cure the trouble, try one that is working properly, and if the cylinder continues to miss, test the secondary wire. This is done by employing the screw driver as above outlined except that one end of the blade is held within .25-inch of the cylinder. If a spark fails to materialize, inspect the wire for chafed or broken places and examine its connection at the magneto. If broken at the latter place, a temporary repair may be made by inserting a cotter pin to which the wire may be attached, taping the connection to prevent possible short circuits.

Locating Faulty Ignition.

Where a coil is employed the troublesome cylinder is located more easily as by holding down all vibrators but one the faulty member will be noted readily. It may be possible that the platinum points are not adjusted properly or have become pitted which will require cleaning and resetting. If the system includes a battery, the work will be facilitated by attaching one end of a wire to the steering column and the other in contact with the primary post of the coil, or in other words, the terminal to which is secured the wire leading from the timer. This will close the primary circuit enabling the vibrator to be adjusted easily without cranking the car.

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Broken down insulation is responsible for many mysterious ignition troubles and the secondary wires should be gone over carefully and any suspected places taped. It is surprising how easily a high-tension current will leak through defective wires some of which appear to be in perfect condition. In searching for ignition troubles it is an excellent plan to be systematic, starting from the source of current and tracing each lead carefully, rather than by guessing as to the cause.

Difficulty on Starting.

Dry cells or storage batteries are employed for starting and through considerable service or improper installation may deteriorate, creating difficulty when the spark is weak and the mixture thin. If the storage battery becomes exhausted the only remedy is to have it recharged. Dry cells, however, may be revived temporarily by perforating the zinc cover and moistening the members, taking care not to immerse the terminals. If a very weak spark be present and it will not start the motor, inject a little gasoline in the cylinders, creating a richer mixture, which is easier to ignite than a thin one. If the batteries fail entirely, and the motor cannot be started by spinning on the magneto, the only resort is to push the car along with the clutch in, having the switch lever thrown to magneto. If on a down grade it will be a simple matter to start by this method.

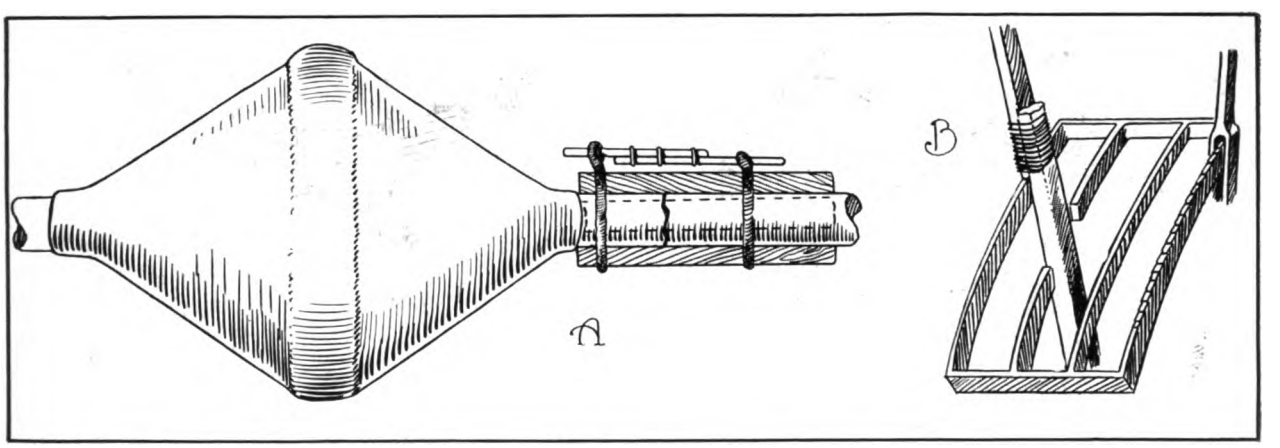


Fig. 2—Other Emergency Repairs: A, Depicting How Broken Axle Housing Was Spliced, Enabling Driver to Reach Nearest Garage; B, Method of Replacing Broken Gear Shift Lever.

Carburetor Troubles.

Briefly speaking the carburetor should not give any trouble if the member is adjusted properly and the driver is careful to have all gasoline strained. Failure to do this will breed difficulty, as dirt will find its way into the needle valve opening while water will prevent vaporization of the fuel and may cause the motor to stop. The error made by the majority of drivers, and some repairmen as well, is to assume that the vaporizer requires readjusting when the motor lacks efficiency or does not operate smoothly.

When the carburetor is suspected of being the cause of trouble the drain cock should be opened and a small quantity of gasoline drawn off, noting if it be clean or if water be present. Close the cock and flood the carburetor by priming and drain off some more fuel, after which restart the motor and the trouble may disappear. If dirt has lodged in the spraying nozzle, open the needle valve a full turn, taking care to note the original adjustment, and start the motor or crank it vigorously, as this treatment will remove ordinary stoppages. Sometimes a larger piece of dirt gets in and acts as a valve, stopping up the nozzle when the throttle is opened, in which event the fuel passages must be cleaned.

As a weak battery presents similar symptoms, do not disassemble the carburetor until sure that the device is at fault. Although many motorists study their instruction books relative to the adjustment of carburetors, they are unfamiliar with the location of the components utilized and at Figs. 3 and 4 are outlined several types of well known vaporizers with the adjusting members clearly depicted.

Adjustments for Altitude.

Although carburetor manufacturers have made considerable progress toward perfecting these devices, they are more or less susceptible to changes of altitude, such as in the mountains high above the sea level. It is a common occurrence for a driver to note that his motor lacks power when operating in high altitudes and where the air is rare and light. Under such conditions the setting of the device must be changed and one of the leading carburetor manufacturers states that the only adjustment necessary is to the air valve.

When operating in high altitudes the tension of the air valve spring should be loosened, or the device controlling the admission of air regulated to admit more atmosphere as a larger amount is required to take care of the gasoline and to keep the mixture uniform. As the atmospheric pressure decreases, the amount of air must be increased and in proportion with the altitude, as valves controlled by a spring respond less readily. Some concerns make it a practise to fit dash devices, whereby the air member may be controlled from the seat. As the majority of

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vaporizers are provided with adjustable air valves, the owner should be able, by careful experimentation, to solve any carburetor troubles due to altitude.

Motor Troubles.

If the operator follows the instructions of the maker relative to the lubrication of the power plant no trouble should be experienced with it, but lack of oil combined with continued driving on the low or intermediate speed when ascending grades, may result in a burned-out connecting rod or main bearing. If the former be at fault, the cylinder may be removed, disconnecting and taking out the connecting rod and piston. While this may not appeal to some motorists it will be more advisable to finish the trip on three cylinders than to incur a large repair bill through operating with a damaged rod. If the main bearing be burned out, the car should be towed.

Minor Troubles.

Minor mishaps may occur, such as the loss of the radiator cap. At Fig. 1 A is presented a suggestion of utilizing a piece of chamois, wrapping it over the filler cap and tying with a piece of string. Should the fuel pipe become broken through accident it may be repaired temporarily by slipping a piece of rubber tubing over the broken ends and splicing with small strips of wood as depicted at E. A chafed place in the line can be stopped from leaking by the application of a little soap and tape or string. Should a bad leak occur and the contents of the fuel tank become lost, progress may be made by utilizing the emergency can of fuel, connecting this member to the carburetor by a rubber pipe and syphoning the fluid to start its flow. If the can cannot be secured, one of the passengers will have to hold the member.

Broken Valve Spring.

In the event of a valve spring breaking or losing its tension, it may be remedied by building up with washers as suggested at D, or by employing a piece of gas piping if accessible. In connection with valves it must be remembered that a mysterious missing of a cylinder may be due to a sticking stem. A little kerosene will remove the trouble and it is a good plan to carry a can of this lubricant. Broken valves will require replacing with new members and these should be ground in if possible.

It is rare that a steering post, tie or reach rod breaks, but in the event of an accident and when the machine is some distance from the nearest repair shop, the broken member may be patched up by taking a piece of gas or water pipe, slipping it over the ends of the broken part, drilling through the material and driving in and peining over pins as outlined at B.

Care of Radiators.

The radiator seldom is given the attention it requires and many cases of overheated motors are due to neglect of the cooler, which should receive as much care as any other component of the chassis. Clean water, distilled or rain, is preferable as hard water forms a scale and reduces its efficiency. The circulating system should be drained off at least once a week to remove any possible sediment and the fins of the cooler kept free from mud or dirt. For emergency repairs in the event of leaks, use chewing gum, putty or wood. A raw potato has been utilized with success. Bran, flaxseed, flour, etc., should never be placed inside the radiator to stop a leak.

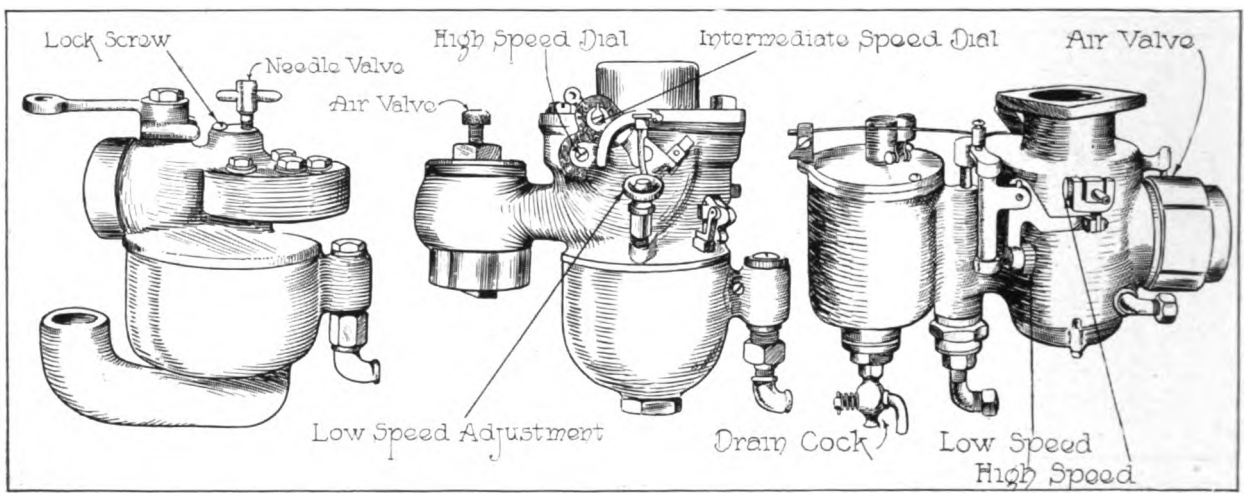


Fig. 3—Outlining Conventional Types of Carburetors and Their Adjusting Mechanism: From Left to Right, Kingston, Schebler and Rayfield.

Broken Springs.

Broken springs are not uncommon, but they should not prevent the completion of the day's run, for they may be repaired by several of the accessories made for this purpose or by utilizing the suggestions depicted at C and F which show a method of repairing a break near the end and in the centre. A hard wood board, from one to two inches thick and about five in the centre, is nailed to a block of wood. The frame of the car is next jacked up to relieve the weight and the ends of the board bound tightly to the springs

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with straps, rope or wire. A repair can be made by interposing a large block of wood between the frame and axle, to take the entire weight. This remedy is practical when the spring is badly damaged.

Should the gear shifting lever break through a defect or accident the hint outlined at Fig. 2 B will be of service. Procure a strip of hard wood and of suitable length, trim and fit it to the stump of the lever by wire or straps. If wood is not handy, the emergency brake lever may be disconnected and utilized in a similar manner.

Broken Axle Housing.

The method of repairing a broken axle housing, shown at A, was noted by the writer recently, and by it the driver was able to travel several miles to the nearest garage. Four pieces of heavy wood were utilized as splints around which were twisted ropes, these being tightened by using a small strip of wood and tying the ends as outlined. Fortunately, such accidents rarely occur to the modern automobile.

Tire Chain Hint.

In touring it is probable some poor roads may be encountered and it is possible that deep sand or mud will make traction difficult. If the tire chains applied in the usual manner fail to extricate the machine, remove them and wrap them around the tire. This kink will start the car out of deep sand or mud. If this suggestion does not result in success, the shovel and boards will have to be utilized.

If the tour includes territory well away from the beaten track and where the repair shop is not available, it is an excellent plan to have the equipment more complete and at least it should include a rope which will be of service in the event of trouble. The experienced motorist who is familiar with his machine will undertake the tour with a less equipment than the novice who should study carefully the contents of the instruction book or consult the agent as to equipment.

TIRE SALES IN MILLIONS.

That the volume of pneumatic tire sales in 1912 will be approximately $120,000,000 is the opinion of those in close touch with conditions in the automobile industry. This figure has been secured by basing the estimate on the number of cars in use and their probable tire requirement. There are nearly 600,000 cars in use in the United States at present. Figuring six tires to a car for 12 months of service, the manufacturers' basis of estimate, it will be seen that approximately 4,000,000 tires will be required. Figuring the tires at an average cost of $30 each, an aggregate of $120,000,000 is shown.

"These figures are not far from correct," says J. M. Gilbert, general manager of the United States Tire Company, New York City. "That 1912 will be by all odds the banner year of the tire industry is already an assured fact. For more than a year our four big factories have been running day and night. The result is that, whereas last season we never were able to catch up to our orders, we are prepared this year to take care of everybody."

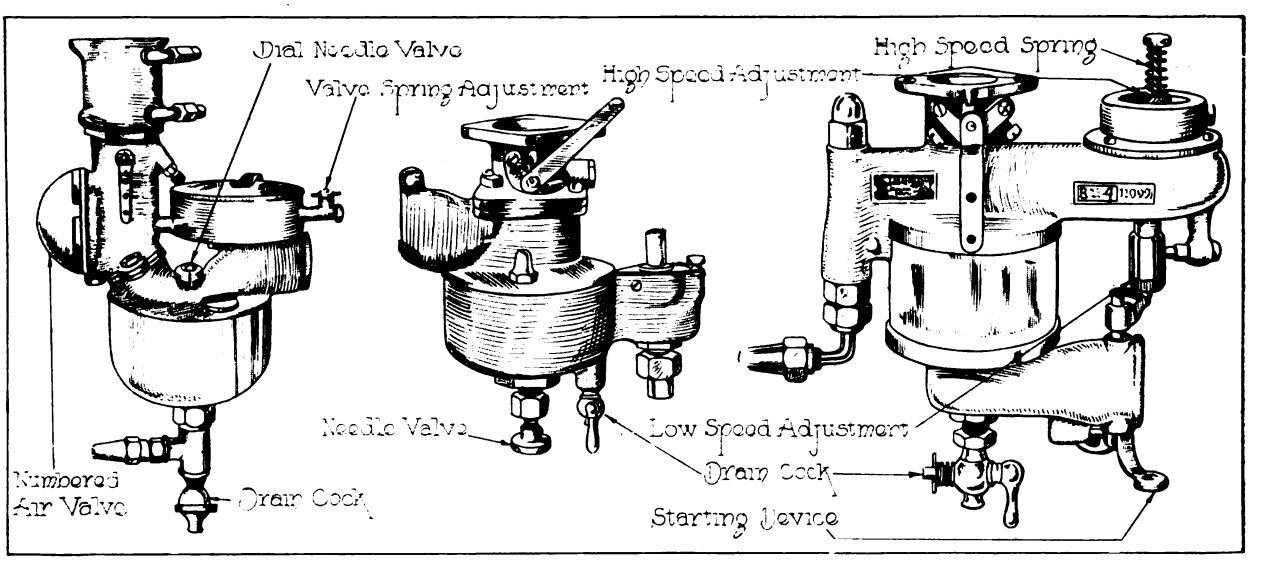


Fig. 4—Depicting Other Types of Carburetors and the Components Utilized in Adjusting: From Left to Right, Excelsior, Holly and Stromberg.

LOLLY BECOMES REMY ENGINEER.

W. H. Lolly of London, England., has been appointed engineer in the service department of the Remy Electric Company, Anderson, Ind. Mr. Lolly is well known among the engineers of this country. On coming here, he was connected with the Remy concern, then left to join the forces of the Connecticut Shock Absorber Company, returning to his former employers a short time ago. Another announcement by the Remy company is that Arthur H. Berndt will become manager of the Indianapolis branch, Sept. 1.

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In The Aviation Field

With the Manufacturer and Operator in America and Abroad

Claude Grahame-White, the English aerial hero, who won the second international race at Belmont Park, Long Island, in 1910, and Miss Dorothy Taylor, daughter of Mr. and Mrs. Bertrand Leroy Taylor of New York City, were married in London June 27. The wedding was an aerial event, in almost every sense of the word.

The bridegroom flew to a point near London the night before, while many of the guests, well known aviators in England and France, followed his example the next morning. The bridal party received its guests under a floral aeroplane on the lawn of the bride's uncle, Sir Daniel Gooch, at Hylands, near Chelmsford, after the ceremony. B. C. Hucks, in a Bleriot monoplane, hovered over the party on the way from the church, showering the members with confetti.



Lieut. T. D. Milling and Passenger in Burgess-Wright Biplane from Which New Aerial Gun Was Tested Recently.

In a recent test of the aeroplane gun invented by Lieut.-Col. I. N. Lewis, U. S. A., Capt. Charles De Forest Chandler repeatedly hit targets three yards by 15, and in less than a minute sent 50 bullets into a target two yards by 20. He was flying in a Burgess-Wright biplane, flown by Lieut. T. DeWitt Milling, and the machine was travelling at the rate of 60 miles an hour. The gun weighs 25 pounds, and is said to have no recoil and no flame. Its capacity is rated at 750 shots a minute. When in use it is strapped at the muzzle to the foot stirrups of the aviator.

The Sociedad Sportiva Argentina has made an offer to the Argentine minister of war, looking toward a popular subscription for an aerial fleet to be presented to the navy. Several prominent men are at the head of the movement, and apparently the fund will be raised in a short time.

The appellate division of the supreme court in New York has dismissed the suit of the Wright Company against the Aero Corporation, Ltd., in which it sought to recover $15,000 for the use of Wright biplanes during the international meet at Belmont Park, Long Island, in 1910. The Aero Corporation was organized for the purpose of conducting this meet, and it was claimed by the plaintiff that it was to receive a total of $25,000 for the use of its machines providing the net receipts and subscriptions should aggregate $125,000. It admitted having received $10,000. The defendant claimed that the receipts did not reach the amount specified and that there was not sufficient funds to repay the loans to subscribers.

Complete details concerning the recent aerial Grand Prix, under the auspices of the Aero Club de France, in which Roland G. Garros in a Bleriot monoplane was the only aviator to finish, have reached this country. The course was from Angers to Cholet, Saumur and return, a distance of 97.7 miles, which was covered seven times in the two days. Seven aviators started and but four finished the first round.

Garros, who drove a Gnome engined Bleriot monoplane, Bosch equipped, of course, not only won the grand prize of $10,000, but a special prize of $4000 and the fourth "consolation" prize of $1000, or approximately $15,000 for the two days. The official time for the various rounds follows:

Grand Prix—Garros, Bleriot, first, 2:39:38; second, 2:57:18; third, 2:20:02; fourth, 1:48:52; fifth,

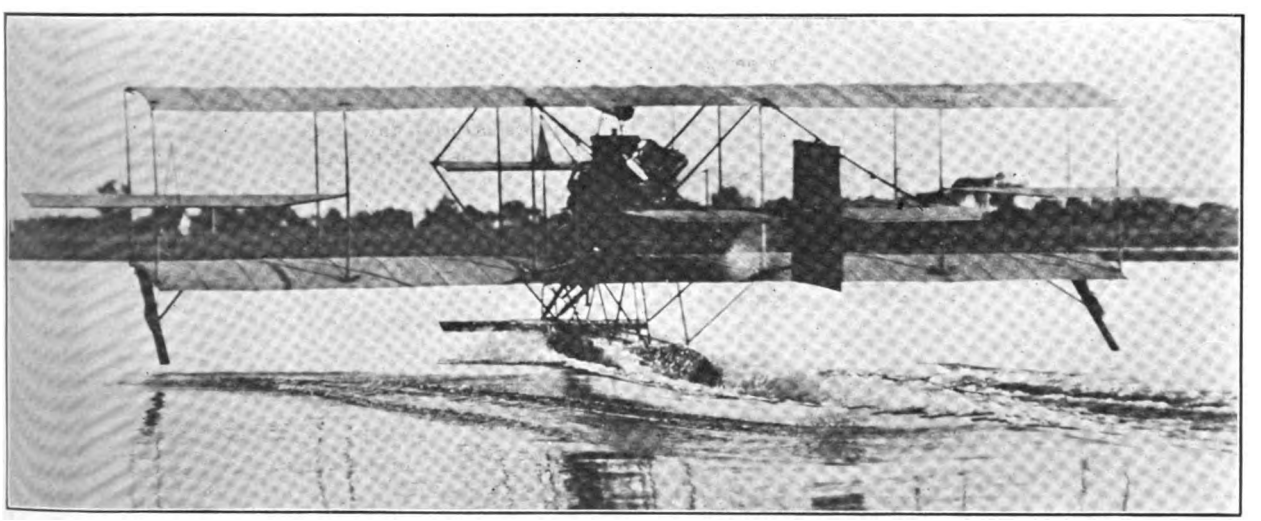
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1:48:13; sixth, 2:20:15; seventh, 1:51:06. Brindejonc, Morane, first, 4:08:07; second, 3:16:35; third, 1:49:00. Espanet, Nieuport, first, 2:06:48. Hamel, Bleriot, first, 2:23:53.

Consolation, three rounds—Espanet, Nieuport, 1:04:56; Bobba, Morane, 4:21:41; Brindejonc, Morane, 4:32:20; Garros, Bleriot, 5:53:41; Gaubert, Astra, 6:40:53.

The French Navy has decided to investigate the merits of the Curtiss hydraeroplane. Flying from Juan-les-Pins to Frejus, Louis Paulhan, the European representative of the Curtiss Aeroplane Company, recently encircled the ships of the fleet and alighted alongside of the Foudre. Subsequently the machine was hoisted on board for the night.

An accompanying illustration shows one of these machines getting up speed before leaving the water. This hydraeroplane has been flown by Hugh A. Robinson in several meets in this country. It was scheduled to appear at the recent Boston meet, but was withdrawn at the last moment, because of the refusal of the Aero Club of America to sanction the events.



Type of Curtiss Hydraeroplane Recently Tried Out Before French Navy, Getting Up Speed Before Leaving the Water.

Experimenting with over-sea flights, the Zeppelin dirigible Victoria Luise, left Hamburg, Germany, June 27, for a 10-hour flight over the North sea, carrying 12 passengers. The successful outcome of the test has caused unusual press comment in England on the ground that it has been demonstrated that an aerial invasion of the British Isles is decidedly possible. The Victoria Luise maintained an average speed of 45 miles.

A dispatch from Vienna, Austria, states that Aviator Czakay carried a passenger to an altitude of 13,779 feet near that city June 28. The best previous record for altitude with a passenger was held at 9840 feet by Prevost of France. The world's record for altitude with aviator alone is 13,943 feet, held by Roland G. Garros of France. No mention is made of the machine flown by Czakay.

Capital closely associated with the Aero Club of America has acquired a plot of ground at Hempstead Plains, Long Island, on which will be constructed an ideal flying field for future meets in the vicinity of New York City. The Long Island motor parkway runs along one side of the field, and it is within easy access of the Long Island Railway. The Hempstead Plains Aviation Company has been organized to take over the project, the officers being as follows: President, Allen W. Evarts; vice president, Gage E. Tarbell; secretary and treasurer, G. L. Hubbell; general manager, Douglas S. Houghton.

Robert G. Fowler, who made a transcontinental flight from Los Angeles to Jacksonville, Fla., in December and January, and J. C. Mars, who has been flying for the past two years as a member of the Curtiss team, have organized the Fowler-Mars Company, with capital of $75,000, for the manufacture of aeroplanes. The new concern expects to locate in Leavenworth, Kan. No announcement has been made relative to the type of machine which will be made, although Fowler flew a Wright biplane and Mars a Curtiss.

Accompanying Harry Brown in a biplane, Rodman Law made a parachute jump from an altitude of 3000 feet near New York City, June 25. This is one of the few successful jumps of this character made in the history of heavier-than-air flying. It is expected to prove of decided value to the future of aviation. The jump was made without incident, the parachute opening after a drop of some 100 feet. The wind carried Law practically a mile before he reached the earth, unharmed.

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While scheduled as the third annual Boston aviation meet, the programme which opened June 29 at Squantum, Mass., was under different management than the previous events, and was without the sanction of the Aero Club of America. Application was made to this organization several weeks ago, and it was not until just before the opening day that decision was reached. The action was determined upon on the ground that the prizes were not posted in the proper manner. This did not deter 13 aviators from signing for the various events, although some of the better known men withdrew their entries. It is understood that those competing were notified that they would be disqualified if they took part.

Those who appeared during the opening day were: Lincoln Beachey, Curtiss; Charles K. Hamilton, Curtiss; Phillips Ward Page, Burgess-Wright; George Gray, Burgess-Wright; Miss Harriet Quimby, Bleriot;



Miss Harriet Quimby Beside Her New 70 Horsepower Bleriot Military Monoplane.

Miss Blanche Scott, Martin; Glenn L. Martin, Martin; Arch Freeman, Burgess-Wright; Farnum Fish, Burgess-Wright; Charles Niles, Thomas; George Catmore, Burgess-Wright; Frank Tirrell, Curtiss, and Paul Peck, Columbia.

Among those who were expected to take part, but who failed to appear after the sanction of the Aero Club of America was denied, were: Lieut. T. D. Milling, Burgess-Wright; Robert G. Fowler, Wright; Frank Coffyn, Wright hydraeroplane; Hugh Robinson, Curtiss hydraeroplane, and George W. Beatty, Wright.

Miss Harriet Quimby, America's first and foremost woman aviator, and William A. P. Willard, manager of the Boston meet, who was flying with her, were thrown from her 70 horsepower Bleriot military monoplane at Squantum, Mass., upon their return from a flight to the Boston light, and instantly killed, July 1. The fatality, which was the first in New England, had a depressing effect upon the other aviators taking part in the meet, but the programme was continued as originally outlined.

The death of Miss Quimby is a serious loss to the cause of aviation in America, particularly as she had given much promise as a pilot of exceptional ability. Both here and abroad, whence she had but recently returned after being the first woman to fly her own machine across the English channel, she was recognized as possessing an intimate knowledge of her machine. She had few equals and no superiors among the members of her sex.

Prominent aviators who were present at Squantum when the accident took place disagree as to the cause. Apparently, a gust of wind caught the monoplane as Miss Quimby was about to descend. Whether the controls became ineffective in some manner, or for some other reason, the tail was seen to rise suddenly, and the passenger was thrown from the rear seat, which in the new Bleriot craft is located well toward the rear. An instant later, Miss Quimby also was thrown from her seat and the monoplane landed in the water on its back.

It was the first machine of this type flown in America and Miss Quimby had driven it but four or five times before the accident. She was accustomed to handling a Bleriot, but of an older type and fitted with a 50 horsepower motor.

Robert J. Collier, president of the Aero Club of America, has completed his course of instruction in the handling of a hydraeroplane under the guidance of Walter Brookins and recently made his first flight unattended in a Wright biplane, equipped with double pontoon attachment. He will take his test for a pilot's license in the near future.

Jules Vedrines of France, who was seriously injured in a flight earlier in the year, has again taken up his work as an aviator pilot. With his head swathed in bandages he recently flew for half an hour in a new 150 horsepower Deperdussin monoplane at Etampes.

The Swedish army has purchased a Breguet military biplane, made in France. This machine is equipped with an 80 horsepower, seven-cylinder Salmson-Canton-Unne motor, and in its official tests made 66.4 miles an hour.

Although the Italian government has offered a substantial prize for the construction of a satisfactory aeroplane of Italian manufacture, it is interesting to note that the army of that country has purchased a Maurice Farman biplane, made in France.

Those responsible for the 1912 aerial craft salon in the Grand Palais, Paris, have decided upon Oct. 26-Nov. 10 as the dates. This is practically two months earier than the salon of 1911.

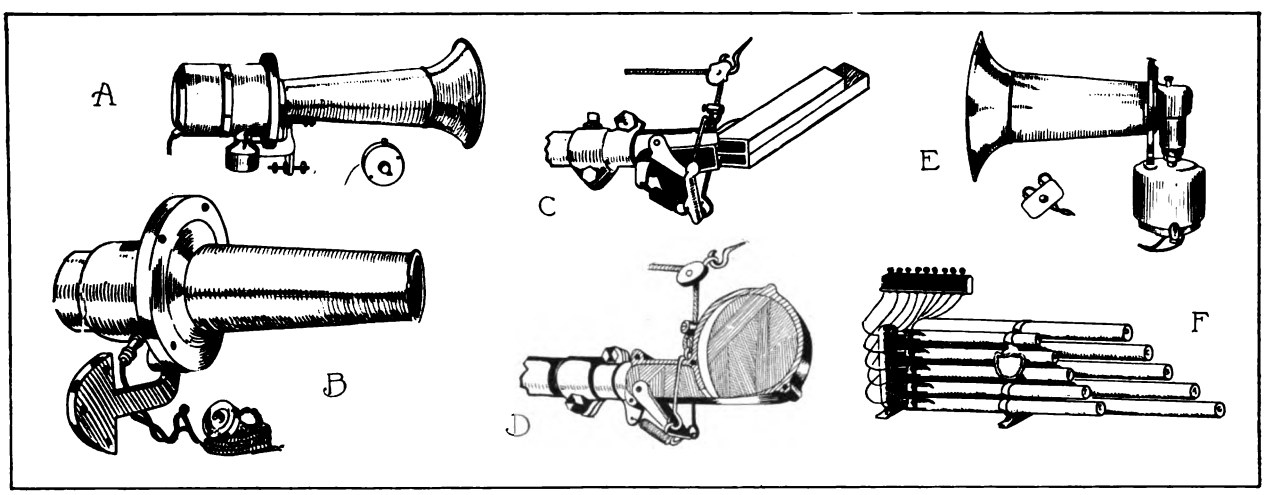
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ACCESSORIES OF VALUE IN TOURING.

Practical Devices Which Facilitate the Maintenance and Operation of the Car or Contribute to the Comfort and Convenience of the Passengers.

ACCESSORY manufacturers have made rapid progress in the development of devices which contribute to comfort and convenience, as well as facilitate the operation and maintenance of the car at all times. Much necessary work which formerly meant strenuous exertion is now performed by mechanical and other means, these requiring but little effort on the part of the user in their application. By the utilization of these practical and useful members the motorist is able to undertake successfully tours through sections where the services of the public garage, for instance, are not obtained easily.

Although the standard equipment of the modern car may include top, windshield, speedometer, horn, lights, gas tank and tools, it may be augmented by the addition of other accessories which are described and illustrated herein, and from which the motorist may make his selection according to his requirements and individual taste. Obviously, it would be impossible to give a full list of such devices in an article of this character, but those selected for description will be found to include standard productions of representative concerns, and it may be extended by the addition of similar supplies found listed in the Classified Buyers' Guide elsewhere in this issue.



Signalling Devices Operated by Electricity or the Exhaust Are Favored Because of Their Volume of Sound: A, B and E, Tuto, Newtone and Klaxon Electric; C, D and F, Jubilee, Jericho and Gabriel Exhaust.

SIGNALLING DEVICES.

Although the bulb horn is recognized as standard for a signalling device there is a growing tendency among motorists, especially those who drive considerably in the country, to fit a signal actuated by the exhaust of the motor or by electricity. The advantages of these horns are manifold, as by them a warning note ranging from mellow tone to a penetrating sound may be produced easily, by depressing a pedal or pushing a button. The fact that they may be operated without removing the hands from the steering wheel appeals to many motorists especially when traversing rough and unfamiliar highways and when the latter wind in and out, often hiding an approaching machine from view.

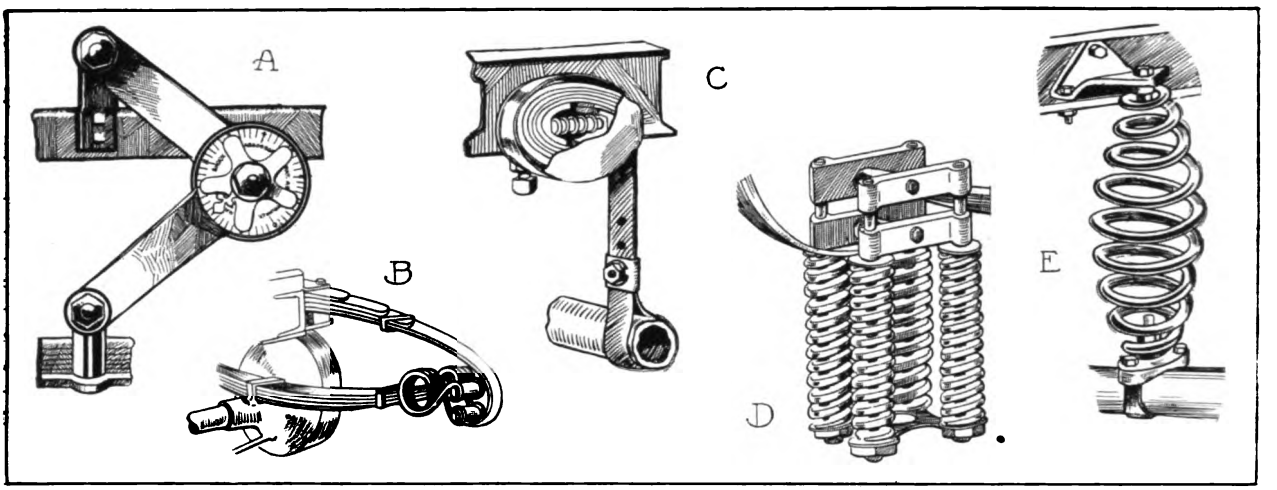
Gabriel.

The Gabriel Horn Manufacturing Company, Cleveland, O., is marketing a new 10-tone Gabriel musical horn which will appeal to motorists who desire a signalling device capable of producing a wide range of notes operated together or independently of one another. The member may be utilized on a 30 horsepower car as well as one equipped with a larger motor and by it a variety of chords is possible. The company also manufactures musical signals of one or more notes, all operated by the exhaust.

Jericho and Jubilee.

A signalling device operated by the exhaust of the motor and which is installed in the rear of the muffler, either by clamping over the muffler stem by a double clamp coupling, or by screwing into the muffler by a threaded coupling, is the Jericho, marketed by the Randall-Faichney Company, Boston. A simple pressure of a pedal gives a pleasing tone, clear and distinct, at any speed without racing the motor. The note may be mellow or far reaching as desired. The company also produces the Jubilee horn, which is operated in the same manner as the Jericho, the device giving forth notes similar to a set of chimes.

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Shock Absorbers Eliminate the Possibility of Broken Springs and Contribute to the Comfort of the Passengers: A, Truffault-Hartford; B, Acme; C, Gabriel; D, Velvet; E, Sager.

Newtone.

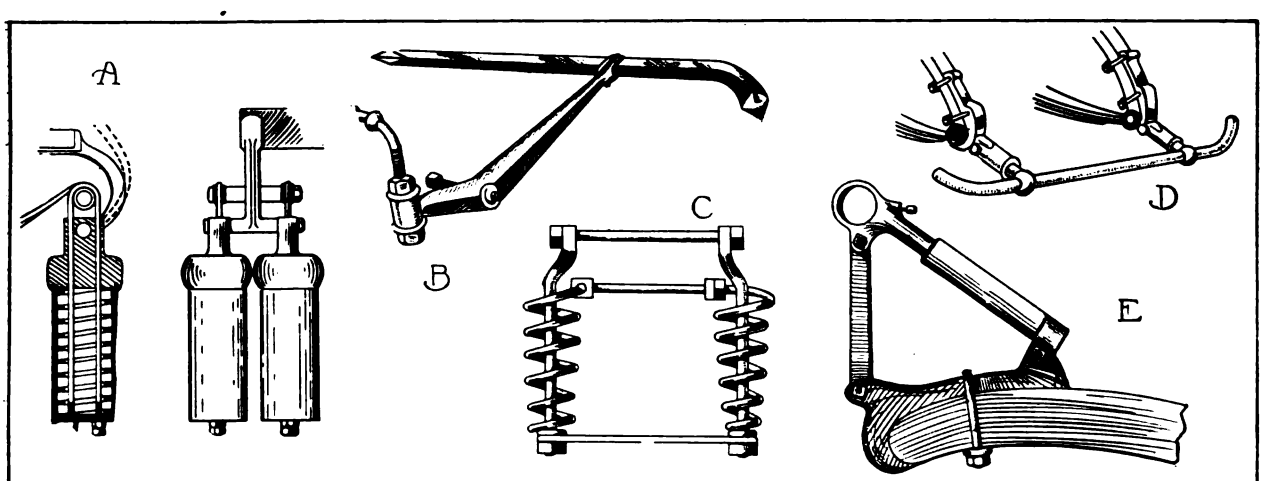
The Automobile Supply Company, Brooklyn, N. Y., is featuring the Newtone torpedo type electric horn, and one of the many features emphasized of it is that it is very economical in current. The motor comprises a field of 75 laminated pieces and the diaphragm is of steel, .03125 inch thick and it is pointed out that this design not only makes for durability and efficiency, but a set of batteries will endure a season. It is operated by a push button switch which may be located as desired and the design adds to the attractiveness of the car. The same quality of construction is maintained in other members of the line.

Tuto.

The design of the Tuto electric horn, manufactured by the Dean Electric Company, Elyria, O., is such that a light pressure of the switch causes a slight contact of the armature on the diaphragm, producing a mellow tone, while further depressing the button increases the amount of current and augments the volume of sound. This range of notes is possible by the special switch make by the company which may be located on the steering wheel or spokes, enabling the operation of the signal without removing the hand from the wheel. In addition, the company makes the Tutoette, a smaller replica of the Tuto, and a new horn known as the Tally-O-Horn. The latter is concealed under the hood, operated easily by a bulb conveniently located near the driver, and produces a low, rich tone.

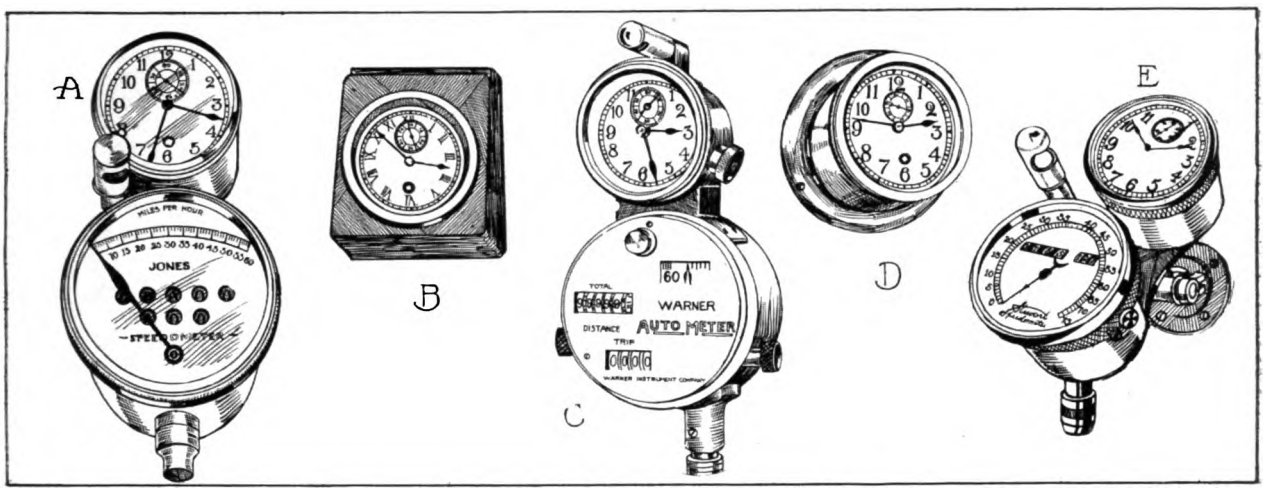
SHOCK ABSORBERS.

The fitting of shock absorbers or some supplementary means of taking up the jars and stresses resulting from the uneven road surface, not only eliminates vibration, but protects the occupants of the machine and its mechanism as well. In addition to comfort and safety, the utilization of shock absorbers diminishes tire bills, an important factor in touring.



Shock Absorbers and Bumpers: A and C, J. M. and Supplementary Spiral; B, D and E, Sager, Western and E-Z Bumpers.

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Speedometers and Clocks Are Valuable Adjuncts to the Equipment: A, C and E, Jones, Warner and Stewart Speedometers; B and D, Chelsea and Boston Clocks.

Acme Torsion Springs.

The Acme torsion springs, manufactured by the Acme Torsion Spring Company, Boston, as their name implies, are designed to eliminate vibration and to absorb road stresses. They are in the form of a double coil, one on either side of the springs, and extensions permit of easy and quick attachment to the latter.

Gabriel Rebound Snubber.

The principle of the Gabriel rebound snubber, made by the Gabriel Horn Manufacturing Company, Cleveland, O., is that of checking the recoil of the springs by means of the friction of a belt wound about a device that is expanded by a spring. The circular case containing the belt is attached to the frame of the car and the other end of the belt to the axle. As the spring is compressed the belt is automatically wound up, the recoil being restrained by the friction and the resistance by compression.

J. M.

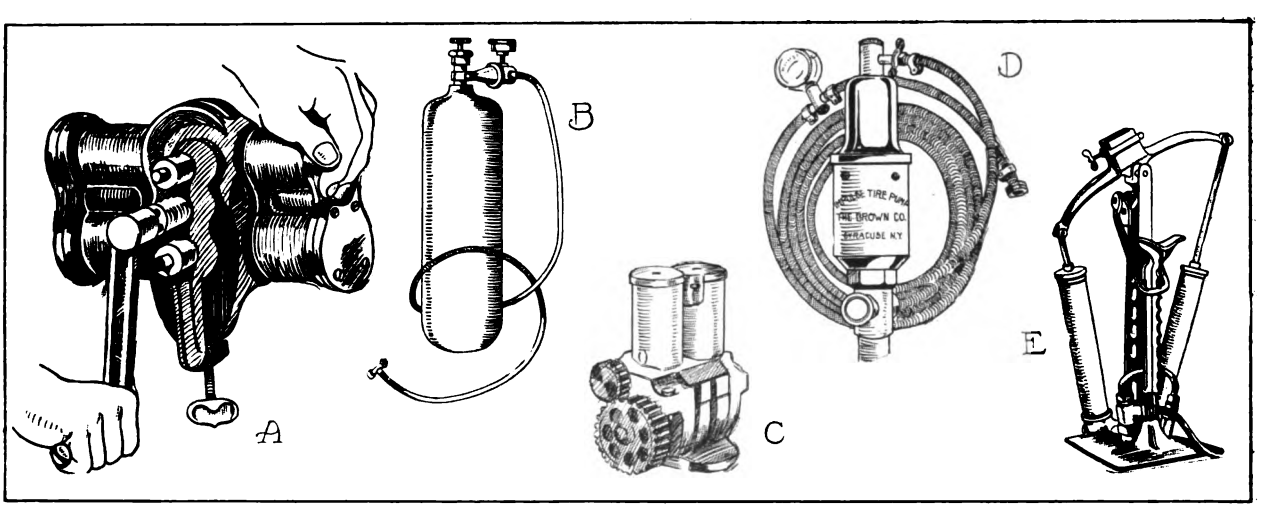
The J. M. shock absorbing device, manufactured by the J. M. Shock Absorber Company, Philadelphia, comprises two coiled springs enclosed in barrels adapted for fitting to the rear or forward springs of the machine. The coiled springs hold those of the vehicle normally and when subjected to road shock the compression of the coil members in their containers nullifies the stresses. Special fittings are provided for attachment.

Sager Springs.

The Sager shock absorbing springs are wound oval instead of round, it being held by the manufacturer, the J. H. Sager Company, Rochester, N. Y., that the design makes for better resistance to the road shocks. The springs are fitted by hangers to the chassis frame and clamp to the axle. As the springs are normally set they resist compression or recoil of the car springs proportionate to the degree of movement. They are made in differing sizes and forms.

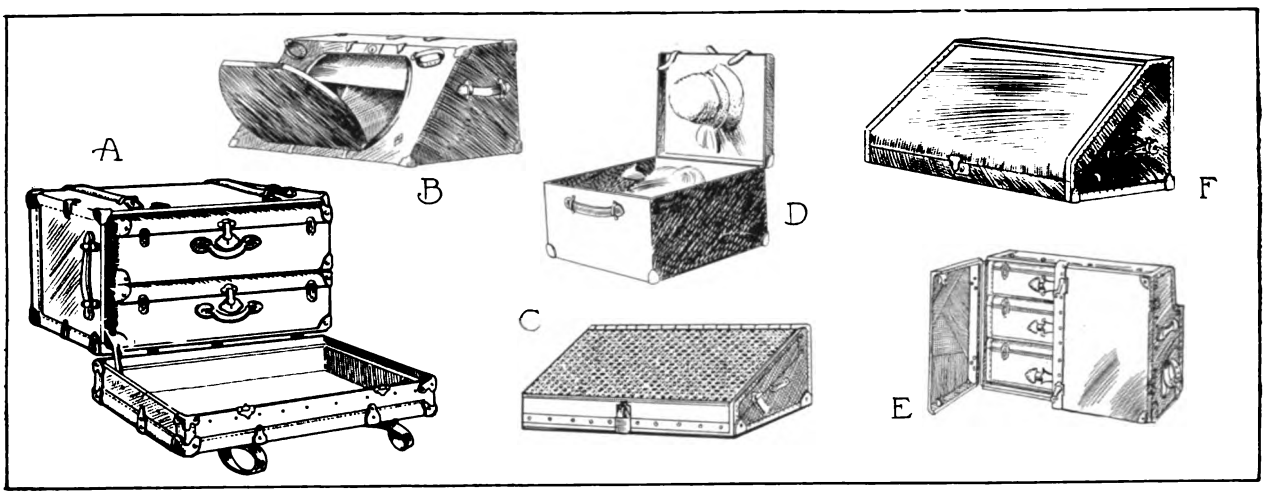
Supplementary Spiral Springs.

The Supplementary Spiral Springs, marketed by F.



The Inflating of Tires Is Made Easy by Power Pumps, Air Bottles, Etc.: A, Hawthorne: B, Goodyear Tire Bottle; C, Crown; D, Brown; E, Warner-Service.

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Trunks Are Made in Shapes and Sizes to Meet Individual Requirements: A, Auto-Rest; B, Kamlee; C and E, Ajax; D and F, Berg.

Shirley Boyd, Boston, are designed to eliminate broken springs as well as lateral and vertical motion of the car. Comprising a pair of spiral members for each spring, varying compressional and recoil stresses are absorbed, taking up every shock and allowing the car to regain normal position without jarring the passengers. They are applicable to both front and rear springs and are made in five models.

Truffault-Hartford.

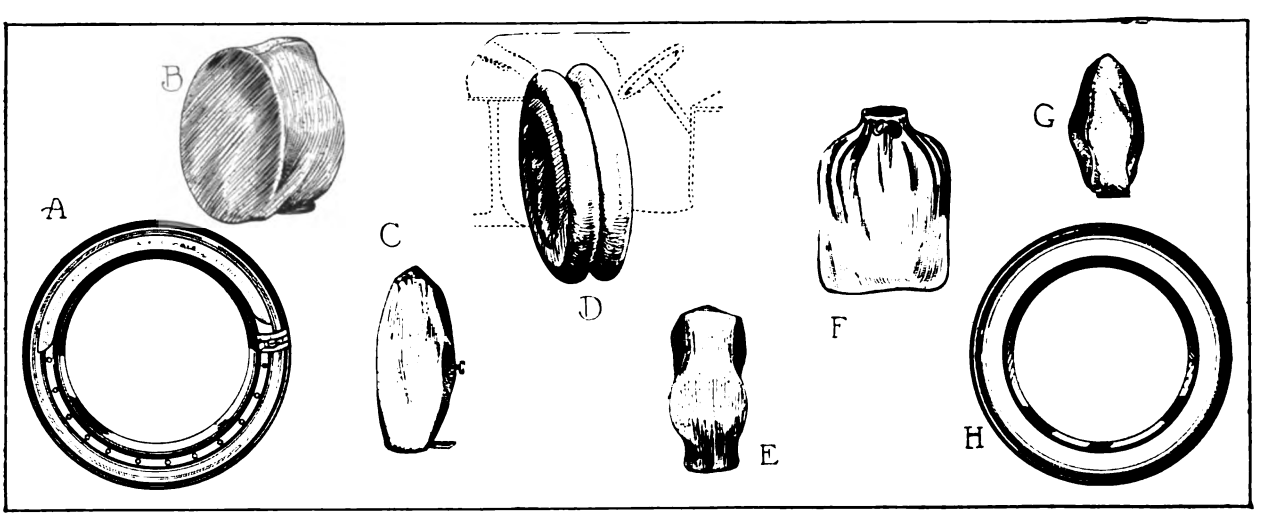
The Truffault-Hartford shock absorbers, made in four sizes by the Hartford Suspension Company, Jersey City, N. J., comprise a double arm with a circular recess containing frictional discs and a single arm between the recesses, the parts being retained by a bolt and adjustment nut. The device may be adjusted to compensate for any excessive spring action and being enclosed is impervious to the action of dirt, moisture and foreign elements.

Velvet Auxiliary Springs.

The J. W. Blackledge Manufacturing Company, Chicago, maker of the Velvet auxiliary springs, have a shock absorber comprising four helical springs mounted on four rods fixed in the base, at the top of which are two fittings, the upper attached to the lower spring half and the lower to the upper spring half. The lower fitting moves vertically on the rods with the compression or recoil of the vehicle spring. They are made in five sizes and for different type springs.

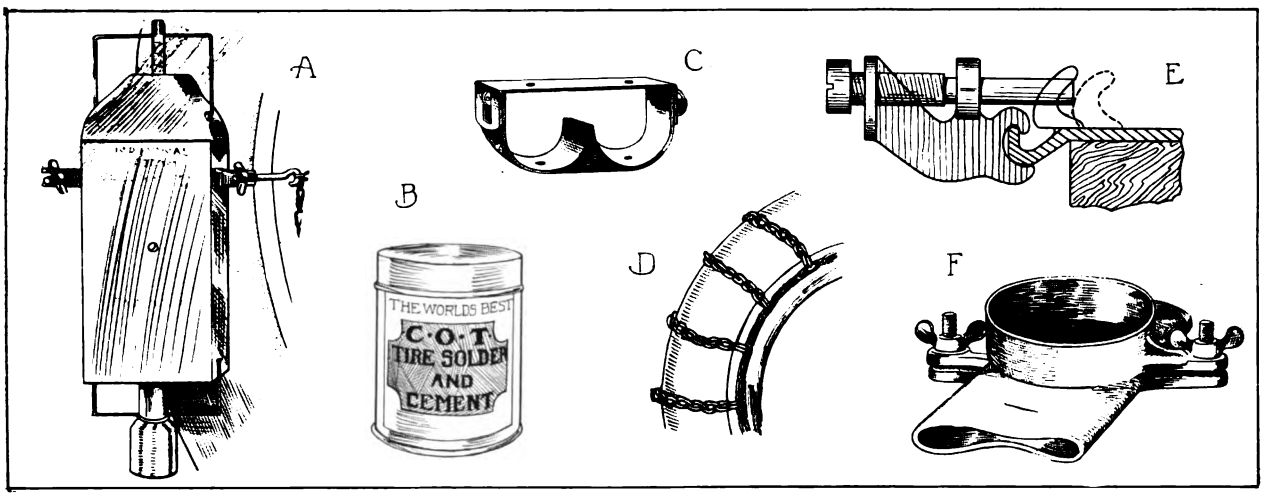
BUMPERS.

Bumpers not only protect the radiator and lamps from injury through careless operation of other cars when on the road, but the device protects the automobile in the garage where shifting the car is attended with more or less risk by those unfamiliar with its operation. Sometimes a machine is likely



Tire and Lamp Covers Exclude Foreign Elements: A, D and H, Gilbert, Amphi and Hopewell Tire Covers; B, C, E and G, Hopewell Lamp Covers; F, Gilbert Inner Tube Bag.

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Some Practical Tire Devices: A, National Vulcanizer; B, C. O. T. Tire Solder and Cement; C, Nathan Tire Lock; D, Weed Tire Chains; E, Tobey Q. D. Rim Remover; F, Adamson Vulcanizer.

to be backed into another, creating considerable damage.

The J. H. Sager Company, Rochester, N. Y., manufactures several types of bumpers and its Diamond bumper will appeal to the most discriminating motorist, as the diamond shaped bar is made of heavy, solid, hardened brass, reinforced with thick, open-hearth steel. The bell cranks are of solid manganese bronze and the device adds to the appearance of the machine.

A different type of bumper is the E-Z Angle, marketed by the Cox Brass Manufacturing Company, Albany, N. Y. The cross bar is carried up higher than those of usual construction and the device is secured to the car by a special clamp.

SPEEDOMETERS AND CLOCKS.

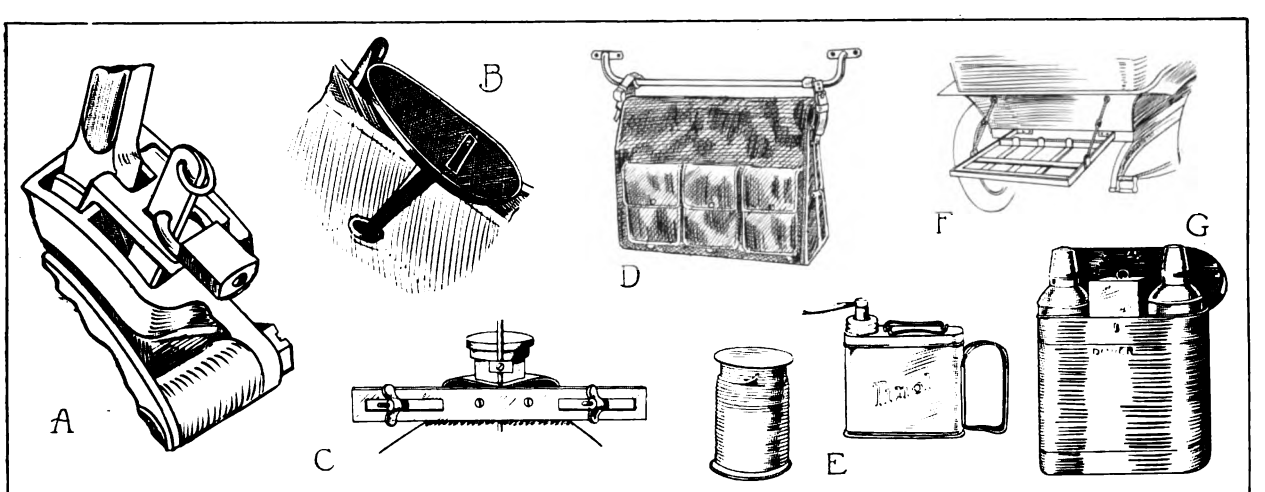
In touring through sections where the laws regulating the speed of the motor car are rigidly enforced, the speedometer will be found to be one of the most essential accessories of the equipment. These instruments have attained a high degree of perfection, and are made in different types and in combination with clocks, and electric lights for illuminating both indicator dials.

Jones.

The Jones Speedometer Company, New Rochelle, N. Y., produces a variety of standard models and of different finish. One combination instrument registers speed up to 60 miles an hour and includes season and trip mileage recorders. It is constructed on the principle of centrifugal force and finished in either nickel or black enamel. The instrument includes a high grade eight-day clock and the dial of this member, as well as that of the speed recorder, is illuminated at night by an electric light.

Stewart.

Various models including those in combination with clocks and electric lighting, are produced by the



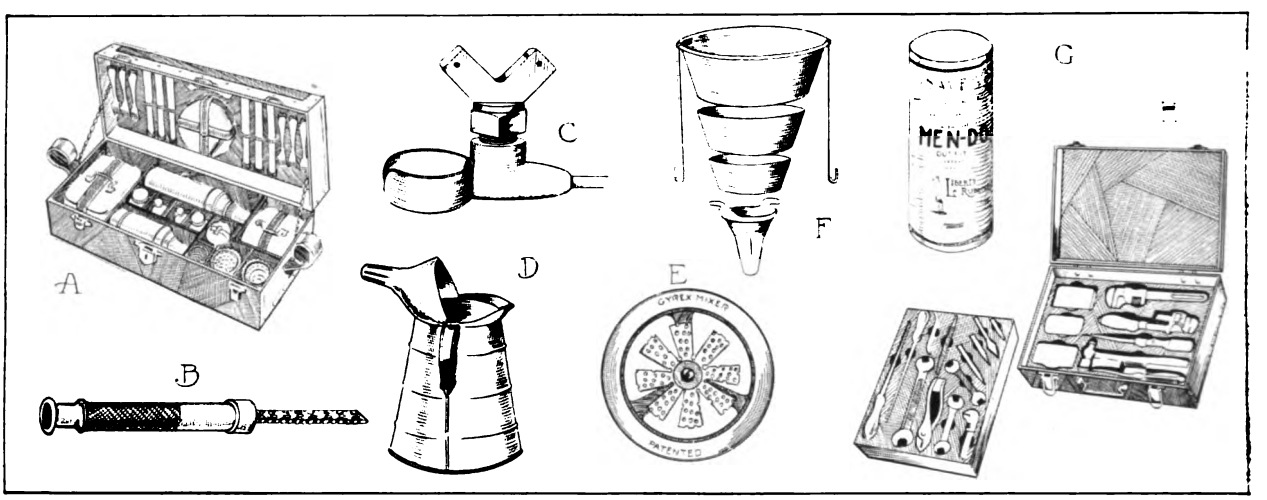
Miscellaneous Accessories: A, Fetter Lock; B, Sidwell Pedal Mat; C, Leyman License Bracket; D, Ajax Combination Coat Rail and Bag; E, Tinol Outfit; F, Connecticut Trunk Rack; G, Dover Thermos Case.

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Stewart & Clark Manufacturing Company, Chicago, maker of the Stewart instruments. The principle of operation is magnetic force. A feature of some models is the provision made for regulation by micrometer. The trip register may be set at any time to .1 mile. Model 29 is equipped with a 100,000-mile season odometer, 100-mile trip register and an eight-day Seth Thomas clock. The speed dial registers to 75 miles an hour.

Warner.

The Warner line of auto-meters, produced by the Warner Instrument Company, Beloit, Wis., are magnetic instruments and model M 2 includes a high grade eight-day clock which is lighted at night by an electric bulb as is the speed indicating scale. The odometer registers up to 100,000 miles before it automatically resets and the trip member up to 1000 miles. Another reset turns up any desired mileage on the trip odometer, facilitating the utilization of route books when touring, also permitting deviations to be made.



Miscellaneous Accessories: A, Ajax Luncheon Outfit; B, Twitchell Tire Gauge; C, Ferguson Gas Burner; D, Dover Combination Measure and Funnel; E, Gyrex Mixer; F, Best Funnel; G, Men-Do; H, Bergrade Tool Case.

Boston Clocks.

A line of high grade eight-day automobile clocks is marketed by the Boston Clock Company, Boston, and these have seven-jeweled escapements, cut steel pinions, compensation balances and dust and waterproof cases. They are constructed of high grade material, beautifully finished and guaranteed not to be affected by rough roads. They are equipped with a theft proof method of attachment. Outside stem winding and setting clocks are listed as extra.

Chelsea Clocks.

The standard equipment of many cars does not include a clock and the fitting of one of these members to the dash enables the driver and passengers to note the time without necessitating the use of the watch. The Chelsea Clock Company, Boston, manufactures a variety of high grade instruments for attachment to the dash or interior of the body. The retaining screws are concealed and means are incorporated to prevent theft. The numerals are read easily and the clocks are impervious to road shocks, and are accurate timekeepers.

TIRE PUMPS, BOTTLES, ETC.

Punctures are inevitable and pumping up a large sized tire by hand on a hot day is a disagreeable task. These labors may be avoided by adding to the equipment a pump actuated by the energy of the motor, by the utilization of a tire bottle containing compressed air, or a mechanical device requiring but little effort in service.

Brown Impulse.

The Brown Impulse tire pump, manufactured by the Brown Company, Syracuse, N. Y., is a compact device which is screwed into the spark plug opening, and although utilizing the compression of the cylinder it draws in fresh, pure air through a specially designed valve. The device is equipped with a pressure gauge for preventing improper inflation and a length of tubing suitable to reach each tire on the car.

Crown.

The Crown tire pump produced by the Clarke Pump Company, West Newton, Mass., is gear driven from any convenient place on the power plant of the car. The bore and stroke of the two cylinders are large, providing a pressure capable of inflating a large sized shoe in a very short time. It is provided with means for operation as desired and when not in service does not utilize any energy of the motor.

Goodyear Tire Bottle.

The Goodyear air bottle, produced by the Goodyear Tire & Rubber Company, Akron, O., will appeal to motorists as by it a tire may be inflated quickly without any other effort than turning a valve. It is equipped with a gauge for noting the pressure of the air in the tube, and each bottle will inflate from six to 30 tires, according to their size. The bottles are exchangeable at any of the company's numerous service stations.

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Hawthorne.

The Hawthorne four-cylinder pump, made by Hawthorne Manufacturing Company, Bridgeport, Conn., is designed for attachment to the running board or other convenient place and the turning of a handle actuates four pistons which create a positive source of pressure with little manual labor. The device is compact, may be carried easily in the tool box, and includes a suitable length of tubing.

Warner-Service.

A combination jack and pump is the Warner-Service jackpump, made by the Warner-Service Manufacturing Company, Jersey City, N. J. By it the car may be lifted easily and connected with the jack are two high pressure compound pumps, actuated by hand.

TIRE AND LAMP COVERS.

Tires and lamps should be covered when not in service, as the air, sunlight and moisture affect the former while the metal of the lamps becomes tarnished and the burners clogged with dust through exposure to the elements. Tire covers not only preserve the shoes but add to the appearance of the machine.

Hopewell.

The tire cover manufactured by Hopewell Bros., Newton, Mass., will appeal to motorists as it is attached easily and protects the casing fully. The tread overlaps, giving protection where most needed and the design is also adaptable to shoes fitted to demountable rims. In addition the company makes a large line of lamp covers, these including side, tail, limousine and headlight, utilizing oil, acetylene and electricity. The covers are substantially constructed of high grade material and are equipped with a special fastener.

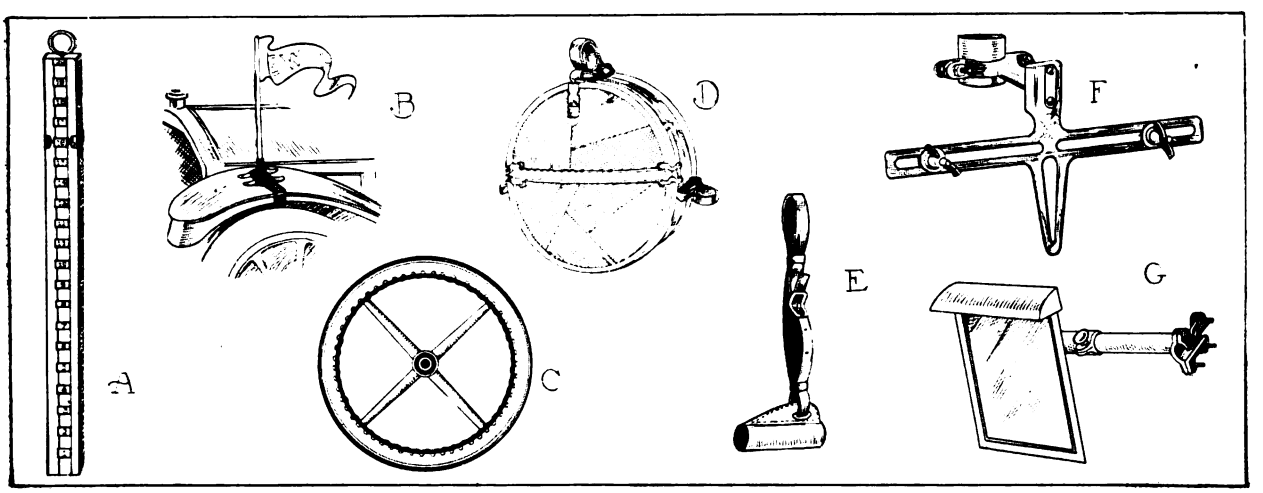
Tire Trunks.

Although many motorists carry inner tubes in casings under the seats, when their use is desired the passengers are inconvenienced. By fitting a tire trunk to the running board, the tubes are more accessible and as the trunks are equipped with locks loss of the tubes is prevented. Space is also provided for the storage of other articles, which are protected from the weather as the trunks are moisture and dust proof.

OTHER PRACTICAL ACCESSORIES.

There are numerous practical devices which may be included under the head of tire equipment and among these may be mentioned a vulcanizer for repairing damaged casings, also for mending punctured inner tubes. These accessories are so constructed that they may be operated easily by those unfamiliar with tire repairing and work may be performed upon the road, if desired.

In addition to the above is C. O. T. solder and cement manufactured by Charles O. Tingley & Co., Rahway, N. J., an equipment which is guaranteed to repair cuts in shoes or punctures in tubes without heat or vulcanization. Being compact the outfit occupies but little room in the car.



Miscellaneous Accessories: A, Goodnow Gasoline Gauge; B, Universal Pennant Holder; C, Nathan Wheel Cover; D, Berg Tire Trunk; E, Gilbert Crank Handle Holder; F, Neverout License Bracket; G, Empire Mirror.

Another preparation for mending tires and tubes is Men-Do, manufactured by the Liberty Rubber Company of Orange, N. J. It comes in a neat, compact can, and casings and tubes may be repaired easily and quickly without heat or tools, the material being applied with the hands.

It frequently happens that the tire rims will become rusted, making their removal a difficult matter. A simple and inexpensive tool for this work, and which will start the most obstinate rim is the Tobey rim remover manufactured by William L. Tobey, Boston. It is operated by a screw driver and is very compact, and may be carried in the vest pocket if desired.

The equipment of the car is not complete without a set of Weed tire chains as those members not only prevent skidding thereby avoiding accidents but provide traction on muddy roads and slippery pavements.

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They are made by the Weed Chain Tire Grip Company of New York City.

Trunks.

As the passengers of the automobile will require a change of raiment at the completion of the day's trip, and as there are more or less extra wraps to be carried, it is important that these members be protected from the dust and rain. Manufacturers of trunks have specialized in those adapted for motoring, and a wide variety of styles and designs is obtainable, among which may be mentioned those for storing dress suit cases, clothes, hats, etc. Some are constructed to be utilized as a foot rest in the tonneau while others are to be secured to the trunk rack, the type depending upon the design of the car and individual requirements of the occupants.

A trunk rack will be of service on the tour and a very durable member is manufactured by the Connecticut Steel & Wire Company, Hartford, Conn., which possesses among other advantages that of being folded up when not in use. Coat and robe rails occupy but little room and an auxiliary attachment is the coat rail bag in which may be stored to advantage many articles, and the device is also provided with convenient individual pockets.

Luncheon Outfits.

Another accessory that will appeal to the tourist is the luncheon outfit which is equipped for six persons and includes knives, forks, plates, cups, food boxes, Thermos bottles, etc. These outfits are manufactured in different styles including one in the form of a tire trunk which is fitted with folding legs inside the cover, which serves as a table.

A neat and compact outfit is the Dover steel Thermos case, made by the Dover Stamping & Manufacturing Company, Cambridge, Mass., as provision is made for the carrying of two Thermos bottles and a sandwich case. The utility of the vacuum bottles is well known and appreciated by motorists as they maintain fluid in a hot or cold condition as desired. The Dover case is constructed of steel and its interior is fitted with a heavy lining which forms an absolute protection against shocks. The cases are enamelled black, are inexpensive, and occupy but little room.

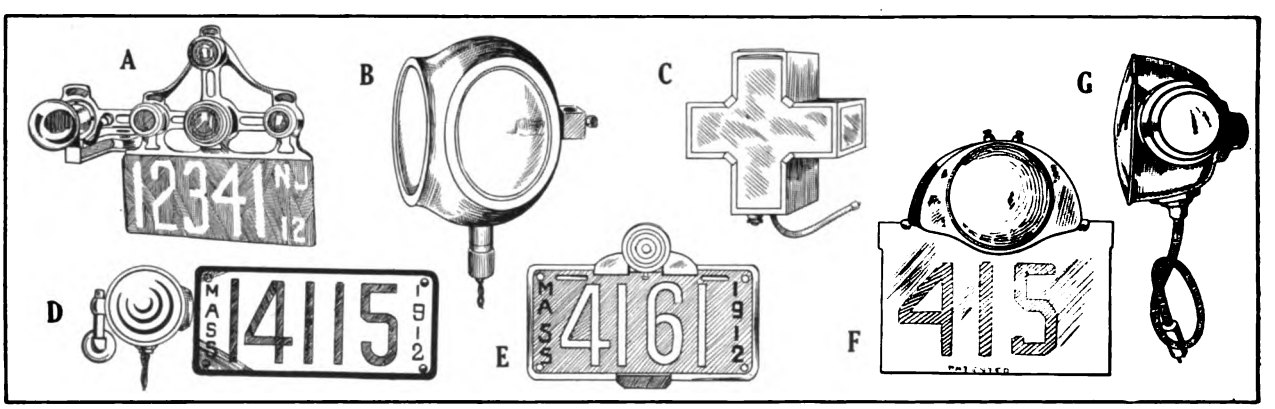
License Brackets and Pennant Holders.

In some states the laws require the license tag to be so attached that it will not swing and while the rear number may be secured easily, suspending the front member is more difficult. There are several forms of license brackets designed for attachment to the filler member of the radiator and some of the devices include a pennant holder.

There is a growing tendency to collect and attach pennants to the car as it tours through different cities and states, and among the equipment for this purpose is a clamp member permitting of fitting to the fender or other convenient place.

Another useful device is the driver's mirror which is secured to the windshield or dash, enabling the operator to discern an approaching vehicle from the rear, as well as preventing accidents in traffic.

In touring the motorist cannot be too careful in maintaining the supply of fuel and to eliminate guess work the car should be provided with a measuring device. The Goodnow Manufacturing Company, Boston, produces the Goodnow gasoline gauge which is practical and inexpensive and which is handsomely finished in black stained wood and with 20 brass markers. These and an outside lever marker register the amount of the fluid at any given time.



Electric Rear Lights and Signalling Devices: A, Neverout; B, Electric Star; C, Fowler; D, Gray & Davis; E, Couch & Seeley; F, Holt & Beebee; G, Guide.

Among other accessories may be mentioned a cover for the steering wheel, its function being to eliminate vibration as well as facilitating the control of the machine. They are made in different materials and are applied easily. A leather support for the starting crank handle not only prevents wear by swinging but keeps the crank from coming in contact with road obstructions.

In operating over rough roads the foot is likely to slip off the clutch pedal and endeavoring to "ride" the pedal is tiresome. This is overcome in the Sidwell pedal mat, manufactured by the Sidwell Pedal Mat Company, Boston, as the device is fitted with a toe stop in addition to the non-slipping material.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



INTERESTING BANK WAGON.

The uses to which industrial transports are put are so many and so varied that it excites very little comment when a new line is added. This is particularly true in America, while abroad commercial vehicles have by no means gained the supremacy that might be expected. Recently, Great Britain was decidedly interested in its first motor driven bank wagon. Many of the banking houses in the larger cities in this country have enjoyed the greater security thus afforded for some months.

Herewith is presented the G. V. electric bank wagon in service with the Bay State Trust Company, Boston, the chassis being a 1000-pound delivery wagon, made by the General Vehicle Company, Long Island City, N. Y., while the body is of special design. It will be noted that every effort has been made to present a vehicle that will afford the most protection to money and securities, transferred from place to place.

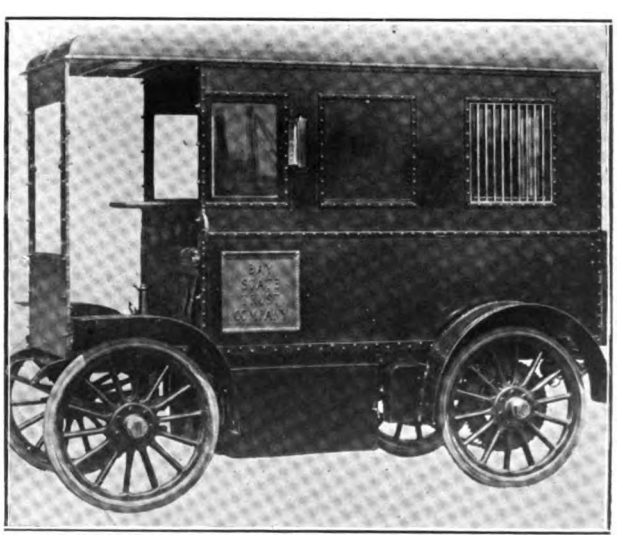
Since the adoption of this car, the bank in question has added materially to its business through a service which includes the delivery of pay rolls and the collection of deposits. Under the old plan each business house was compelled to maintain its own wagon and corps of employees to protect its pay roll while being taken through the city streets. Under the new regime the bank assumes the responsibility of loss during delivery. The collection of deposits also is an important matter as it provides means for stores and other concerns to make late deposits without danger of loss by carelessness or theft.

TRANSCONTINENTAL MOTOR DELIVERY.

The first attempt to utilize a motor truck in the delivery of merchandise across the country was begun in Philadelphia last month, when Charles W. Young & Co., of that city, consigned a three-ton load of goods to an Alco truck, made by the American Locomotive Company, New York City and Providence, R. I., for delivery to the Carson Currier Company, Petaluma, Cal. The distance to be traversed is approximately 4436 miles. The truck is equipped with a special steel body, and fitted with new United States demountable solid tires, made by the United States Tire Company, New York City. Its progress across the continent, by way of New York City, Albany, Buffalo, Chicago, etc., will be watched with interest.

KISSELKAR MAKES NEW RECORD.

A three-ton KisselKar truck, made by the Kissel Motor Car Company, Hartford, Wis., in climbing Mount Hamilton, Cal., recently, made a wonderful record. The mountain is said to be the steepest regularly travelled grade in the United States. The route



G. V. Electric Chassis Fitted as Bank Wagon.

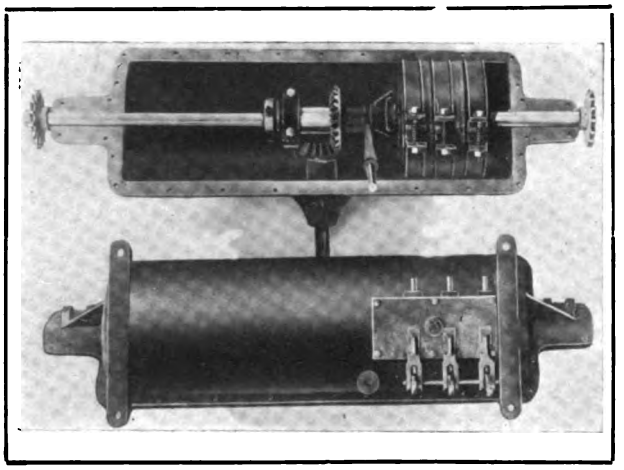
was from San Jose to the Lick observatory, 4209 feet above sea level. The machine was loaded 50 per cent. beyond its capacity, and still covered the distance, which is 27 miles, in 6:25:00.

FEATURES OF THE KOEHLER.

The Koehler light delivery wagon was designed by L. E. Schlotterback, one of the pioneers in the commercial vehicle industry, for the purpose of meeting specific demands in the economical transportation of

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loads in various lines of business, such as the grocer, expressman, department store, etc. The design was decided upon only after a careful study of needs, and



Koehler Transmission, Clutch and Differential Enclosed in Oil Tight Housing.

an exhaustive test of various types with carrying capacities ranging from 500 pounds to 10 tons. The rated capacity of the car is 1600 pounds, and this rating is the result of the study and tests mentioned.

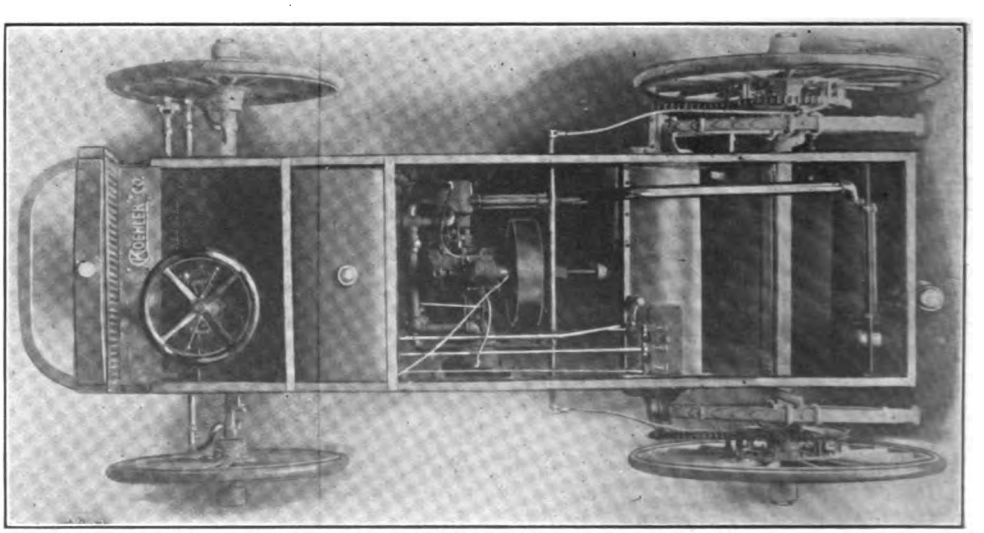
The car is made by the L. E. Schlotterback Manufacturing Company, Newark, N. J., and is marketed by the H. J. Koehler Sporting Goods Company of 1709 Broadway, New York City. It presents many interesting features, none the least of which is the provision for accessibility. Simple in construction and moderate in price, the Koehler 1600-pound wagon is expected to meet with a ready acceptance by the business public. The motor is a two-cylinder, four-cycle, water-cooled unit, of the horizontal opposed type, with bore of 5.25 inches and stroke of four. The horsepower rating is 22-24, although it is stated that it will develop considerably more than this when operating at its maximum efficiency. Ignition is by Bosch high-tension magneto located on top of the motor and driven by enclosed gears. A conventional type of float feed carburetor is employed, and the intake and exhaust manifolds are constructed to ample proportions.

The lubrication system is a combination of forced feed and splash, and all oil is filtered as it is drawn from the reservoir. Cooling is by the thermo-syphon system, through integral water jackets, made large to secure efficient cooling under continued operation. The extra large radiator is suspended on springs to eliminate vibration.

A straight line drive from motor to combined transmission and jackshaft is provided, and although there is no angle a universal joint is fitted. An innovation is the assembly of the clutch, transmission and jackshaft as a unit in an oil tight housing located transversely in the chassis. The transmission is planetary, and all gears are of a high grade chrome nickel steel, hardened throughout. The clutch bands for the low and reverse are semi-steel which cannot slip or burn, and the high speed clutch is a cone. Final drive is by double side chains.

The chassis frame is U shaped, of channel section steel, three by 1.5 inches, with curved end at the front, forming a solid and serviceable protection against damage to the radiator. The cross supports are substantial, and additional strength is secured by the fitting of a metal floor plate of sturdy design, to which are fastened all controlling parts.

The front axle is a one-piece drop forging 1.5 inches square with knuckle yokes integral. The rear axle is two inches square, and both members are constructed of 40 point carbon steel. Semi-elliptic springs are utilized in front and full elliptic members in the rear. Two sets of powerful brakes are provided, the service members being on the jackshaft, and the emergency, on the rear wheels.



General View of Koehler Chassis, Showing Simplicity of Construction and Accessibility of Components.

NEWS OF THE TRUCK FIELD.

In the final organization of the Krebs Commercial Car Company, Clyde, O., the following officers were elected: President, B. A. Becker; vice president, George Slessman; secretary, Homer Metzger; treas-

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urer, Robert B. Jones; general manager, J. I. C. Krebs.

The Kearns Motor Car Company, Beavertown, Penn., is to erect a new factory building of concrete. A recent order received by the company called for the delivery of 100 trucks in New York City.

The Penn Unit Manufacturing Company has been incorporated, and is to have headquarters at Allentown, Penn., where a line of commercial motor vehicles will be made. The capitalization is $500,000, and James K. Bowen is the prime mover in the organization. S. Bruce Somervell will look after the sales end.

The Cleveland Motor Truck Company, Cleveland, O., and the Howard Automobile Company of Galion, in the same state, recently combined under the title of the Cleveland-Galion Truck Company. Heretofore both concerns have made trucks on a limited scale. It is planned to expand.

The manufacture of commercial vehicles in large numbers is to be commenced soon in Alhambra, Cal., by the merged Durocar Manufacturing Company and the Amalgamated Motor Company, both of Los Angeles. The new company is capitalized for $1,000,000.

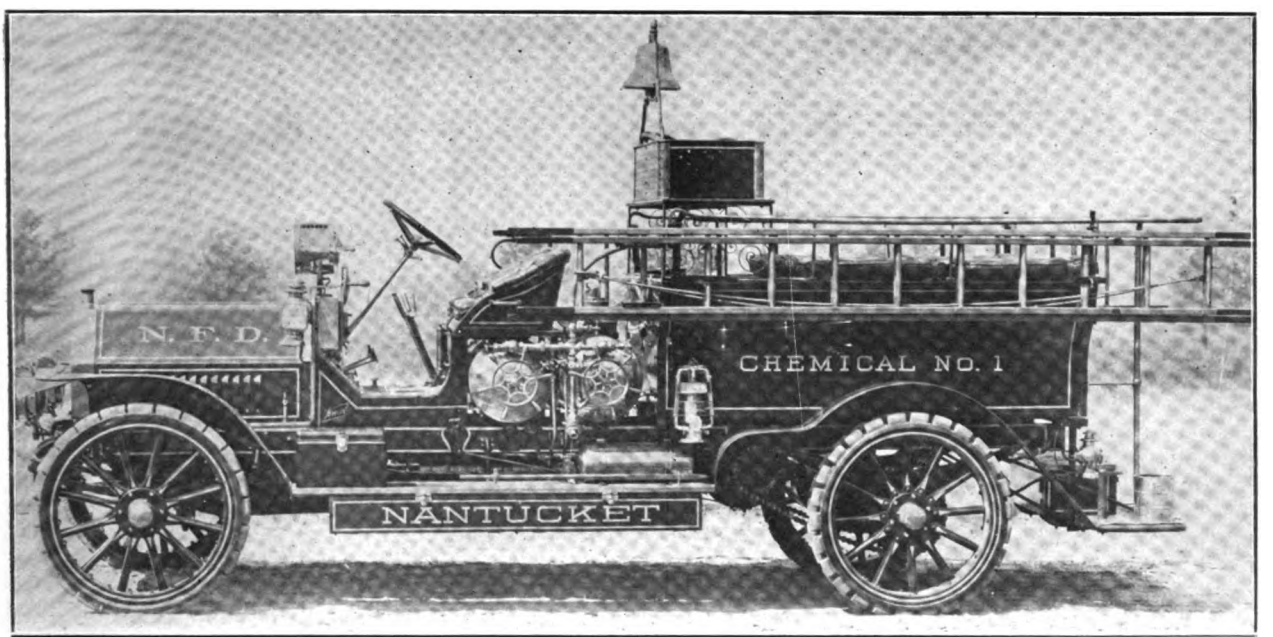
The H. Lange Wagon Company is among the newer concerns to enter the motor truck manufacturing field. The company has a factory in Pittsburg, Penn., where carriages are also made. Trucks of one and two-ton capacities will be the only types manufactured at first.

The Nayasett Motor Company, Springfield, Mass., a consolidation of the Springfield Metal Body Company and the Brightwood Manufacturing Company, is planning to manufacture the S. P. A. trucks, which have been imported heretofore. The new concern is to continue to make the Orson car.

KNOX CHEMICAL FOR NANTUCKET.

Although the people of Nantucket, Mass., went to the legislature some few years ago with a successful appeal for a special statute forbidding the use of automobiles on the island, the city of Nantucket has purchased the Knox combination chemical and hose wagon shown in an accompanying illustration. The car, constructed by the Knox Automobile Company, Springfield, Mass., was delivered on the island last month, and now enjoys the distinction of being the only mechanically propelled vehicle with the legal right to be operated in that territory.

The chassis is the regular 50 horsepower model to which the Knox company fits fire fighting apparatus. In addition to two 35-gallon chemical tanks and the necessary chemical hose, it carries 1500 feet of regulation fire hose and all the other usual fire equipment.



Knox Chemical Wagon Delivered to Nantucket Fire Department and the Only Mechanically Propelled Vehicle Permitted to Be Operated on the Island.

One particular feature is the fitting of a Perkins automatic lighting system, by which the searchlight, side and tail lamps may be ignited instantly from the seat by pushing a button. In common with other Knox vehicles of this type, it is supplied with siren horn, an ordinary automobile horn and a locomotive bell.

The car has attracted no end of attention throughout Massachusetts, it having been sent over the road from the factory in Springfield to New Bedford, whence it was taken to the island by boat. E. P. Crocker, who will be the only licensed operator in Nantucket, has been at the Knox plant becoming thoroughly familiar with the construction and method of operation. In addition to the Knox combination vehicle, the fire fighting equipment of the island includes two hand drawn steamers.

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SIXTH ANNUAL TOURING NUMBER.

In presenting its sixth annual Touring Number, The Automobile Journal feels confident its readers will join with it in declaring it the most comprehensive compilation of touring information ever offered in like form. The data have been collected from a large number of sources, and in their preparation this magazine has been aided materially by many individuals and concerns which it would be impossible to mention by name. Tourists are invited to co-operate with The Automobile Journal in making its bureau of information as complete and exhaustive as possible, and all requests for additional data will receive prompt attention.

NEED FOR UNIFORM LAWS.

The digest of motoring laws elsewhere in this issue suggests that much good work has been accomplished in the matter of reciprocal relations between the states. Most commonwealths provide that visiting motorists shall be exempt from registration during a specified period, while others permit full reciprocity. Those states which require special permits have been reduced almost to a negligible quantity, with the removal of New Jersey from the list.

It is impractical, in a compilation of this nature, to include all the provisions of the various laws. It has been believed that the tourist would desire general information rather than specific. A careful reading of different statutes reveals numerous minor details, which indicate the need for still more energetic effort on the part of organized motorists toward the adoption of laws which shall better meet the situation presented by the growth in transcontinental and interstate touring. This is especially true wherever local ordinances are permitted.

DEMANDING ORIGINAL PACKAGES.

Motorists who decide upon long distance touring will be prevailed upon to accept substitutes for standard brands of accessories and supplies which they may need while en route. In some of the localities visited it undoubtedly will be found that the garages and supply houses have little more than the transient trade which reaches them during the touring season. This may not be as true as in years past, but it is an ever present danger.

These men have little at stake. They never expect to cater to the needs of the same party a second time. Standard goods may net them a smaller margin of profit. Motorists should be particular to demand the original packages and where they are unable to get these, they should make every effort to reach a larger centre in which such supplies must necessarily be carried. The manufacturer's trade mark is the consumer's protection, quite as much as his own.

GOOD ROADS SITUATION.

That it is possible to present detailed itineraries covering a large portion of the United States, is a satisfactory commentary upon the growth of the good roads sentiment in America. The entire story of this issue is not told without the aid of the illustrations, and motorists and others will be somewhat surprised in studying these photographs to discover the very excellent highways which exist in place of the old Indian trails of other years in the Rocky mountain district, for instance.

In a more or less general way, it has been known in the East that the people of the West were decidedly interested in this problem, but the exact situation has not been brought to its attention so forcibly before. The good roads conventions appear to have served a useful purpose, at least insofar as these sections are concerned.

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MOTORING NEWS OF NATIONAL IMPORT.

Stockholders Ratify Financial Plans of United States Rubber Company---General Motors Loses One of Its Most Capable Men---Other Appointments and Promotions Indicate Industry's Progress.

Stockholders of the United States Rubber Company, at a special meeting in New Brunswick, N. J., formally ratified the increase in capitalization to $120,000,000 and the conversion of the second preferred into first preferred stock. A meeting of the directors followed a few days later when a 20 per cent. extra common stock dividend, provided for in the financial plan, was declared. Fifty thousand shares of common stock are to be issued at par to the holders of the $25,000,000 now outstanding.

The directors also passed resolutions for the offering of 100,000 shares of first preferred stock at par to all the holders of three classes of stock to the extent of 12.5 per cent. of their present holdings. This offering is also a part of the general financial plan. The usual quarterly dividends of two per cent. on the first preferred, 1.5 per cent. on the second preferred and one per cent. on the common stock was declared, payable July 31 to holders of record July 6. President Colt presented a report which showed that after setting aside $1,200,000 to meet the dividends declared, the United States Rubber Company had in its treasury a balance of over $5,000,000 applicable to dividends, or more than enough to cover the 20 per cent. stock dividend on the common shares.

Immediately following the meetings of the stockholders and the directors, the latter started to put into operation the arrangement for procuring additional capital for the company. After declaring the regular quarterly dividends, the board announced a common stock dividend of 20 per cent., payable in such stock on July 8 to the holders of record of the common stock at the opening of business on that day.

Also it authorized the offer to the holders of record at 3 on the afternoon of July 12, of all the stock of the company of all classes then issued, including the holders of the new common stock, of the right ratably to subscribe for $10,000,000 of first preferred stock to the extent of 12.5 per cent. of their holdings.

MEAD NEW AMPLEX HEAD.

Hutchinson Leaves Marquette Company to Take His Place with Olds Motor Works.

An announcement which means much to the industry is that of the retirement of W. J. Mead as vice president and general manager of the Olds Motor Works, Lansing, Mich., maker of the Oldsmobile, to become president and general manager of the reorganized Amplex Motor Car Company, Mishawaka, Ind., maker of Amplex cars. Mr. Mead was also a vice president of the General Motors Company. His place as head of the Oldsmobile establishment has been taken by Oliver C. Hutchinson, the former head of the Marquette Motor Company, Saginaw, Mich., makof Marquette cars.

In the departure of Mr. Mead the General Motors Company loses one of its best known and most capable men. Before his advent in the automobile field, he had made a decided success in the bicycle and sewing machine business. His first motor car experience was with the Jackson Automobile Company, Jackson, Mich., maker of Jacksoncars. In 1905 he joined the forces of the Buick Motor Company, Flint, Mich., maker of Buick cars, and for a time was manager of the Chicago salesrooms of that concern. Three years ago he became associated with the Olds Motor Works, and rapidly arose to distinction in the councils of the General Motors Company, acting as its head for a time.



W. J. Mead, President, Amplex Motor Car Company.

Mr. Hutchinson is well known in automobile circles. Under his management the Marquette, the newest production of the General Motors Company, first placed on the market for the 1912 season, has achieved a remarkable success. In this connection, it may be stated that plans are under way which involve the production of an entirely new model for 1913, and the work of Mr. Hutchinson will be carried on by a new manager, whose name the concern does not feel at liberty to divulge at present.

Respecting the Amplex plans, it is stated that under Mr. Mead's direction the factory will be enlarged

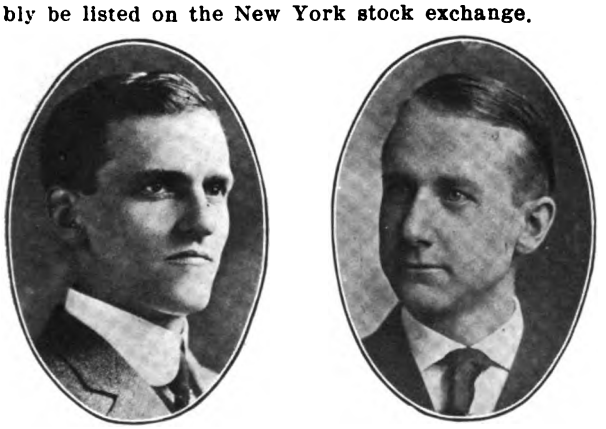
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and brought up-to-date in every particular. It is understood that the sales end will be entirely separate, and that offices will be located in Chicago, probably on Michigan avenue. Special attention will be paid to the matter of the service department, through which owners of Amplex cars will be accorded most efficient co-operation.

OVERLAND PLANS EXPANSION.

Increase in Capital Stock to $15,000,000 Will Supply Money for New Buildings, Etc.

President John N. Willys of the Willys-Overland Company recently announced plans for increasing the capital stock of his company from $6,000,000 to $15,000,000, and the taking in of his various properties without change of status. When the increase is made, the capital stock will be divided into $10,000,000 preferred and $5,000,000 common. Willys will retain all of the common stock and the preferred will probably be listed on the New York stock exchange.



With Willys-Overland Company: At Left, Carl A. Neracher, Chief Engineer; at Right, Fred I. Tone, Engineer, Toledo Plant.

Arrangements are being made for the erection of four new factory buildings, the improvement of smaller ones and the employment of 3000 additional men. It is planned to double the capacity of the plant. All of the new buildings will be erected in Toledo, O. One will be in the rear of the present plant, and will be 700 by 100 feet and three stories in height. It will extend from the Lake Shore Railway nearly to Derby street. A second will be erected just west of the drop forge department fronting on Derby street, and will extend back to the new 700-foot building. The second structure will be 200 feet long, 70 feet wide and two stories in height. The third will be 130 by 60 feet, fronting on Derby street, and will be used as a garage. The Kinsey Manufacturing Company, one of the Willys concerns, will construct a new five-story building, 300 by 100 feet, on the corner of Derby street and West Central avenue.

It will be remembered that Willys recently purchased a controlling interest in the Gramm Motor Truck Company of Lima, O., maker of Gramm trucks. That it is the intention to operate these various concerns under one general management seems to be borne out by the appointment of Carl A. Neracher as chief engineer for Overland cars and Gramm trucks, although Fred A. Tone remains as engineer of the Overland plant in Toledo, and F. Bisantz of the Gramm plant in Lima.

Mr. Neracher was for several years chief engineer of the Garford Company, Elyria, O., maker of Garford pleasure and commercial lines, although his experience covers a much longer period. He is well known in the industry and is regarded as an engineer of marked ability. His headquarters will be at Toledo, from which point the sales policy of the Willys properties will be conducted.

MORGAN WITH MARION.

Becomes Chief Engineer of the Reorganized Concern Under President Handley.

Matthew B. Morgan, one of the best known automobile engineers in the country, has joined the James I. Handley forces as chief engineer of the Marion Motor Car Company. The selection of Mr. Morgan by President Handley provided one of the big surprises of recent date in automobile circles.

Mr. Morgan was chief engineer of the Chalmers Motor Company, Detroit, the past three years, producing the 1910, 1911 and 1912 models. Three years previous to associating himself with the Chalmers interests, Mr. Morgan was with the Olds Motor Works, Lansing, Mich., maker of the Oldsmobile. He first acted as assistant engineer, but was made engineer to take the place of Chief Engineer Dunham when the latter went to the Hudson Motor Car Company. The Oldsmobile six-cylinder is well known as one of his creations.

Before going to the Oldsmobile concern he was with the Packard Motor Car Company, Detroit, and with the Peerless Motor Car Company, Cleveland, O. In the Peerless factory he had work as special assistant to Chief Engineer L. P. Moore. Mr. Morgan says that he can base his fame on having designed the first racing car for Barney Oldfield, the famous "Green Dragon."

TO ESTABLISH BRANCHES.

Wagner to Direct the Sales Policy of Buffalo's $3,000,000 Electric Combine.

Howard E. Wagner, until recently sales manager of Wyckoff, Church & Partridge, Inc., New York City, has assumed his duties in the same capacity with the Buffalo Electric Company, Buffalo, N. Y. He will make his headquarters in Buffalo, and will take charge of the work of establishing branch houses in a number of cities throughout the country.

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Mr. Wagner's association with the automobile industry dates from 1904, when he had charge of the selling of Pope Waverley electrics at Indianapolis, Ind. From 1906 to 1908 he managed the selling department for Babcock electric carriages for Wyckoff, Church & Partridge in New York, and in the latter year became branch manager for the Babcock Electric Carriage Company in that city.



Howard E. Wagner, Sales Manager, Buffalo Electric Company.

The Buffalo Electric Company was organized recently with capital of $1,000,000, being a consolidation of various electrical concerns in Buffalo, including the maker of the Babcock electric vehicles. The reorganized firm also will enter the field with electrically driven baggage trucks and commercial vehicles. Branch houses already have been established in Rochester, Buffalo, Chicago and Cleveland, and others undoubtedly will follow in all principal cities.

TEXAN WITH HENDERSON.

Ray Leeman, Versed in Contest Work, Publicity Manager for Indianapolis' New Car.

The Henderson Motor Car Company, Indianapolis, Ind., maker of the new Henderson car, which made its initial appearance during the 500-mile race on the Indianapolis speedway, Memorial Day, is collecting its department heads from widely scattered points. Announcement has just been made of the appointment of Ray Leeman, advertising and publicity manager of the Overland Automobile Sales Company of Dallas, Tex., as publicity director.

Mr. Leeman has been prominent in the automobile industry of the Southwest for the past five years, and is considered an expert on runs, tours, etc. He was for some time manager of the Goodyear Tire & Rubber Company's branches in Houston and San Antonio, Tex., and his association with the Overland Sales Company placed him in direct personal relation with a large portion of the retail trade throughout that section of the country.

SIMPLEX COMPANY MOVES.

Demand for Its Product Makes Increase in Manufacturing Facilities an Absolute Necessity.

The Simplex Automobile Company recently found it necessary to remove its entire plant from New York City to New Brunswick, N. J., in order to keep pace with its rapidly growing business. The former factory building on the East river front has been entirely abandoned, but the service station in Long Island City and the retail branch at 59th street and Central Park South are being continued. The new factory building covers three city blocks, and it is the intention of the concern to materially increase its output.

ANOTHER MICHIGAN RECRUIT.

Chicago Expert on Advertising Methods Selected to Carry Out Plans Now Under Way.

As a further evidence of the extensive plans under way by the Michigan Buggy Company, Kalamazoo, Mich., maker of the Michigan car, comes the announcement of the appointment of George H. Daugherty as advertising manager. Following so closely upon the news of W. H. Cameron's selection as chief engineer, the industry is decidedly interested in these recent accessions to the Michigan forces.

Mr. Daugherty has had wide experience in handling automobile accounts, having superintended some of the most signal successes in this field. He has been connected with agency work for the past 10 years, his first work in this line being with the Long-Critchfield Corporation, the predecessor of the Taylor-Critchfield Agency. During the past few years he has been an investigating member of the advisory board of Lord & Thomas, the Chicago advertising agency, and has travelled widely, developing the advertising possibilities of many of the most important accounts handled by that house.



George H. Daugherty, Advertising Manager, Michigan Buggy Company.

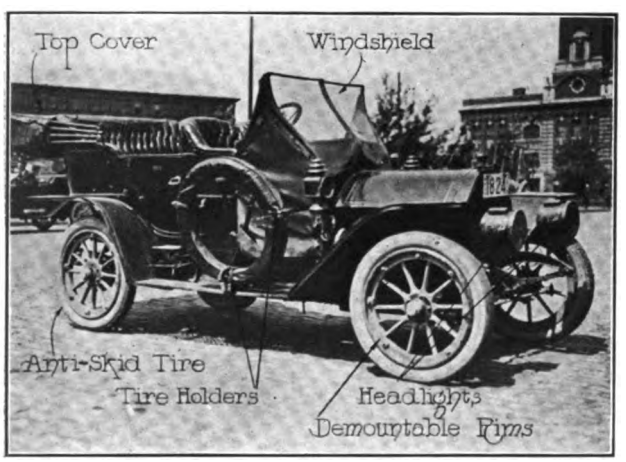
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PREPARING THE CAR'S EQUIPMENT.

Outlining the Necessary Overhaul of the Standard Fittings and Suggesting Methods of Their Proper Installation for Successful Long Distance Touring.

ASSUMING that the motor car has been placed in first class condition for the tour, its equipment should receive the same treatment. This is quite as important in every way, and has an equal bearing upon the pleasure of the outing. The various standard accessories, such as the top, side curtains, windshields, lamps, tires, tubes, etc., should be subjected to a thorough inspection and any needed repairs or replacements made.

The most important of these are the shoes and tubes, and their examination should be very complete. Some make it a practise to fit new members all around, carrying those replaced as spares, while others prefer to obtain the last possible mile from the old tires, taking new ones and making changes as required. In either case, the wheels of the car should be jacked up, the shoes removed, cleaned and gone over, marking each cut for repairs and weak places in the fabric for reinforcement. The inner tubes also should be examined, testing each, especially if an old one, by inflating and noting the condition of the rubber. If in doubt respecting this, take it to a tire man and have him pass upon it, as well as upon any questionable shoe. This may save trouble on the road.



Showing Extra Casing on Running Board, Demountable Rims and Windshield—Note Method of Utilizing Anti-Skid Shoes on High Forward and Off Rear Wheels.

Clean Rims Aid Tire Changing.

Before replacing the tires, clean the rims with sandpaper and remove any rough places that may have been occasioned by riding on a flat tire. Although many advocate painting the rims to make easy the changing of shoes, the writer recommends the use of graphite, as this material applied with enough oil to make a thick paste will exclude water and prevent rusting. The paste should be applied freely, afterwards rubbing well with a cloth which will leave a highly polished surface. Demountable rims, including those fitted with bolts and locking nuts, should be treated similarly.

The number of new or extra shoes to be carried will depend to a certain extent upon the condition of those on the machine and how severe it is upon casings. If the same size tires are utilized all around, one or two extra members may suffice, but where different sizes are fitted to the front and rear wheels, it is advisable to carry at least one extra envelope for each. But it is an excellent plan to take plenty of inner tubes, as it is possible that half a dozen punctures will occur in one day, and it is anything but pleasant to patch tubes by the roadside.

Holders for Extra Tires.

Although many cars are fitted with tire holders capable of carrying one or two shoes, it may be that the motorist will desire to include three or more in the equipment and when such is the case it may be necessary to strap the extra casing to the holder. There are several ways of securing the shoes as will be noted in the accompanying illustrations, but irrespective of the method adopted care should be exercised that the members do not project too far from the running board as they may be torn off when passing another machine on narrow highways. If the holders are not equipped with a locking device it is an excellent plan to fit one, preventing theft. Locks also should be fitted to the tool box and other compartments.

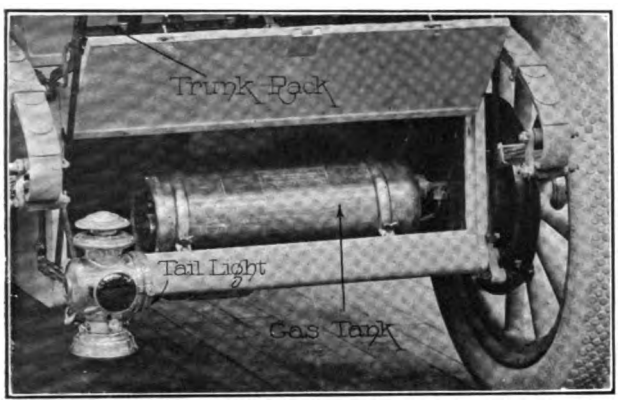
The Lighting System.

Next in order are the lights and it is vitally important that the lighting system be overhauled thoroughly. Beginning first with the oil lamps, side and tail, these should be removed from the car, any leaks soldered, and broken or cracked glasses replaced with new. It may be possible that the wicks are short, preventing the burning of all the kerosene and when such is the case it is well to fit new. In cleaning the lamps remove all soot that has accumulated at the top, for if the members have been smoking it may have been due to the draught being partially stopped. With a little effort, aided by polish, the interior and exterior of the lights may be improved greatly. After renewing the supply of oil, replace the lamps, noting if the brackets and retaining screws are secure and in good condition.

The acetylene headlights should be removed from their brackets, the lenses and glasses tested for looseness, and if cracked or broken replaced with new. The mirrors may be cleaned by utilizing a little warm water, soap and a soft cloth, polishing with tissue paper.

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The burners may be clogged and these may be cleaned by employing a tire pump or with a needle device adapted for this work. Next examine the tubing



How One Owner Fits Gas Tank, an Arrangement Making for Neatness as Well as the Prevention of Theft.

leading from the main line to the lamps. This material is affected by the weather and if tiny cracks be noted, replace the rubber with new. While these connections are removed, and those between the tank or generator, clean out the metal tubing, as a poor flame at the burners may be caused by deposits which accumulate in the pipes.

If a gas tank is employed, examine the brackets and tighten any loose nuts, also note the amount of acetylene shown by the gauge. If low secure a new tank, although these members are exchanged easily, being carried by the majority of garages, especially those catering to the tourist trade. If the car is equipped with a generator this device should be given a thorough cleaning after which the retaining straps or bolts should be tightened. Before leaving the lighting equipment, turn on the gas and light the lamps, noting the condition of the flame and examining for possible leaks.

Electric Lighting Equipment.

As many cars are now equipped with electric lighting outfits a few suggestions as to their care will not be amiss. The wiring system should be gone over carefully for chafed places, and any loose connections repaired. The instructions of the maker of the generator should be carried out to the letter. Where a straight battery system is employed the current container should be removed and fully charged. Extra bulbs may not be necessary but it is a good idea to have them in the event of trouble and they should be packed carefully in cotton batting and so stored that they will not be subjected to shocks.

Horn and Signalling Device.

As the laws of some states are very strict regarding the use of a signal, prohibiting the utilization of other than the ordinary horn in the cities, it is an excellent plan to inspect this member. It may be possible that a new reed is needed or the bulb is cracked. Relative to exhaust signals, these will require but little attention other than cleaning. Electrically operated devices should be given the care recommended by the maker and if actuated by dry cells, the latter tested and new ones procured if the amperage is low. The wiring and switches also should be inspected for chafed places which might create short circuits.

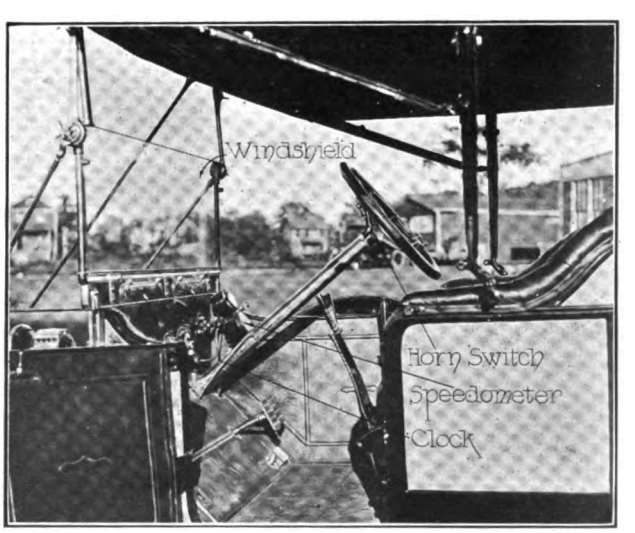
Speedometer Is Important.

It is surprising to note the number of motorists who do not give their speedometers any attention whatever and when in need of repairs delay the work. This device is decidedly important in touring as in passing through different states, and even cities, the speed limits are ever changing and it is essential that the speedometer be efficient as well as in proper working condition. It is needless to point out that the pleasures of the tour are marred by delays due to a violation of the speed laws and the subsequent visit to the police court, to say nothing of the expense involved.

Tops, Curtains and Windshield.

The discriminating motorist will put up, brush and clean the top, noting during the work if the retaining straps and their connections are in good condition. This also applies to the slip cover. The sewing may have started due to careless handling, or small tears may be present which will develop into larger ones, besides detracting from the appearance of the machine. Leather tops may be given a smart appearance by the application of a suitable dressing while others may be cleaned. The shabby look of some tops is due to carelessness in folding these members. At the same time, look over the side curtains, making sure that the complete set is in the car and that the fasteners are intact.

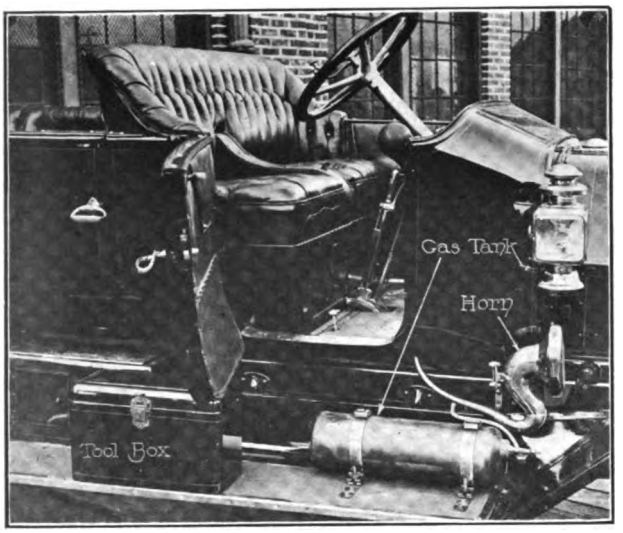
The windshield should be gone over carefully and loose nuts and bolts secured, cleaning the glass and



Outlining Convenient Location of Electric Horn Switch on Hand Wheel and Installation of Combined Clock and Speedometer.

eliminating any rattles which may be present. Look over the fastenings of the trunk rack as this precaution may save the loss of valuable baggage. The

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Showing How Gas Tank and Tool Box May Be Fitted to Running Board Without Interfering with Entrance of Driver.

number plates should be given attention and if suspended by straps examine the leathers for chafed places. Where fitted through the radiator inspect for play as the fins of the cooler may be chafed through, creating leaks. If the itinerary includes states where the tourists' privileges are limited, make provision for the fitting of the extra license tags.

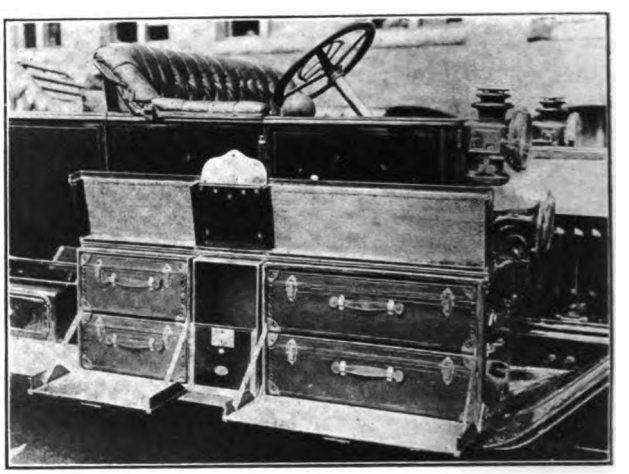
Tool Equipment.

The tool equipment and number of spare parts will depend upon the machine and the itinerary. If the tour be through territory where the roads are in poor condition and where the motorist will have to rely upon his skill in the event of trouble, it is obvious that the equipment should be more complete. While it is advisable to carry a set of practical working tools, there are numerous devices which may appear indispensible to the novice that can be left at home. The experienced motorist eliminates as much as possible all extra weight, having in mind the strain upon the tires as well as the comfort of the passengers.

A very complete tool equipment, and one which will enable the undertaking of ordinary roadside repairs, is presented in an accompanying illustration. It may be augmented by special tools among which may be mentioned a set of socket wrenches, a small vise, hacksaw and blades, soldering outfit, valve lifter, wheel puller, and those tools specially designed for the car.

Some Necessary Articles.

Of course, a jack and tire pump should be included as well as the tire and tube repair outfit, these and the tire irons being optional with the motorist. As tires should not be inflated by guess work, a tire gauge is indispensable. One or two blow-out patches and outer sleeves may come in handy as will a collapsible bucket for refilling the radiator or washing after a roadside repair. A can of hand soap and a bar of ordinary soap will be useful, especially the lat-



Outlining Special Trunk for Running Board, Accommodating Four Cases and Provided with Locks.

ter for stopping gasoline leaks. Include a chamois in the equipment and make it a rule never to refill the fuel tank without straining the gasoline, as it will save considerable carburetor trouble. Funnels for oil and water will not occupy much room although the latter may be dispensed with if desired. A combination grease and oil gun can be stored conveniently and a small can of grease for renewing the supply in the various cups is essential unless this work is done at the garages.

In former seasons many tourists made it a practise to carry a supply of oil and while it is an excellent plan to carry a gallon, practically every garage handles sealed packages of the leading and representative oil concerns of the country. In renewing the supply of lubricant the motorist cannot be too careful in demanding the original packages, which is a protection to himself as well as the maker.

Include a box of assorted cotter pins, lock washers, cap screws, taper pins, nuts and bolts in the

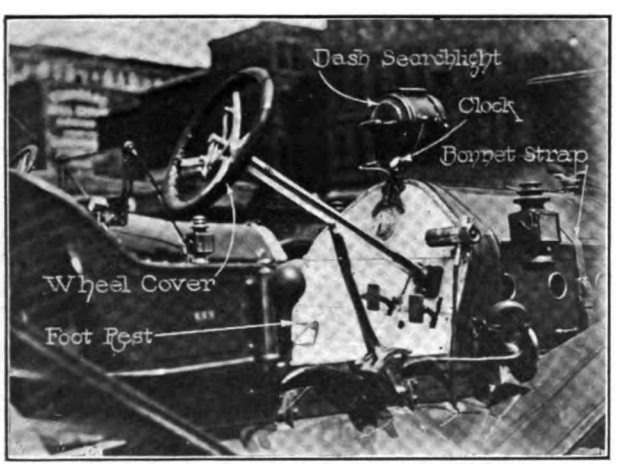


Extra Shoes May Be Carried at the Rear When the Design of the Car Favors Such Location.

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equipment, also a roll of first quality friction tape and a sheet or so of emery cloth. A small quantity of valve grinding compound will be useful, in case a new valve must be fitted or the old members reground. A little candle wicking, cotton twine and waste or old cloths will not take up much room and will be of service. A few extra gaskets for the intake and exhaust members and circulation system should be included, and these may be either purchased or made, depending upon the design of the power plant.

An electric trouble lamp is a valuable acquisition to the tool equipment as by it repairs about the power plant may be made safely. The cord should be of sufficient length to permit working around the machine and provided with practical terminals. No motorist should attempt a trip without extra spark plugs and several of these may be carried in a special case which will protect them from injury. A few primary and secondary terminals and wire may be included if desired, as the material may be of service.



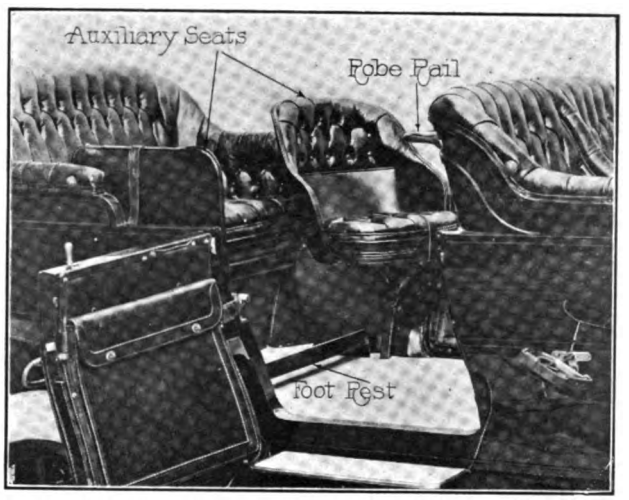
The Swinging Dash Type of Light Is Valuable in Touring—The Equipment Also Includes Clock on Lamp, Foot Rail, and Covered Hand Wheel.

No equipment is complete without a set of tire chains as these members will be invaluable in traversing roads where traction is difficult. If the old chains are worn, procure a new set and try them on the wheels to make sure they are the proper size as well as that they fit accurately. In connection with these devices a tool for making repairs may be included.

Spare or Extra Parts.

The number of spare parts depends upon the car, its mechanical condition and weaknesses. In this the motorist must be guided by his knowledge of his machine. The extent of the equipment is largely a matter of individual taste and there are many useful as well as practical accessories which will be of value on the tour and which are described elsewhere in this issue and from which the tourist may make his selection.

In storing the touring equipment the articles should be so arranged as to permit of easy access to those which will be used most frequently. The

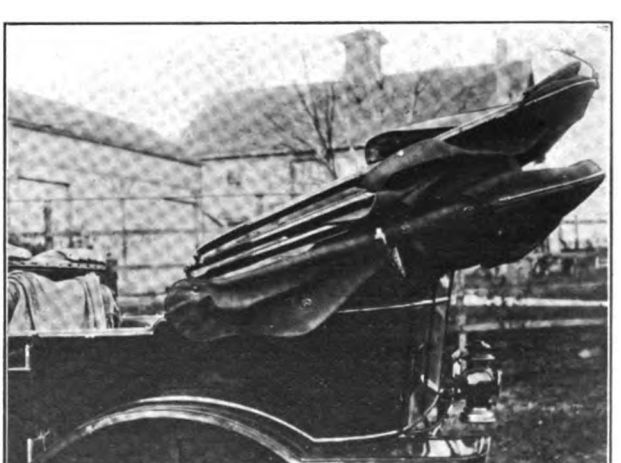


If the Tonneau Is Roomy Auxiliary Seats May Be Fitted to Accommodate Extra Passengers—The Illustration Depicts the Folding and Pullman Types.

trunks and baggage should be covered with a dust and water proof cover and where extra dress suit cases are carried in the tonneau these arranged so that they will not shift, creating inconvenience to the passengers. Where possible the load may be lightened by expressing some of the baggage ahead.

C. H. SNOKE NEW MANAGER.

C. H. Snoke went to Sioux Falls, S. D., recently to take charge of the South Dakota branch of the Studebaker Corporation, with headquarters in Detroit. Mr. Snoke is the successor of C. E. Stubbins, who has gone to Kansas City, Mo. For the past three years he has been manager of the Studebaker branch in Oklahoma City, and previous to that had the management of the Minneapolis branch. He is a young man of wide experience in the automobile business, and has been with the Studebaker concern for about 16 years.

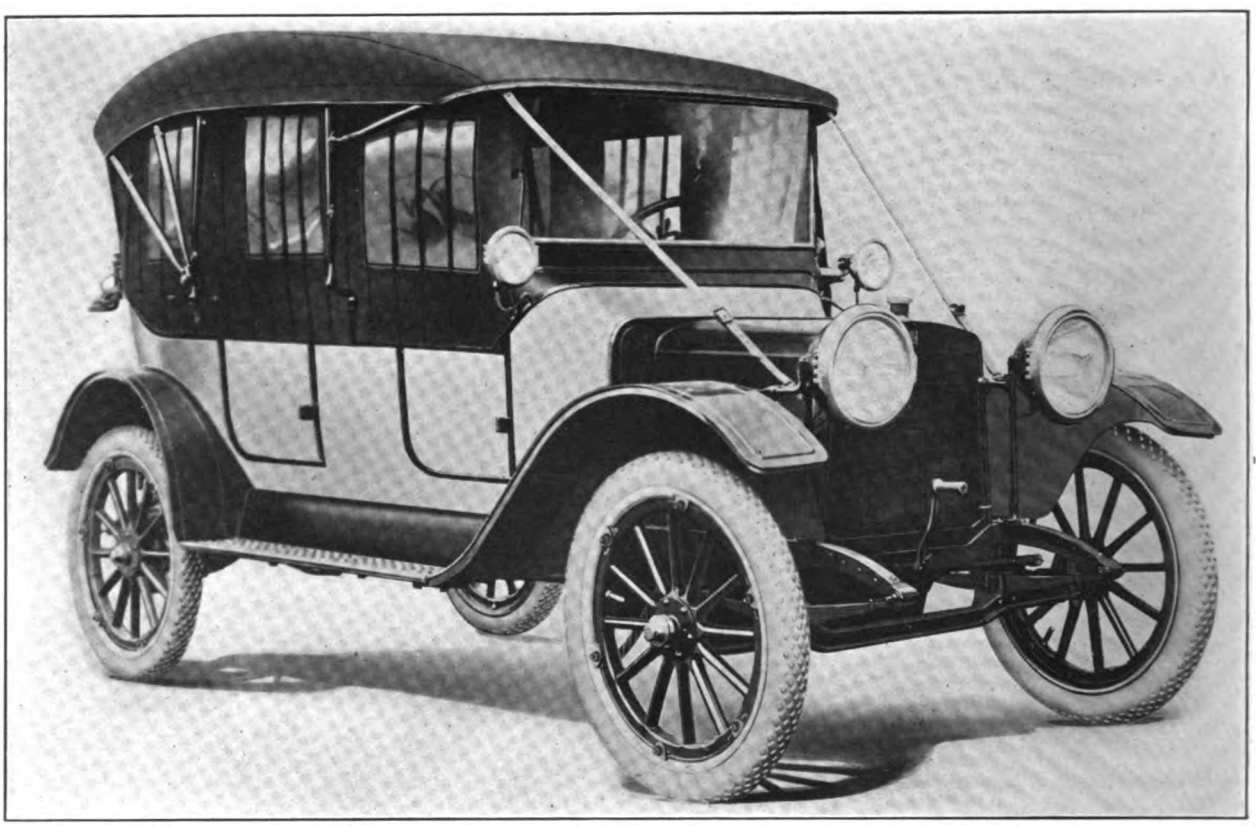


Improper Method of Folding Top, Making for Rapid Deterioration of Material and Collection of Dirt.

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R-C-H MODELS FOR 1913.

WITH the announcement by the R-C-H Corporation, Detroit, Mich., of cars it will produce for the 1913 season, is the statement that the company proposes to build 30,000 machines of the different types. The magnitude of this production is almost beyond the comprehension of the layman, and from the viewpoint of the manufacturer it is an undertaking of enormous proportions, because of the manufacturing facilities necessary to build the machines and the selling organization essential to marketing them. It is pointed out that this is the first instance in the history of the industry when a company, just entering its second year of existence, ever inaugurated such ambitious business plans.



R-C-H Touring Car, Completely Equipped, Showing Top and Seats Enclosed by Jiffy Curtains, the Bullet Electric Head and Dash Lamps, and the Anti-Skid Tires on Demountable Rims.

The success of the R-C-H Corporation has been remarkable in many ways, but one of the reasons that impelled it to plan what may appear to be extremes is the fact that its cars are now sold in no less than 35 different countries, with the prospect that this number will be so increased during the year to come that it will be represented by active and aggressive agents in practically every market of the world. The fact that the R-C-H car has been exploited as a low priced vehicle, standardized in production, of sufficient power to do any work that may be required of it, with full automobile capacity, constructed to well tried and perfected design, of high class material, and with every quality guaranteed, has established it as one of the leading American cars.

The R-C-H car was developed before it was placed in the market. This means that it was designed with the greatest of care to meet the requirements of those who desire a machine of this type, and in this design was embodied all of the qualities that had been sought by motor vehicle designers, based on sound engineering and the use of every material that would insure endurance and service. In other words the maker sought to provide against every result that might eventuate from wear and use, and made liberal margins of safety in every component subject to stresses and strains. Nothing experimental was considered, and so the R-C-H car may be regarded as an industrial development of unusual merit, every detail being figured with the exacting care of commercialism and the entire construction harmonized for uniform results throughout.

Because of the manner in which the R-C-H design was created it is not to be assumed that changes of

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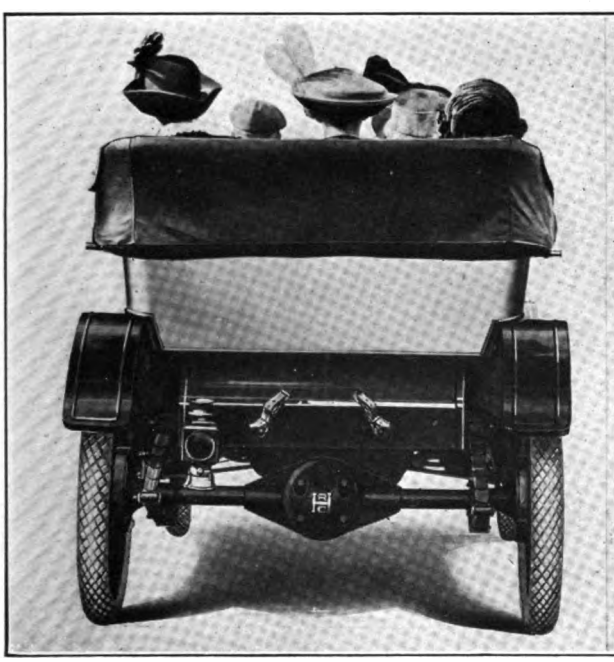
a material character have been made in the machines that will be built for 1913. As a matter of fact one of the strongest indorsements of the vehicles is that they differ but slightly from those of the previous season, for with an experience with the thousands of machines in all conditions of service no valid reason has been found for departure from the original design, material and construction.

It is claimed for this car that it has more drop forged parts than any other vehicle produced in America, and that these have been used wherever practicable, that high carbon manganese steel is used in all components requiring unusual strength and endurance, and that chrome nickel steel is used throughout all shafts and gears in the transmission and rear axle.

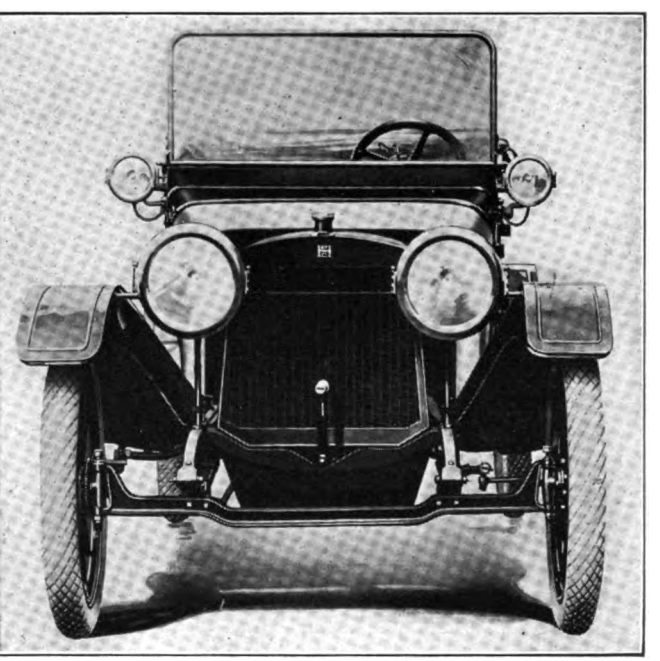
The maker maintains that in no case has a popular priced car been placed in the market that is so completely equipped as is the R-C-H, nor with equipment of so high a quality. For the standard price is included not only a machine that is recognized as being in every way dependable, but every installation that will add to the utility, serviceability and convenience of the owner, with every regard for use and appearance. That is, every accessory is regarded in the market as being not only standard, but a high standard as well, that is certain to give satisfaction from every point of view; not mere necessities, but whatever will increase the comfort of the driver and those accompanying him, affording fullest protection, shelter and facility for giving desirable attention or necessary work, either on the road or in the garage.

To enumerate: The wheels are fitted with demountable rims and these are shod with 32 by 3.5-inch non-skid tires, and there is an extra rim and holders for carrying the rim and ready inflated tire; a handsome Fairfield rubber top, one of the most durable of shelters, is installed, it being possible to raise or lower this with comparative ease, it being supported by straps attached to the forward end of the chassis frame; Jiffy curtains, which may be attached or detached while sitting in the seats of the car, may be used to completely enclose the sides of the machine above the seats and below the top proper; a substantial top cover; a windshield that is constructed integral with the body and may be raised or lowered or adjusted at any angle; a Tally-Ho bulb horn that is concealed under the hood and with the bulb mounted on the steering column or at the side of the car; a rear-view mirror, by which the driver may view the traffic conditions of the highway behind him without turning; 12-inch bullet type electric head lamps with double parabolic lenses; six-inch bullet type electric dash lamps with parabolic lenses; a Warner type 30 auto-meter, a robe rail, lifting jack, tire tools, tire repair kit, tire pump, and the usual kit of tools for adjustment or other work about the car.

The R-C-H car is driven from the left side, a quality that has been featured in many of the highest priced machines, and the control levers are located in the centre between the two front seat passengers and at the right of the driver. In this respect the vehicle is unusually well adapted for use in traffic and it is especially convenient for the occupants of both seats, in that all may enter or leave the car with equal ease, and the right side may always be at the curbing line. As the traffic regulations of many cities require that



Rear View of R-C-H Car, Showing Body Design and Rear Axle Construction.

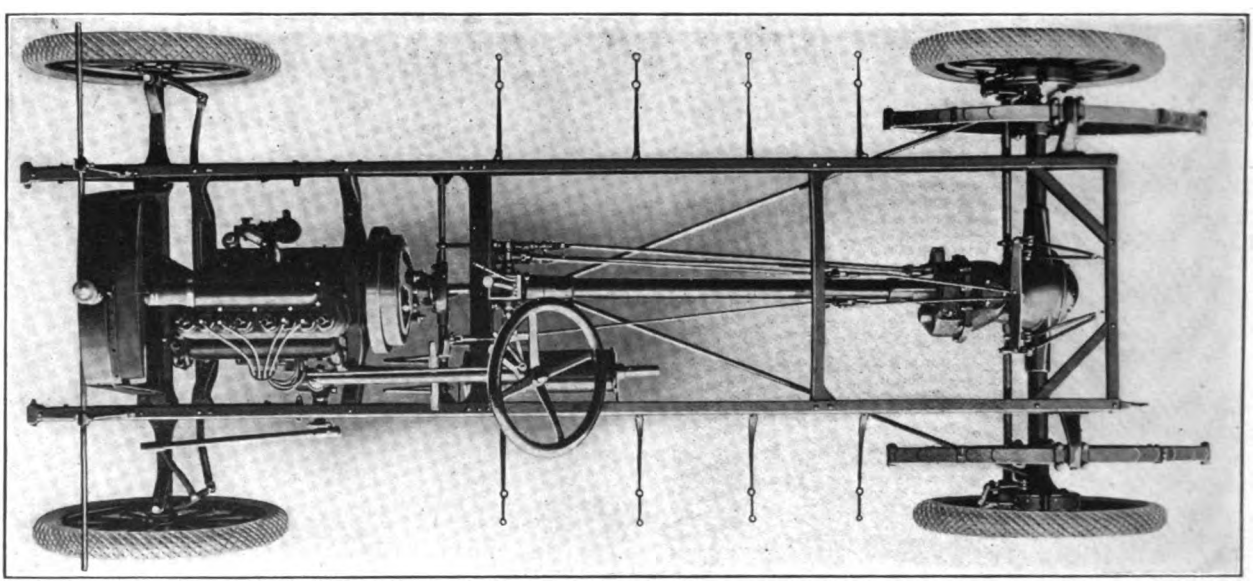


Head-On View of the R-C-H Touring Car, Showing Details of Equipment.

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a car be with its right side only to the sidewalk, and as side levers, tires, etc., may obstruct the right running board, the cleanliness, comfort and convenience of the R-C-H, particularly for women passengers, whether a touring car or roadster, is apparent.

The policy of the R-C-H Corporation is that what were once luxuries with the motorist have become necessities because the vehicles are used practically all the time and under conditions and circumstances that were unusual but a season or two ago, and to meet with the requirements of the people the practical car must have whatever is needed, so that for the one price the purchaser will have a machine so complete that nothing more will be essential. That is, the price will be for all, and instead of buying a car and equipping it with one article bought here, and another there, and installed by inexperienced or indifferent workmen, it will be received as a harmonious whole, and at a cost that will mean a large saving were all equipment bought and installed as need suggested, to say nothing of the cost of labor and the appearance of the machine.



The R-C-H Touring Car Chassis, Illustrating Every Detail of the Power Plant, the Clutch and Driving System, the Transmission Gearset, Rear and Front Axles, Brakes and Control.

The R-C-H chassis is made in two types, that with 110-inch wheelbase being for the touring cars, and the other of 86-inch wheelbase being a runabout. These have the same design and construction and differ in length of chassis frame, and driving system. Otherwise they are identical. In the description that follows the touring car chassis is detailed.

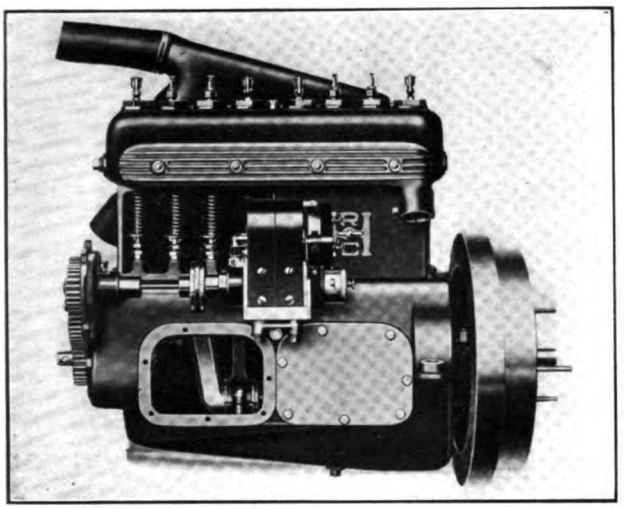
The R-C-H motor is a single type and it is a four-cylinder, four-cycle, water-cooled engine of the L head form with the cylinders cast en bloc, this being a practise adopted very generally abroad. This design gives a very rigid casting of extreme simplicity and it permits the use of a two-bearing crankshaft, which minimizes motor length and weight and insures against deterioration under vibratory stresses. The motor has a cylinder bore of 3.25 inches and a stroke of five inches, and it is rated by the maker as 25 horsepower. It is stated that driven to 1700 revolutions by dynamometer test the engine has developed 27 horsepower. Because of the fact that the S. A. E. standard formula does not establish a value for stroke when this exceeds the bore this rating is not given.

The cylinder block is made of an excellent quality of fine gray iron with the water jacket cast integral and with a large opening over the cylinder heads. The valve pockets are at the left side and at the ends webs extend to the full width of the block, forming a recess below the pockets in which the valve mechanism is enclosed. The water jacket is large and the spaces liberal, the inlet being at the forward end on the right side, this inlet being cast integral with the block, and the outlet manifold extends the length of the block and is incorporated with a plate that covers the top of the cylinder heads. The size of the openings permits a very thorough cleaning of the core sand and there are no obstructions to the flow of the water. The base of the casting has wide flanges that are bolted to the engine case. The cylinder block is machined and bored, aged and reamed and then ground to size. The pistons are of the same material as the cylinders and are cast with heavy bosses for the wristpins. These are turned and ground to fit and are channelled for three rings, which are fitted above the wristpin bosses.

The crankcase is an iron casting of barrel form with heavy forward end web, with the bottom formed with an oil reservoir at the rear, and two cross webs that prevent the movement of the lubricant in the base. There is drainage through these webs into the oil sump, which is U shaped and is at the extreme rear of the case. At the left side are two large in-

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spection plates and by removing these examination can be made or work done on the connecting rod big ends, and the main bearings can be reached. The rear



Valve Side of R-C-H Motor, with Valve Mechanism, Timing Gears and Engine Case Covers Removed.

end of the crankcase is closed by a heavy plate that carries the rear and main camshaft bearings and is bolted to the case. In assembling the crankshaft and the camshaft are placed into the case from the rear. The design is simple and the construction substantial.

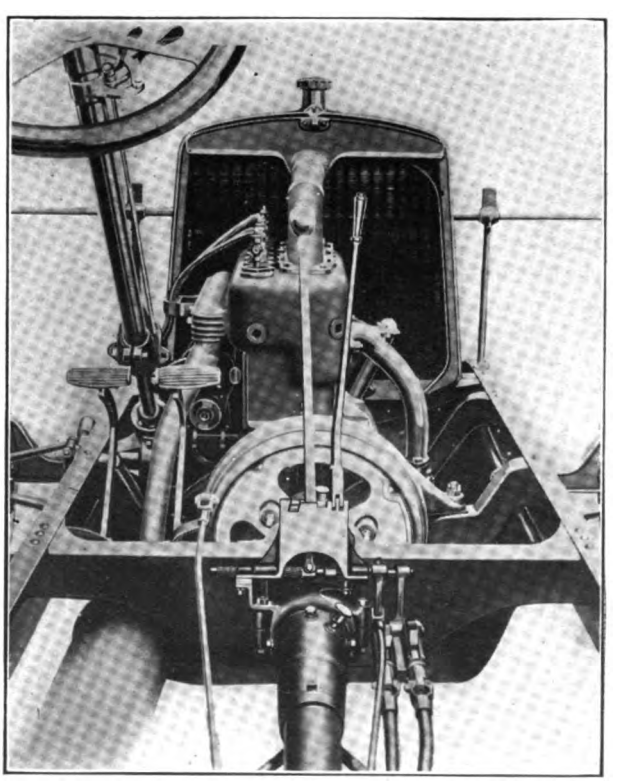
The crankshaft is a nickel steel drop forging, carefully machined and ground to 1.825 inches diameter at the main and connecting rod bearings, and of such strength as to effectually resist all stresses. It is mounted on two long bearings of Parsons' white bronze. The connecting rods are special steel drop forgings and these are fitted with Parsons' white bronze bearings of liberal length for the crankpins, the caps being bolted and provided with shims for adjustment for wear. The small ends are clamped firmly to the wristpins, which are of large size, of special steel, hardened and ground, that have bearing in the cast iron bosses of the pistons. The camshaft is a high grade steel drop forging that is machined and ground to size with the cams integral, the cams being large and designed for endurance. The shaft is mounted on two long end bearings of phosphor bronze.

The timing gears are of special steel, of large diameter and wide faces, and these are protected by a cast iron housing that encloses them. They are cut off from the crankcase proper and are carried on large and substantial bearings.

The valve action is conventional in that the ports are large and the valves, with nickel steel heads electrically welded to stems of high carbon steel, have a sufficient clearance to insure a complete cleaning of the cylinders and full charges of fuel. The valve guides are cast in the cylinder block and are unusually long to have endurance. The springs are large and are designed to resist the heat of the motor and retain their temper. The tappet rods are of special steel and are ground to size and hardened, the upper ends being fitted with hardened screws and nuts for adjustment and with fibre inserts to prevent noise. The valves are enclosed by plates that are retained by wing finger nuts on retaining bolts anchored in the cylinder block. They can be exposed in an instant when desired.

The motor is cooled by the thermo-syphon system, the capacity of the radiator and motor being 3.5 gallons. The radiator is large and there is an uninterrupted flow of the water through the engine and the radiator, the manifolds being very large and with easy curves that insure against obstruction. The water capacity is sufficient to effectually cool the engine under all conditions of operation. There are no complications and the system is the acme of simplicity.

The ignition is by a Bosch high-tension magneto without auxiliary of any kind, this being regarded as the most satisfactory form, as the car can be started with a quarter-turn of the crank, and the wiring consists merely of the four leads from the magneto distributor to the spark plugs and the ground wire through the switch on the dash. The magneto is installed at the left side of the motor and is driven by an outside shaft from the timing gear. The cable



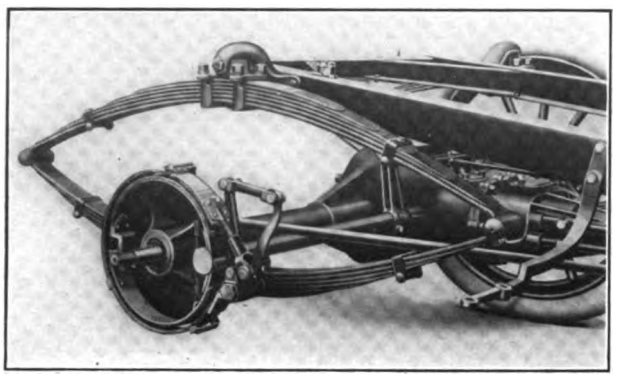
Power Plant, Clutch and Control Assembly of the R-C-H Chassis, and the Forward End of the Torsion Tube.

leads are carried up to the spark plugs through a fibre block clamped to the engine block and are held securely from contacts and there is fullest protection

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against short circuits and worn insulation.

The engine is lubricated by a constant level splash system for the crankshaft and crankpin bearings, the



Rear Axle, Brake and Spring Assembly of the R-C-H Chassis, Showing the Swivelled Spring Hangers.

camshaft bearings, the valve tappets, the wristpin bearings, and the cylinder and piston walls. The oil reservoir, with two quarts capacity, is at the rear of the engine case, and it is a U shaped well in which a wheel with miniature buckets in its periphery is driven by frictional contact with a disc mounted on the crankshaft just ahead of the rear main bearing. This wheel carries oil from the well to two ducts that are cast on the sides of the crankcase. The oil flows in these ducts to four U shaped steel troughs or pits that are fitted beneath each connecting rod big end cap, and flanges or scoops attached to the caps sweep into each trough for a period each revolution of the shaft, throwing the lubricant about the interior of the motor in the form of a fine spray. The ducts are inclined about 15 degrees toward the forward end, and the flow is such that there is always an abundant supply of oil when the machine is climbing a grade, and the cross webs of the case prevent a flow of the oil toward the forward compartments from the well, when descending. The excess oil from the troughs and the drainage from the walls and bearings flows back to the well and is used so long as it is supplied. The oil is placed in the crankcase through a breather pipe, and high and low level cocks permit the driver to ascertain instantly the condition of the lubricant supply. The timing gears at the forward end of the motor are packed with a light grease in which they revolve and are thoroughly protected from wear.

The fuel is carburetted by a float feed carburetor, automatic in its action, that has but two adjustments and is extremely simple in construction. It is claimed to be remarkably efficient under all conditions of operation, and with the power of the long stroke motor it is the experience of many owners that from 20 to 25 miles may be driven to the gallon of fuel. The carburetor has a hot air intake to insure a temperature that will completely vaporize the gasoline, and the long riser from the carburetor to the manifold cast integral with the cylinder block is without obstruction to a free flow of the gas. The exhaust header of the manifold is cast separately and is ribbed for more effective radiation. It is large and straight and the lead to the muffler is without obstruction. It is claimed that tests have been made with the motor completely silenced and with the exhaust header removed, without any perceptible difference in the horsepower production.

The flywheel is cast with fan spokes and the inner periphery of the wheel forms the female member of the clutch. The cone is a skeleton type to permit a draft of air through the flywheel and to secure lightness as well. It is 11.5 inches diameter and 1.75-inch face, carrying a facing of high grade leather. This facing is mounted over a series of springs to insure ease of engagement and four clamps that are recessed into the face of the cone and are retained by nuts holding the facing firmly. The springs may be easily adjusted when necessary, and the renewal of a facing can be accomplished without trouble with material purchased and cut at any leather shop. The clutch is operated with comparatively slight pressure and is very efficient.

The motor is mounted on two cross members, at the centre of the forward member and at either side of the rear, this making effective three point suspension. Directly back of the clutch is another cross frame member that carries the clutch shaft, and behind this is a second cross frame member that supports the forward end of the torsion tube housing the driving shaft.

Above the forward end of the torsion tube, and supported by the tube and the cross member, are the quadrants and mounts of the speed changing and emergency brake levers. The torsion tube is of steel, with heavy walls, and the forward section of it carries the ends of the radius rods. The rear end is attached to a section that forms a part of the transmission gearset housing, and this is bolted to the cen-



Forward Seat and Control Members of the R-C-H Touring Car, with Accessories Installed.

tral section or shell for the differential gears of the semi-floating rear axle. The driving shaft is 1.125 inches diameter. The forward end of the torsion tube

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is spherical in shape and this is fitted into a globe socket attached to the heavy cross member. There is a universal joint coupling the clutch and the driving shafts. The shaft is carried on two long roller bearings. The rear bearing carries the sleeve which couples the ends of the driving and transmission shafts.

The gearset is a selective sliding type with three forward speeds and reverse, and it is operated by linkage with the lever at the forward end of the torsion tube. The driving pinion is integral with the transmission shaft. The shafts are of chrome nickel steel, and the gears are wide face, of the same material, all heat treated to give the greatest strength. The jackshaft bearings are of phosphor bronze. The differential is a bevel gear type with four bevel pinions. The bevel gear spider is forged solid of chrome nickel steel, ground on the bearing surfaces and is unusually strong. The differential is mounted on annular ball and heavy roller bearings. The differential may be examined and removed by taking off an inspection plate at the rear of the axle housing. The rear axle housing is of malleable iron and steel tube. The driving axles are of nickel steel and the outer ends are carried on large roller bearings. The wheels have large hub flanges and are keyed to the ends of the driving shafts. The alignment of the axle is preserved by two steel radius rods extending from the brake drum flanges to the forward end of the torsion tube. The rear axle and transmission can be removed by taking out four bolts without dismantling any other portion of the mechanism.

The front axle is drop forged from high grade steel and is I section, dropped in the centre. The yokes are large and the steering pivots and spindles are of corresponding size. The tiebar is behind the axle for protection and the draglink is heavy and adjustable for wear. The forward wheel bearings are the cup and cone ball bearing type. The wheels are of second growth hickory, 12 spokes to each wheel, and are fitted with demountable rims and 32 by 3.5-inch tires.

The frame of the chassis is of pressed steel channel section of ample strength and it is reinforced by five cross members, hot riveted, with gussets formed integral with the members. This is carried on semi-elliptic springs forward and full elliptic springs at the rear, the rear springs being on swivelled seats with the forward ends slightly elevated to absorb the stresses of road shocks.

The control of the car is by a clutch pedal operated by the left foot, a service brake pedal operated by the right foot, an emergency brake actuated by a hand lever with a ratchet lock, a foot accelerator, and ignition and fuel throttle levers mounted on a quadrant on the steering column below the wheel. The steering gear is an irreversible type that is easily adjustable for wear and the 16-inch wheel makes steering very easy. The speed changes are by a hand lever that is operated in an H slot. The service brake is external contracting on the drums of the rear wheels, and the emergency brake is internal expanding within the same drums. Both brakes are equalized and there is minimized danger from skidding.

The touring car and the roadster bodies are of the so-called English type, being roomy and comfortable, of sheet metal with substantial wood frames. The windshields are incorporated into the bodies and there is no possibility of this equipment becoming loose and causing annoyance and excessive wear and noise. The forward doors are 18 inches width, and the rear doors 18.75 inches width. The width of the front and rear seats is respectively 18 and 19.5 inches. The lengths of the front and rear seats are 38.5 and 43.5 inches. The bodies are made with a tool box under the rear seat and pockets in all four doors. With the roadster there is locker space under the seat. The fuel tank capacity is 10 gallons, the tank being under the forward seat of the touring car, and is either back of the seat or under the seat of the runabouts, according to the type. The upholstery is of a high grade machine buffed leather with abundant hair padding and long springs for the seats and back cushions. The standard finish for the cars is with black hood and fenders, and red body with black band about the top, with black running gear with narrow red striping. The touring car is lighted by electric lamps from a six-volt 100 ampere-hour battery, with 16 candlepower head lamps, four candlepower dash lamps and two candlepower tail lamp, all controlled from the dash by push button switches. The hardware and the metal trimming of the car are nickel plated. The weight of the touring car is about 2000 pounds and the roadster weighs about 1800 pounds.

WILL NOT LOCATE IN KENTUCKY.

C. G. Stoddard of the Edwards Motor Car Company denies the report that this concern is to locate temporarily in the building formerly occupied by the Longest Bros. Company in Louisville, Ky. He adds that it expects to take temporary quarters in a building somewhere in the vicinity of New York, although this site has not be selected as yet. He characterizes the statement that his company eventually will take over the Simms Magneto Company as incorrect, as well as the suggestion that the Edwards plant probably will be located permanently in the vicinity of the Simms structure.

GRAMM FORMS PARTNERSHIP.

A partnership between B. A. Gramm, head of the Gramm Motor Truck Company, Lima, O., previous to its being taken over by John Willys, president of the Willys-Overland Company, and Max Bernstein, a business man of Lima, has been announced. The new company, it is stated, is to manufacture motor trucks exclusively. A tract of seven acres has been secured, on which several buildings will be erected.

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CORRESPONDENCE WITH THE READER

The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Eliminating Noise from Hoods.

(1400)—How can I stop the rattling of the hood on my car? It is a long one and the side clasps appear to be snug, but the hood rattles when going over rough places. Would a bonnet strap stop the noise?

E. W. MICHELSON.

Ithaca, N. Y., July 1.

A hood strap as suggested should eliminate the rattles referred to, but a better plan would be to

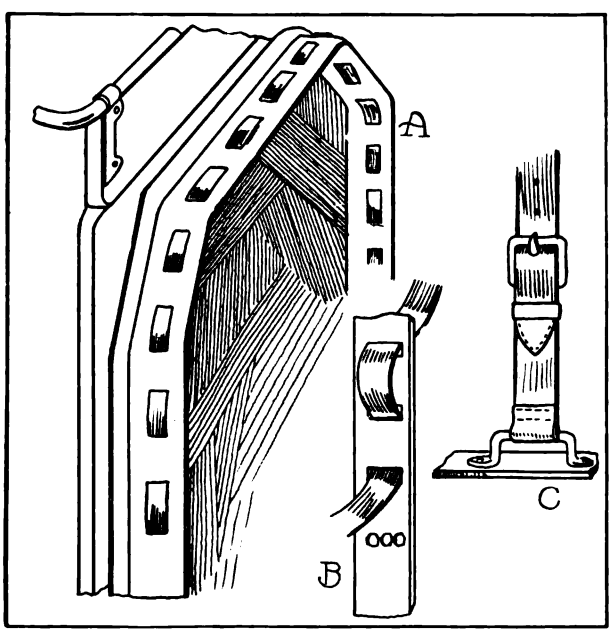


Fig. 1—Showing How a Noisy Hood May Be Quieted: A, Fitting Leather to the Hood Supports; B, How the Latter Are Prepared for the Material; C, Method of Installing Strap.

equip the dash and radiator supports of the hood with some anti-noiseless material, such as leather or rawhide. At Fig. 1 is outlined a method which has been utilized by many makers in the past. It consists of slotting the hood supports and weaving in belt lacing as depicted at A. At B is shown how the metal may be prepared for the leathers. Drill one or more small holes, then break out the edges with a small chisel, afterwards smoothing up the rough places with a file. The lacing is knotted at one end and inserted as outlined.

A hood strap could be applied easily and would not be very expensive. A handle, such as illustrated at C, which also depicts the fitting of the strap, is attached to each board supporting the hood, and to these are sewed the strap which is made in two sections. One is equipped with a buckle and the other perforated.

Should Be Satisfactory.

(1401)—I am investigating the merits of a certain make of touring car into which the following parts are installed. Six-cylinder Rutenber motor with 4.125-inch bore and 5.25-inch stroke, McCue full floating rear axle and drop forged front axle, F & S imported ball bearings, Bosch magneto, Warner multiple disc clutch and transmission, Spicer universal joints and Rayfield carburetor. Please be so kind as to inform me whether any better parts can be installed into a car than the above enumerated.

C. E. DOTY.

Dallas City, Ill., June 25.

An automobile containing the components outlined should give very satisfactory service as they are utilized in high grade machines, represent the result of years of experimentation in producing high quality parts, and enjoy an enviable reputation among manufacturers of motor cars.

Testing Spark Coils.

(1402)—Can you advise me of a simple method of testing a high-tension coil of the four-unit type without placing it on the machine and connecting up the spark plug and other wires? I am in doubt as to my coil as it was not working very well previous to my overhauling the car.

A CONSTANT READER.

Lancaster, Penn., June 27.

The coil may be tested without placing it upon the car and making the connections as stated. At Fig. 2 is presented a diagram showing a simple method of utilizing a battery, four wires, a spark plug and an ordinary monkey wrench. It will be noted that two wires are secured to the battery terminals, one to the positive and the other to the negative. The wire a is led to the battery terminal of the coil and the switch lever thrown to right to make a connection.

The other lead b is attached to the wrench which serves the same function as the frame of the car, that of a ground. The spark plug is next placed in the jaws of the wrench and the latter set, taking care that the terminal of the plug does not come within an inch or so of the metal of the tool. The secondary wire from the No. 1 coil is then led to and secured to the plug in the usual manner.

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Next take a piece of wire and secure one end to the primary terminal of the No. 1 unit which is also connected through the secondary lead to the plug. The free end of the wire d is now touched to the wrench, completing a circuit, and if the vibrator is adjusted properly and the coil in good condition, a spark will be noted at the gap of the plug. Each unit may be tested in a similar manner.

It is important in conducting the experiment to make sure that a path for both the primary and secondary circuits is provided. That of the secondary is secured through the shell of the plug, wrench and ground wire to battery. Care should be exercised in testing any coil for if the spark is called upon to jump too large a gap, the windings are likely to be broken down in the operation. It should also be remembered that a spark loses much of its size when in a cylinder under compression and in testing a coil this must be taken into consideration.

Varnish for Copper.

(1403)—What is a good preparation to put on copper tubing to prevent oxidation? I note that the tubing on my machine corrodes as we are near the salt water during the summer. L. W. K.

Torrington, Conn., July 5.

A varnish for copper may be made by taking one part each of carbon disulphide, benzine, oil of turpentine, hard copal and two parts of methyl alcohol. Several coats of this material should be applied, allowing each to dry thoroughly before another application.

Home Made Blow-Out Patches.

(1404)—I have read somewhere that considerable service may be obtained from an old tire by fitting a smaller sized shoe inside. Is this a practical idea and how is it done? Also how are blow-out patches made from sections of old shoes?

INQUIRER.

Syracuse, N. Y., June 27.

The experiment has been tried with success by some owners, but the writer is of the opinion that the best method is to fit a new shoe which will be more satisfactory in the end. In selecting a shoe for the work, however, one in fairly good condition is best. The bead is cut off and the edges skived; that is, are cut slanting. Care must be exercised not to leave any sharp edges which might come in contact with the inner tube. If a larger liner is utilized a section may be cut out, taking care to make perfectly fitting ends. The real knack is to insert the inner tube so that it will not be pinched when the outside tire is being placed upon the rim.

Blow-out patches are made in a similar manner, skiving the edges of the section. It is advisable to reduce the thickness of the material by removing the rubber, so as to prevent undue strain on the inner tube. It is somewhat of a task to prepare these members, and as ready made patches are not expensive the writer suggests purchasing the latter.

Constant Leaking Radiator.

(1405)—For the past three months I have experienced considerable trouble with a leaky radiator. Have had it repaired several times by an expert but after replacing it on the machine it will leak after a short time. The tinsmith states that he tested the radiator under pressure and that something is wrong with its mounting. Can this be possible? JAMES McQUADE.

Harrisburg, Penn., June 25.

If the repair was thorough, as the tinsmith states, the trouble is due to the cooler being subjected to stresses and these may be caused by several things. It is possible that the leak may be due to the frame springing or becoming broken. The writer recalls a similar case where a removal of the side boards on the frame revealed a break which allowed the frame to compress the radiator supports. After welding the frame and repairing the leak, the trouble was eliminated.

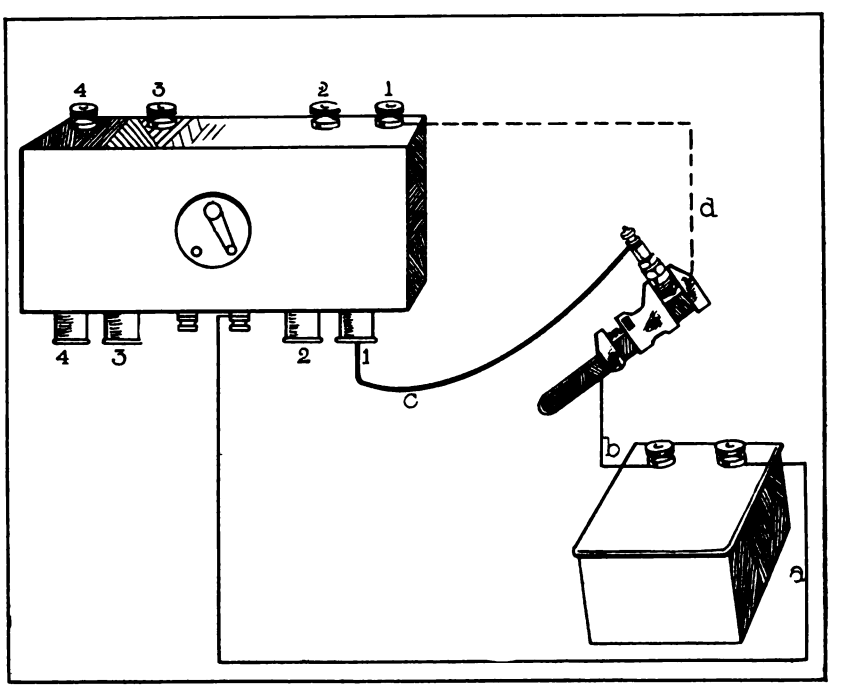


Fig. 2—A Simple Method of Testing Out a High-Tension Spark Coil Without Placing the Device upon the Car.

Examine carefully the frame and the radiator supports, also remove the cooler and test these members for any play. It may be possible that undue vibration is set up and if the radiator is supported at the bottom by a band and locked by studs, insert a strip of leather or similar material to counteract the vibration. This method has been known to end radiator troubles such as outlined.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



National Tour Routes.

Secretary-Treasurer G. B. Gibson of the Federation of American Motorcyclists, 24 Main street, Westboro, Mass., has mailed to every member of the federation a detailed routing of the four national tours to the convention in Columbus, O., July 17-21. Application blanks may be obtained from Dr. Gibson or from the various tourmasters, the names and addresses of which are given in connection with the following information:

Northeastern tour, from Albany, N. Y.; tourmaster, Fred S. Ellett, 224 Lormore street, Elmira, N. Y. —July 13, Albany, Schenectady, Amsterdam, Herkimer, Utica, Oneida and Syracuse, 158 miles; 14, Syracuse, Auburn, Geneva, Canandaigua, Rochester, Batavia and Buffalo, 150 miles; 15, Buffalo, Fredonia, Westfield, Erie, Conneaut, Ashtabula and Cleveland, 183 miles; 16, Cleveland, Medina, Wooster, Mt. Vernon and Newark, 123 miles; 17, Newark, Granville and Columbus, 30 miles.

Southeastern tour, from Baltimore, Md.; tourmaster, J. A. Robinson, 1810 West Mosher street, Baltimore—July 14, Baltimore, Ellicott City, Ridgeville, Frederick, Braddock, Middleton, Boonsboro, Hagerstown, Clear Spring, Indian Springs, Hancock and Cumberland, 138 miles; 15, Cumberland, Eckhart Mines, Frostburg, Grantville, Keyser, Addison, Uniontown, Brownsville, Beallsville, Washington and Wheeling, 132 miles; 16, Wheeling, Bridgeport, Cambridge and Zanesville, 72 miles; 17, Zanesville, Brownsville, Etna, Reynoldsville and Columbus, 55 miles.

Northwestern tour, from Chicago; tourmaster, J. A. Campbell, 1709 Fernwood avenue, Toledo, O.—July 15, Chicago, Hammond, Hobart, Valparaiso, La Porte, South Bend, Elkhart, Goshen, Churubusco and Fort Wayne, 182 miles; 16, Fort Wayne, Van Wert, Delphos, Lima, Wapakoneta, Sidney, Piqua, Troy, Vandalia and Springfield, 147 miles; 17, Springfield, Vienna, Summerford, West Jefferson and Columbus, 43 miles.

Southwestern tour, from Louisville, Ky.; tourmaster, E. G. Baker, 920 Hume-Mansuir building, Indianapolis, Ind.—July 15, Louisville, Jeffersonville, Salem, Bedford, Bloomington, Gosport, Martinsville and Indianapolis, 150 miles; 16, Indianapolis, Greenfield, Knightstown, Cambridge City, Richmond, Eaton, Dayton, Fairfield, Enon and Springfield, 145 miles; 17, Springfield, Vienna, Summerford, West Jefferson



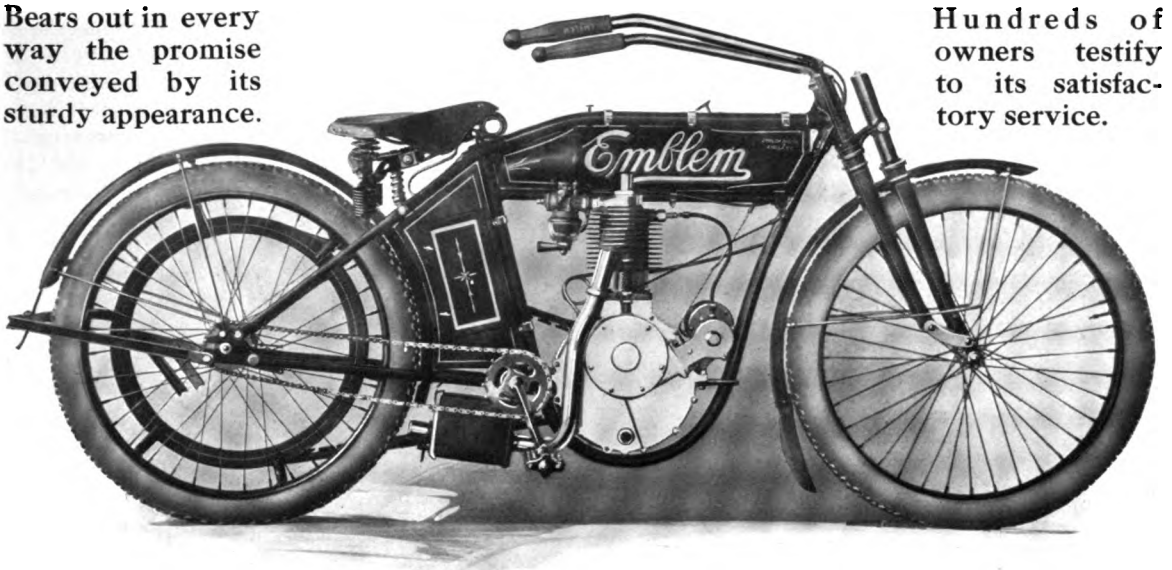
Members of the Providence Motorcycle Club Lined Up for One of Their Weekly Runs, with Secretary Edwards Busy Checking Them Out.

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ANGOLA ERIE COUNTY NEW YORK

and Columbus, 43 miles.

Manufacturers' Annual Meeting.

The annual meeting of the Motorcycle Manufacturers' Association will be held in Detroit at the Hotel Cadillac in August, the meeting to be in conjunction with the sixth annual convention of the Cycle Trade Industries, which is to take place Aug. 6-9. Officers for the ensuing year will be chosen and it is expected several matters of importance will be considered. The programme for the big convention, of which the meeting of the motorcycle manufacturers is something of a side issue, is practically complete. Among several pleasure trips arranged for by the committee is a daylight and moonlight sail on Lake St. Clair and the Detroit river, a steamer having been chartered especially for the event. The committee has also planned a theatre party, the usual bowling contest and special entertainment for the women.

Perfect at Los Angeles.

Referee Charles Fuller Gates, who supervised the recent 550-mile endurance run of the Los Angeles Motorcycle Club of Los Angeles, Cal., has just announced the final revision of score sheets, which show that 22 of the 41 riders who started, finished, and 15 of these with perfect scores. The course was one of the most difficult and strenuous ever laid out in this country, and wound over 14 mountain passes, three deserts and nine rivers, and through 36 cities and towns. Paul Derkum, on an Indian, was the only professional to finish. He had a perfect score, and made the shortest time. Another remarkable performance was that by Erwin Knappe, who carried a tandem passenger, and finished perfect. The finishers, makes of machines they rode and their scores follow: R. D. Bissett, Excelsior, 1000; A. J. Menegay, Indian, 1000; W. C. Vaughn, Merkel, 1000; O. Bosshart, Indian, 1000; K. Verrill, Yale, 1000; C. Briggs, Excelsior, 1000; H. Shafer, Thor, 1000; W. S. Bryson, Merkel, 1000; F. Johnson, Excelsior, 1000; T. Johanson, Indian, 1000; J. Leonett, Indian, 1000; L. T. Clark, Indian, 1000; E. Knappe, Indian, 1000; G. L. Ledbetter, Indian, 1000; Charles Wride, Indian, 998; William Kuhn, Indian, 987; H. Lightcap, Thor, 955; Ray Little, Harley-Davidson, 950; F. E. Holdridge, Excelsior,

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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886; H. H. Redfield, Minneapolis, 666; G. C. Speer, Indian, 666.

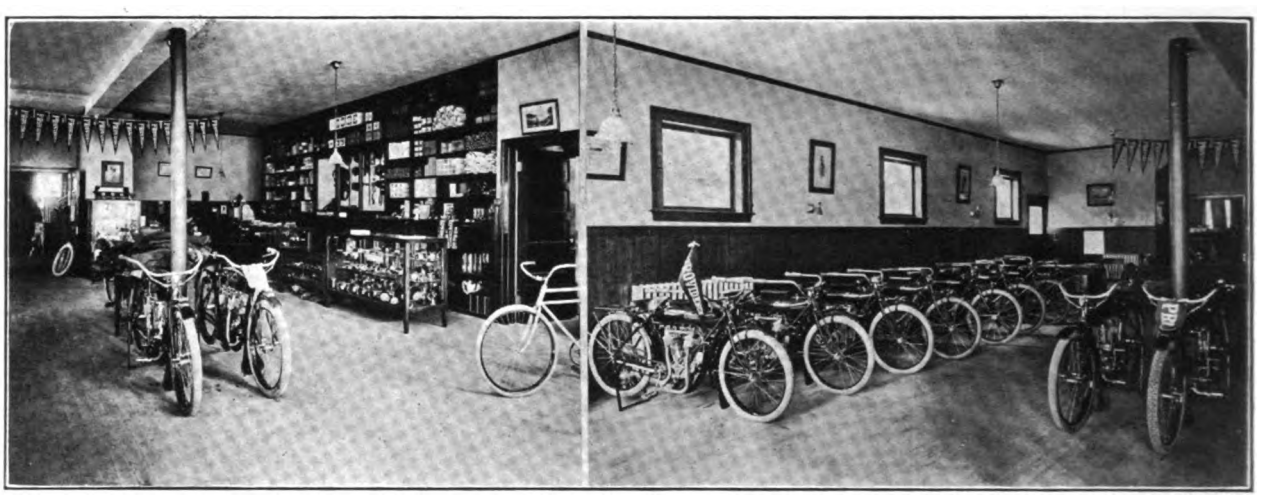
Lynn Club Active.

The Lynn Motorcycle Club of Lynn, Mass., recently enjoyed a run to Hampton Beach, N. H., where the members were entertained over Sunday by William Wiswell. An excellent dinner was served Sunday, following which the host and a number of others were called upon for speeches. The club is planning another run, this time to Essex, in the near future.

Swenson's New Home.

B. A. Swenson, Rhode Island agent for Indian motorcycles, has moved into his new business home at Broad, Blackstone and Friendship streets, Providence, R. I. This structure, which will be known as the Swenson building, is an able demonstration of what may be accomplished by proper business methods. Two views of the interior are shown herewith.

Some 12 years ago, when Swenson first started in business for himself, selling bicycles, he had very little capital but indomitable courage and a determination to succeed. He still handles bicycles, but it was when he began to sense the possibilities of the motorcycle that he laid the foundation stone for his future prosperity. It was by no means an easy task, since the general public was not ready to agree with him. How well he has succeeded is evidenced by the new building.



Two Views of the Interior of B. A. Swenson's New Indian Wigwam in Providence, R. I.—The Repair Shop Is in the Rear of This Salesroom.

The location is on one of the most prominent streets leading to the centre of the city, on the through route for tourists. That portion occupied by the motorcycle and motorcycle supply business comprises about half of the first floor, with the one-story addition in the rear, which is utilized as a repair shop and factory for the numerous Swenson specialties developed by him. The machines are neatly arranged through the centre of the salesroom and along the sides, while the surplus stock is carried in convenient racks in an adjoining room. The supplies, spare parts, etc., are arranged in drawers, carefully labelled. In fact, the whole plan shows admirable attention to detail.

The business undoubtedly is the oldest motorcycle and supply house in New England. Beside the main store in Providence, sub-agencies have been established in Wakefield and Westerly, R. I. July 1, still another Swenson venture was started in Pawtucket, R. I., when the Motorcycle Supply Company, Inc., opened for business at 73 East avenue. This concern has for its incorporators, B. A. Swenson, Edward Lutz and Clifford Frazer.

Indians Win Abroad.

In the recent Anglo-Scottish motorcycle team hill climb at Jedburgh, Scotland, Indian machines, made by the Hendee Manufacturing Company, Springfield, Mass., showed to exceptional advantage, providing the fastest time in the solo classes. In the larger class, A. H. Alexander rode an Indian over the .75-mile 12 per cent. grade stretch in 0:40. In the same event J. R. Alexander, riding an Indian, was timed in 0:48.2. A. H. Alexander made the fastest time for his team in the sidecar class, 0:72.8. The English team was a winner by 0:07.2. The winner was decided by totalling the time in seconds of the members of each team.

In the big reliability run of the Motor Cycling Club of London, recently held from London to Edinburgh and return, revised results of the scores show that Indian machines, made by the Hendee Manufacturing Company, Springfield, Mass., won as follows: Clark Cup—T. G. Proctor (sidecar), third; London-Edinburgh, gold medals—E. Gwynne; P. G. E. James and W. H. Wells (sidecar); London-Edinburgh and return, gold medals—H. E. Hull; B. A. Hill and T. G. Proctor (sidecar).

Another Tandem Seat.

A new tandem side seat which will doubtless find favor with women who prefer to sit sidewise was re-

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cently introduced by Boen Bros., 54 South street, Utica, N. Y. The design is such that the weight of the rider comes directly over the rear axle, which is claimed to give improved balance. The seat measures 12.5 by 20 inches, is upholstered in leather and has a nickel plated hand rail around the side and rear. It has several four-inch springs which, combined with a pneumatic action, makes it independent of the springs of the motorcycle to absorb all the shock and jar. A guard protects the rider from the rear wheel.

Champaign Club Reorganized.

The Champaign Motorcycle Club was recently reorganized at Urbana, O., and has 30 active members. New and capable officers have been elected and the club plans for an active and progressive year. F. A. Harenberg, secretary, announces that the members will join the F. A. M. in a body. Among motorcyclists in other parts of the country who are actively engaged in organizing clubs might be mentioned C. P. Wyatt, Box 603, Albuquerque, N. M.; E. C. Brunkhorst, 228 Ohio street, Sedalia, Mo.; A. C. Wagner, Celina, O.

Moonlight Ride for Savannah.

The second annual moonlight ride of the Savannah Motorcycle Club of Savannah, Ga., was held recently. Over 500 members took part in the outing, for which a large steamer was especially chartered. Following a short run, machines were abandoned and a sail was taken down the harbor. Dinner was served on board, and a fine evening's entertainment was provided by members. Several weeks previous to the outing members advertised it in a unique manner by attaching long strips of yellow cloth to their machines, bearing an announcement of the event and its date.

Merkel Men Victorious.

The Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel machines, calls attention to the fact that two of its mounts, ridden by Fred W. Mercer of Seattle and Ray E. Day of Tacoma, finished with perfect scores in the recent 404-mile endurance run held from Seattle, Wash. These men were the only amateurs to complete the test without penalization.

Indian Machine Stolen.

The Hendee Manufacturing Company, Springfield, Mass., maker of Indian mounts, has offered $100 reward for the recovery of an engine which was stolen from its twin-cylinder, seven horsepower Indian racing machine at the locker on the track at Philadelphia, Penn., last month.

Ocean-to-Ocean Relay Test.

An ocean-to-ocean motorcycle relay will probably attract the attention of motorcyclists a little later in the summer. The advantage of such an event is being called to the attention of clubs all over the country, and following the F. A. M. convention at Columbus, O., it is possible the event will be staged. The idea at present is to have a test, showing how fast a message, say in the War Department, could be relayed from San Francisco to New York by motorcycle messengers. The plan would be to have the relays from 50 to 100 miles and to have three men in each relay so that if one were delayed the others could continue with the message. If the event takes place, the route would be mapped so that the greatest possible speed could be maintained.



Mr. and Mrs. Leroy Snodgrass of Los Angeles Cal., and Their Sidecar Attachment.

Erie Club's Annual Parade.

The second annual motorcycle parade under the auspices of the Erie Motorcycle Club, Erie, Penn., was held recently, the affair proving the biggest success of its kind in the club's history. About 200 riders, with lamps aglow and machines decorated with streamers and banners, paraded through the principal streets of the city in single file, announcing their approach by the blowing of horns and ringing of bells.

ATTENTION MOTORCYCLISTS

Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

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298 Blackstone Street, Providence, R. I.

The F. N. Shaft-Drive Motorcycles

Single cylinder with two-speed gear and handle bar control of clutch.....$275.00
(The only machine in the world possessing this incomparable feature.)

Four cylinder ordinary automobile engine, compound spring fork, two powerful brakes, footrests if specified, combined luggage carrier and stand, long wheel base and large tires.....$350.00

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At the recent hill climb conducted by the Cincinnati Automobile Dealers' Association, two motorcycle events were included in the programme. Vernon Jones on a Merkel won the 30.50 cubic inch class.

Constant Secures New Record.

In the one-hour championship motorcycle race at the state fair grounds in Detroit recently, J. U. Constant of Brooklyn, N. Y., established what is declared to be a world's record for a dirt track, covering 66.625 miles. The previous record of 61.5 miles was held by Fred Huyck of Chicago. Constant's best time was 0:53.4.

Worcester Club Incorporated.

Agreement of association has been filed with the commissioners of corporation in Massachusetts by the Worcester Motorcycle Club as a social body, interested in the development and extended use of motor vehicles. The club has been in existence for several years and has had its headquarters and clubhouse at 92 Stafford street. The officers are: President, Harry S. Cutting; vice president, Charles E. Braman; treasurer, William H. Tannebring; secretary, Munroe S. Ripley; board of governors, Roger H. Christy, Russell R. Coes, Howard L. Clark, Ira C. Coombs and Charles H. Adams.



One Corner of the Testing Department of the Emblem Manufacturing Company's Plant at Angola, N. Y.

Will Manage Newark Track.

Paul Derkum of Los Angeles, Cal., one of the best known racing men in the country has signed to manage the new motordrome, recently completed at Newark, N. J. Derkum had planned to spend the summer in the East, and the managers of the new race track feel highly pleased to secure the services of a man so well known to the riders and the racing game. The new ellipse is located on South Orange avenue in the Electric Park amusement corral, directly opposite the Newark bicycle track. New York automobile men and Newark brewing interests are backing the project.

Club Notes, Here and There.

The Chicago Motorcycle Club is to hold a reliability contest for factory teams only, July 29-Aug. 3. The run will be 1200 miles for a $500 trophy.

The 15-day tour of the Short Grass Motorcycle Club will start from Pratt, Kan., Aug. 17.

Riders from Chicago, Milwaukee and other places competed in the eight racing events under the auspices of the Appleton Motorcycle Club at Appleton, Wis., recently. The contests were held on the dirt track at the fair grounds.

The Buffalo Motorcycle Club has completed arrangements for holding runs every Sunday for the balance of the season and plans are being made for an endurance run on Labor Day. Other events, not yet decided upon, may be held during the summer.

George V. Gove is the leading spirit in a movement to form a club of the motorcycle riders in Brockton, Mass., and vicinity. If enthusiasm enough can be aroused to make the organization a permanent one, affiliation with the F. A. M. will be sought.

Members of the Sandusky Motorcycle Club of Sandusky, O., recently took a three days' run to Buffalo, N. Y., and return. The club members left in a body July 4 and returned on the 7th, approximately 500 miles having been covered.

Gus Habich, a popular motorcycle dealer in Indianapolis, Ind., held his annual free-for-all motorcycle run and picnic, June 30, a large number of riders from that city and vicinity grasping the opportunity to participate in an enjoyable day's outing. Athletic events provided an interesting part of the programme.

The Columbia Motorcycle Club of Columbia, S. C., held its first F. A. M. meet July 4. The list included five events, run on a mile track, the feature being the 50-mile race.

Members of the Atlantic City, N. J., Motorcycle Club are urging the many new riders to join the F. A. M. The club recently had a run to Philadelphia.

The San Jose, Cal., Motorcycle Club recently voted to affiliate with the F. A. M.

Excelsior Wins Hill Climb.

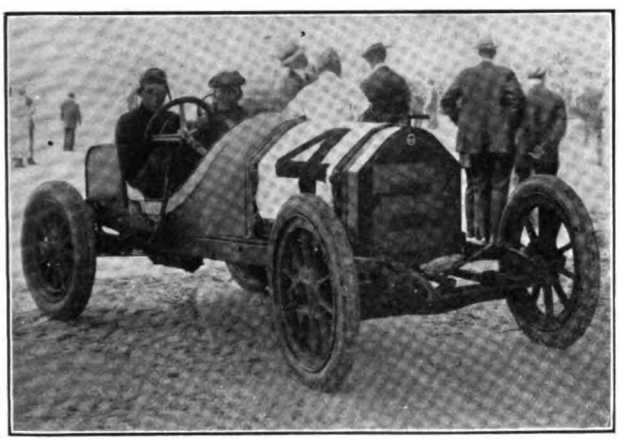
Joseph Wanstradt, riding an Excelsior mount, made the quickest time in the hill climbing contest at Cincinnati recently, when he covered the half-mile course, which was laid on a 15 per cent. grade with one turn, in 0:29.8 in the 61 class. Running a close second was C. S. Schwarm, Indian, who was clocked in 0:30. Vernon Jones won the 30.50 event by negotiating the hill in 0:39.

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STUTZ AT OLD ORCHARD BEACH.

Takes Two Long Distance Events and Creates New Record---Schacht and Mercer Also Prominent Winners---Second Annual Meet a Splendid Success.

STUTZ drivers, John LeCain and David Lewis, easily proved the features of the second annual beach meet at Old Orchard, Me., July 4-6. It was the same car which won the 75-mile event of the first day and



John LeCain at Wheel of Stutz Car Which Won Two Long Distance Events at Old Orchard Beach Meet.

the 100-mile contest of the last, but the two drivers named divided the honors. Incidentally, it may be added that the Stutz created a new record for the distance over this course.

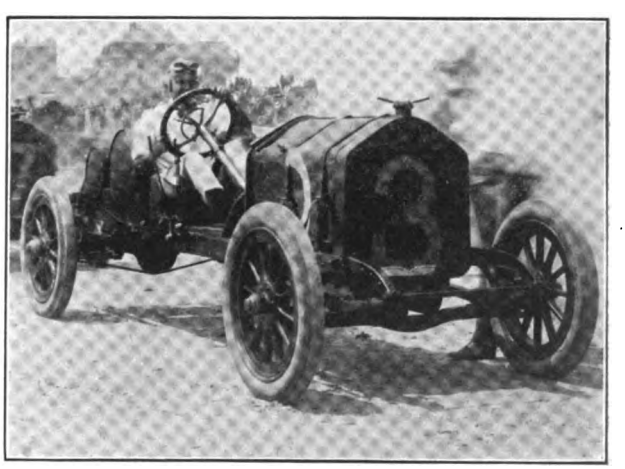
It should not be forgotten, however, that William Endicott in a Schacht secured first place in one 100-mile event, exceeding all previous marks for the distance on this speedway, which is now regarded as second alone to the Daytona beach course in Florida. In fact, nearly every one of the races on the three-day programme offered some exceptionally fine driving.

While from a racing standpoint the meet was a grand success, it must be added that the Old Orchard Automobile Association lost money. Over 50,000 people witnessed the various contests, but unfortunately the beach is so located that spectators may obtain quite as good view of the course from the roadway, and many declined to pay the admission fee. For two miles the beach was screened off by canvas, but at such height that those standing in vehicles or on porches could look over it. As a result it was voted unanimously by the association at its meeting July 6 to abandon the admission charge another year. It is estimated that the two years of racing at Old Orchard have made it evident that the beach is one of the best in the world, and that next year even larger crowds will visit the hotels during the meet, particularly when it is made known that no admission fee will be required. There also is some discussion as to the advisability of holding another meet here, Labor Day. Detailed announcement will be made later.

Records began to fall with the opening event, when Louis Disbrow drove the Jay Eye See, a special racing car, a mile from a flying start in 0:35.1, lowering the mark of 0:39.8, set last year by L. F. N. Baldwin in a Stanley steam car. While other attempts were made later in the meet, Disbrow's mark still stands. This is all the more remarkable, inasmuch as the course was somewhat uneven, a condition which was eliminated during the last day.

Many of the shorter events were spiritedly contested, but naturally the most interest attached to the long distance races. Could it have been possible to have eliminated the turns, much faster time would have resulted in these. The straightaways were covered at record speed, but the drivers always were forced to slow down at the two turns, with the only other alternative of running into the water.

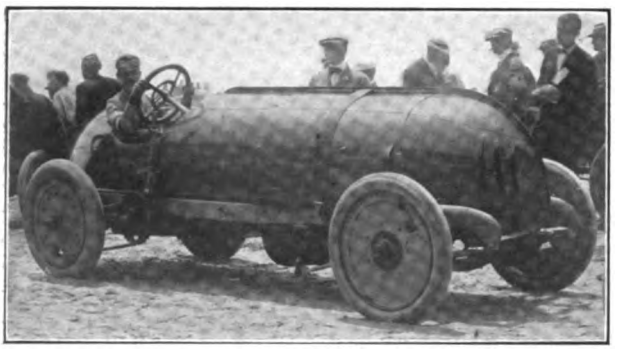
In the 75-mile race of the first day, which was to have been for 100 miles, but was cut down on account of the rising tide, nine prominent drivers took part as follows: Harry Grant, Berkshire; John Rutherford and Neil Whalen, Nationals; William Endicott, Schacht; Joseph Matson and Robert Stuart, Fiats; Charles Basle, Bianchi; L. F. Hersey, Chadwick, and John LeCain, Stutz. Matson took the lead at the first turn, followed closely by LeCain and Whalen. On the third lap, Endicott moved up, while Matson went out on the fifth. LeCain took the lead at this point and was not headed. At the end of 25 miles, Grant



John Rutherford and the National Car, a Prominent Winner in Second Old Orchard Beach Meet.

was in third place, and took the second at 60. Both he and Whalen were driving strong when the race was called, with the Stutz a winner.

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Louis Disbrow's Special Jay Eye See Racing Machine Which Lowered Baldwin's Steam Car Mile Record.

Two more long distance events were held the second day. In the 50-mile race, the contest easily was between Joseph Nikrent in a Case and Alfred Hummell in a Mercer. Nikrent was in the lead until the end of the 49th mile, when Hummell, who had been giving a splendid exhibition of consistent driving, passed him a winner.

In the 100-mile race, William Endicott in a Schacht created a new course record. It was a hard fight, however. Almost from the very beginning of the race, John Rutherford, who created a beach mark with his National at Old Orchard last year was in the lead. Endicott held the second place in like manner. It was on the 99th mile that Rutherford lost the contest, Endicott being less than 20 feet behind him when his car was forced to stop for an instant. As it was the National was less than nine seconds behind the winner at the end.

Practically four minutes were clipped from the Schacht record in the 100-mile race of the last day, in which David Lewis sent the Stutz over the finish line in first place. Six cars competed in this event. Endicott experienced tire trouble at the very beginning, and the manner in which he attempted to make up lost time won him much applause from the crowd. He passed car after car, going under the pier so fast that many of the spectators held their breath.

Lewis was in second place at the start. When Endicott stopped at the end of five miles, he took the lead, and was not headed. Whalen in a National was then in second place, with Basle in a Bianchi, Cobe in a Jackson and Grant in a Berkshire behind him. While Endicott was overtaking the field, Grant was just as earnestly striving to close up the gap between him and first place. At the end Endicott was in second place and Grant in fourth. Whalen was in third. During the last 40 miles, Lewis seemed to realize the necessity for urging his Stutz, and the finish was one of the most exciting bursts of speed that has been seen in an American race. It developed at the conclusion that Grant had driven the entire event with but one ring in the first cylinder.

The summary of the meet follows:

THURSDAY, JULY 4.

One Mile, Time Trials.

Car	Driver	Time
Jay Eye See,	Disbrow	0:35.1
National,	Rutherford	0:47.0
National,	Whalen	0:47.5
Chadwick,	Hersey	0:55.1
Berkshire,	Grant	0:58.0

Five Miles, 161-230 Inches.

E-M-F,	Burke	Default

Ten Miles, 231-300 Inches.

Case,	J. Nikrent	10:28.6
Mercer,	Hummell	10:30.7

Five Miles, 301-450 Inches.

National,	Rutherford	4:25.8
Stutz,	Lewis	4:42.1
Schacht,	W. Endicott	4:45.0
National,	Whalen	4:46.5

Ten Miles, 600 Inches.

Simplex,	Disbrow	8:36.7
Fiat,	Matson	8:50.0
Stutz,	Lewis	9:00.0

Seventy-Five Miles, Special.

Stutz,	**LeCain**	1:17:48.7
Berkshire,	Grant	*1:21:06.0
National,	Whalen	†1:21:12.0

*70 miles; †65 miles.

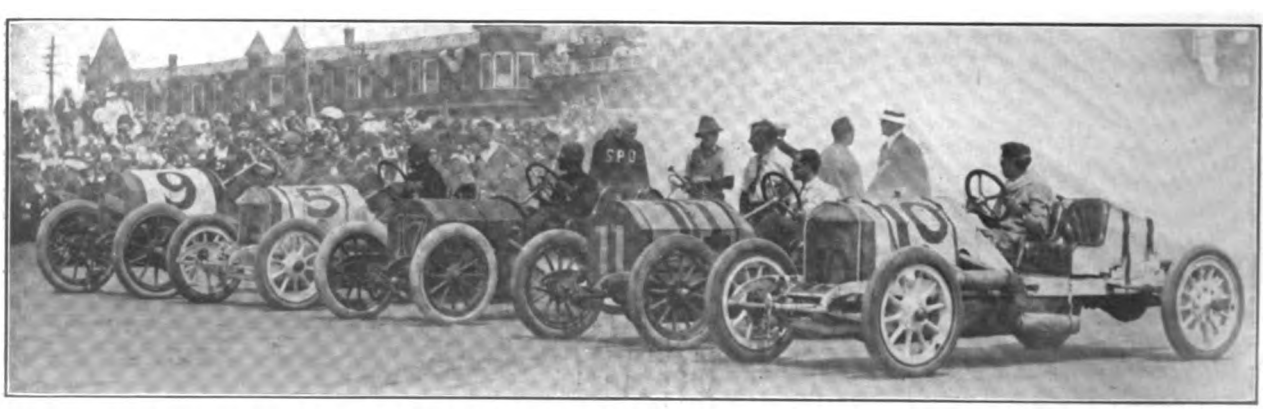
FRIDAY, JULY 5.

Ten Miles, 300 Inches.

E-M-F,	Burke	5:49.5
Mercer,	J. De Palma	5:57.1
S. P. O.,	Plimpton	6:16.5

Five Miles, Free-for-All.

Simplex,	Disbrow	4:39.1
Stutz,	Lewis	4:40.0
Fiat,	Matson	4:42.0



Start of the 50-Mile Event the Second Day, Won by Alfred Hummell in Mercer 11, the Second Car in Line.

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STUTZ

WHY does the Stutz go on winning in practically every race it enters?

WHY is it that when the Stutz enters a race the highest priced cars in the world have to look to their laurels?

WHY the consistency of the Stutz?

WHY is it that the Stutz factory runs full capacity all the year round?

WHY are the motor wise looking on the Stutz with such favor and endorsing it in the most unqualified terms of praise?

There is but one answer:---BECAUSE THE STUTZ IS REALLY A GOOD CAR.

In the one year of its existence, the Stutz has been a consistent winner in almost every race in which it has been entered. The first Stutz ever built was constructed from the blue prints up in five weeks and went through the first 500-mile race without a single mechanical adjustment. Successive Stutz cars have not departed from the construction of this first Stutz radically.

In the last 500-mile race the Stutz finished 4th and 6th. The 3rd Stutz entry was running beautifully when a blown tire threw it off the track. Neither of the three entries suffered any mechanical difficulties. The extreme smallness of the cars, as compared with some of the entries made their showing nothing short of spectacular. Note that the Stutz also won—

Bakersfield, Calif., February 22nd, 1912—Bakersfield Road Race, Lakeview Trophy Cup, Taft Cup.
San Jose, Calif., March 17th, 1912—Five-Mile Match Race Free-for-All.
Santa Monica, Calif., May 4th, 1912—Stutz finished 4th and 5th.
San Francisco, Calif., May 16th, 1912—Broke Sacramento to Folsom record.
San Francisco, Calif., May 21st, 1912—Broke Sacramento-Stockton round trip record.
Sacramento, Calif., June 2nd, 1912—Stutz won everything in two-days' track meet.
Salem, N. H., June 8th, 1912—Fifty-Mile race at Rockingham Park, N. H.
Old Orchard, Maine, July 4th, 1912—One Hundred-Mile Race.
Tacoma, Wash., July 5th, 1912—One Hundred-Fifty-Mile Class Race.
Old Orchard, Maine, July 6th, 1912—One Hundred-Mile Free-for-All.

You will never want a car that will go 500 miles at a sustained terrific speed, but it is a great satisfaction to know that you have a car which could endure the test if it had to.

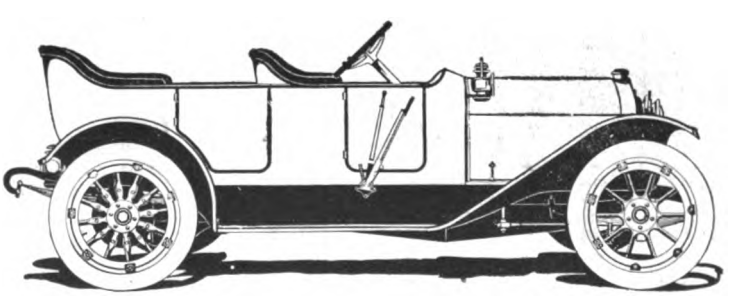
And the Stutz sells for the reasonable price of $2,000. See our nearest dealer for a demonstration.

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Manufacturers of Stutz Cars

INDIANAPOLIS, INDIANA

DEALERS:—The Stutz comes to you all ready to run—no additional final assembly required. Furthermore, the Stutz stands up and doesn't eat up all your profit in service. This is why Stutz Dealers are making money. Write or wire us.



Five-Passenger Stutz Touring Car, $2000.00

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Fifty Miles, 300 Inches.

Mercer, Hummell	54:10.5
Case, J. Nikrent	55:45.0
S. P. O., Plimpton	1:07:10.7

Five Miles, 301-450 Inches.

National, Rutherford	4:32.3
Stutz, Lewis	4:43.1
National, Whalen	4:47.1

One Hundred Miles, Over 300 Inches.

Schacht, W. Endicott	1:36:41.0
National, Rutherford	1:36:50.1
National, Whalen	1:40:05:1
Berkshire, Grant	.....

One Mile, Time Trials.

Jay Eye See, Disbrow	0:39.1

SATURDAY, JULY 6.

Ten Miles, 231-300 Inches.

Case, J. Nikrent	9:54.0
Mercer, J. De Palma	9:59.9
Lexington, Esleek	12:13.0

Five Miles, Time Trials.

Simplex, Disbrow	4:04.5

Twenty-Five Miles, 300 Inches.

Case, J. Nikrent	25:29.1
Mercer, Hummell	25:37.1
E-M-F, Burke	27:10.8

Ten Miles, Free-for-All.

Simplex, Disbrow	8:53.0
Bianchi, Basle	9:32.1
National, Whalen	9:40.1

One Hundred Miles, 301-450 Inches.

Stutz, Lewis	1:32:43.6
Schacht, W. Endicott	1:36:09.0
Jackson, Cobe	1:50:11.5
Berkshire, Grant	.....

"FAST LIMITED" AUTOSUIT.

The driver or the man who cares for his own car no doubt has had such experience as will cause him to appreciate any form of practical protection for his clothing while working about his machine, and because of the possibility of being compelled to make a repair or adjustment at any time, either on the road or in the garage, it is desirable for every man who tours to provide what will adequately shield his garments from soil. The old dust coat may be used, but every motorist knows the annoyance of the loose sleeves and skirt of the duster, which will either work up the arms or catch on the mechanism and expose the cuffs and coat sleeves, or will not effectually prevent the trousers coming in contact with dusty or oily parts. If it is necessary to work under the car the coat is in every way insufficient, and the overall and jumper will always separate at the waist when the wearer is writhing about on his back and cause his clothing to soil from the road dust or the garage floor.

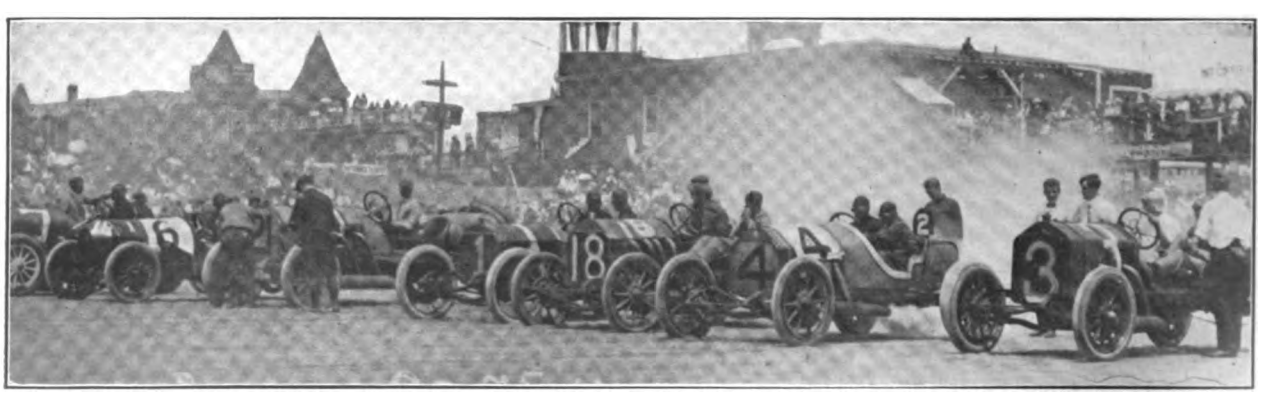
The "Fast Limited" autosuit, made by the Detroit Overall Company, Detroit, is a one-piece garment of heavy pin check denim that may be slipped on over a suit and buttoned snugly, so that the motorist is protected fully, no matter what may be the work. It is closed tightly at the collar and wrists, and being of light weight, makes for decided comfort. There are four pockets in which tools may be carried. It is made with the deep continuous side and relieves the shoulders from the strain of the suspenders and in any position it is a complete protection. When it becomes soiled it may be washed and will be restored to its original appearance. It may be rolled and carried in any convenient place.



The "Fast Limited" Autosuit.

DEATH OF A. W. HARRIS.

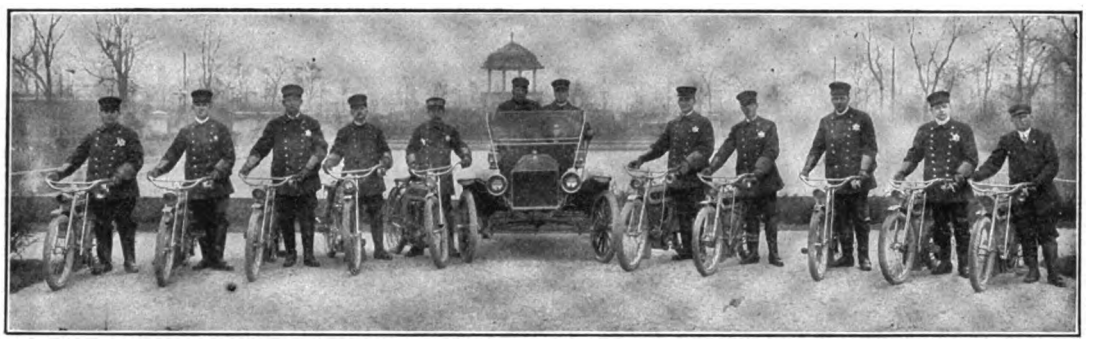
The industry will be deeply grieved to learn of the death of A. Walter Harris, head of the A. W. Harris Oil Company, Providence, R. I., in that city, June 30. Mr. Harris may be regarded as one of the pioneer oil men of the industry; in fact, the A. W. Harris Oil Company was organized some 28 years ago and was engaged in the production of cylinder oils for steam engines and other purposes long before the practicability of the automobile was considered as established. It may be added that the business of the concern will be continued as in the past, Mr. Harris' associates assuming the burdens laid down by him.



Line-Up for the 100-Mile Race, the Last Event of the Meet, in Which David Lewis Drove the Stutz for Its Second Big Victory.

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Police Captains Don't Guess!



Capt. Stiles and ten of his men.

They Know Their Speed and Yours!

Police Departments make it their business to use Speedometers that are absolutely and unerringly accurate---instruments capable of giving real testimony in Court. We reproduce herewith an unsolicited letter from Captain Stiles of the Chicago Police. We offer this as additional and undeniable evidence regarding the absolute accuracy of the JONES.

WEST CHICAGO PARK COMMISSIONERS.
Department of Police.
A. J. Stiles, Captain.

Chicago, June 21, 1912.

Jones Speedometer, Chicago, Ill.

Gentlemen: It is with great satisfaction that I have at last found a Speedometer that has proven under all kinds of tests to be almost absolutely perfect. I have tried all other Speedometers and was compelled to discard them as they would not stand a test for accuracy, or, in other words, were merely a guess. In using the Jones Speedometers in my Department, I can conscientiously say that we have found no condition and under no circumstances the Jones Speedometer to be wrong.

Inasmuch as we are making a great many arrests for the violation of the State Vehicle Law, and with a disposition to be fair, I say again that it was a great consolation that we have found a Speedometer that we can depend upon. These Speedometers I test every day under a Stop-watch and with a very few exceptions they are always accurate.

Yours very truly, ARTHUR J. STILES, Captain.
West Park. Police Dept.

Avoid unwarranted arrest for speeding by using the same Speedometer as the Police. Your testimony will then be as unimpeachable as theirs. You take no chances. The JONES is constructed on the principle of centrifugal force. It is unimpervious to temperature changes. Remember:---The Police in all the larger cities of America and Europe USE THE JONES. Better get in line. Ask your dealer and get your JONES today!

THE JONES SPEEDOMETER

Factory: NEW ROCHELLE, N. Y.

Chicago, Boston, Philadelphia, San Francisco, Buffalo, Los Angeles, Portland, Seattle, Detroit.

When Writing Advertisers, Please Mention The Automobile Journal.

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ALFRED N. MAYO DEAD.

Alfred Nye Mayo, one of the prominent figures in the automobile industry for a number of years, and treasurer of the Fisk Rubber Company, Chicopee Falls, Mass., died June 26. The loss is one which will be felt keenly, not only by the maker of Fisk tires, but by all those connected with the manufacture of cars and fittings. He was a man who made many friends and his advice on matters affecting the welfare of the industry was much sought after.

PHILADELPHIA'S TRUCK PARADE.

Five hundred and nine commercial vehicles were in line during the second annual motor truck parade in Philadelphia, under the auspices of the Philadelphia Inquirer last month. In 1911 there were something like 235 cars on view. This would seem to indicate that the use of the mechanical transport in the City of Brotherly Love was rapidly increasing.

Much credit is due the Philadelphia Inquirer for the successful outcome of its undertaking, in which it has aided the industry materially in bringing the practicability of the motor truck to the business people of the city. Five divisions were required to accommodate the entrants, these being divided as follows: First, cars of over 7000 pounds capacity; second, 4000-6900 pounds; third, 2100-3000; fourth, less than 2000; fifth, electrics. The parade occupied more than an hour in passing a given point.

ROCKINGHAM PARK PLANS.

The success which attended the opening automobile race meet at Rockingham Park, Salem, N. H., June 8, has made it evident that the people of New England and the East are interested in contests of this character and that they will support such events when conducted under proper management. In view of this situation plans are under way for another big meet scheduled for Oct. 12. A number of events will be staged, opportunity being given for both amateur and professional drivers to compete for substantial prizes. The chief award will be for the 50-mile race. Complete arrangements are in the hands of James F. Kerr, 67 Milk street, Boston, Mass., to whom all communications requesting information should be addressed. The entry blanks will be issued within the next two weeks, and further particulars will be announced shortly.

RESULTS AT TACOMA.

According to dispatches from Tacoma, Wash., Teddy Tetzlaff in his Fiat was a winner in two of three long distance road events held there July 5-6. Lee Cooper in a Stutz won the third. Ralph Mulford in a Knox appears to have made some exceptionally fast time during the 200-mile event, driving five miles in 3:55 at one period. It ought to be said in connection with the summary below, that four races of 100, 150, 200 and 250 miles, respectively, were scheduled to be run on these dates. The dispatches make no mention of the 100-mile event, and seem to have substituted a 500-mile race for that of 250 miles. No time is given in this contest, and the situation will need subsequent explanation. The results:



Philadelphia Inquirer's Commercial Vehicle Demonstration Coming Down Street in That City.

Medium Cars, 150 Miles.

Car	Driver	Time
Stutz,	Cooper	2:15:00
National,	Devore	.....
Pope-Hartford,	Rossi	.....

Heavy Cars, 200 Miles.

Fiat,	Tetzlaff	2:54:31
Knox,	Mulford	.....
National,	Devore	.....

Five Hundred Miles.

Fiat,	Tetzlaff	.....
Benz,	Bergdoll	.....
National,	Devore	.....
Fiat,	Verbeck	.....
Stutz,	Cooper	.....

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The NATIONAL STARTER

Securely Founded Upon Right Principles

OF ALL types of starters today on the market none is more simple and direct in its action than the **National.** Dependent upon no other source of energy than that derived from a simple pressure of the foot it is free from all the trouble connected with starters operating on the acetylene gas, electric, compressed air and spring principle. It is built on a trouble-proof, mechanical principle, the efficiency of which has been proved in actual test 100 per cent perfect.

In point of safety the **National** proffers to motorists not only all the security of starting from the seat, but also the insurance against the dangers which of necessity are connected with starters which operate on an explosive principle. You will never blow out a cylinder head or set your car on fire if your starter is a **National.**

Certainty of starting is the **NATIONAL** watchword—100 times out of 100 today, tomorrow, and 5 years from now. Its efficiency is flawless—100% perfect. It will start your car regardless of whether your gas tank is empty or full, your storage batteries fresh or exhausted. You don't have to tinker with a switch, a pump, a handle or a gas distributor *before* you start. One operation—that of simply pressing the dash pedal—is all sufficient to get any car under way at any time.

NATIONAL ECONOMY exhibits itself to the motorist by an absence of upkeep expense and repair bills. *There are no charges for gas or electricity.* It costs nothing to operate a **NATIONAL.** It never requires the services of a mechanic to make it work. It never necessitates having the motor decarbonized. ¶ No bills accumulate on these scores—you pay for your **NATIONAL** but *once.*

The Starter Complete, attached to car, $50.

WRITE FOR INFORMATION

Energetic Dealers Wanted Everywhere

The National Gas Engine Starter Co.

30-32 N. DEARBORN STREET, CHICAGO, ILL.

SIMPLICITY SAFETY CERTAINTY ECONOMY

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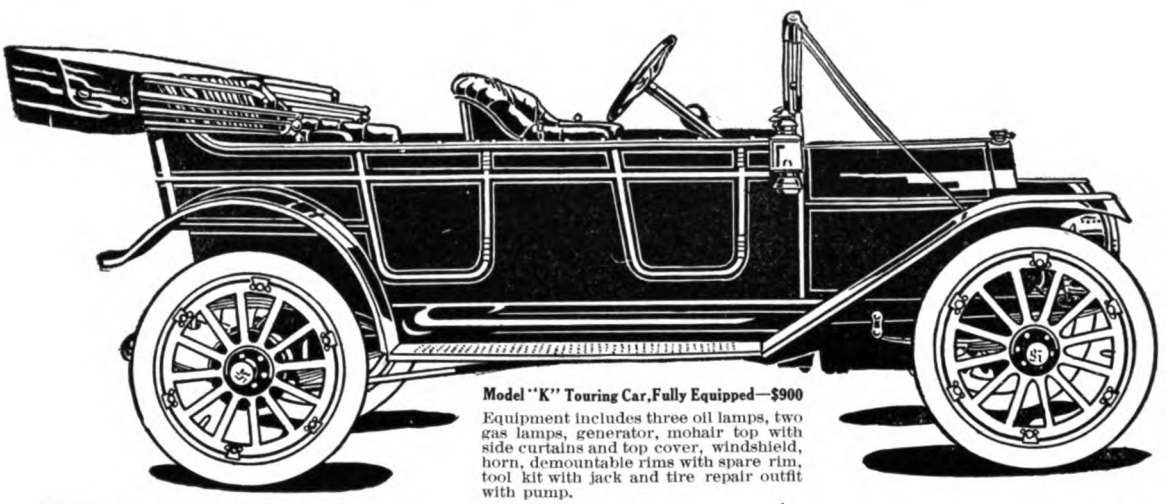
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K-R-I-T



Model "K" Touring Car, Fully Equipped—$900

Equipment includes three oil lamps, two gas lamps, generator, mohair top with side curtains and top cover, windshield, horn, demountable rims with spare rim, tool kit with jack and tire repair outfit with pump.

The K-r-i-t is always a new car

One of the main elements of the extraordinary K-r-i-t value is the fact that the K-r-i-t is always a new car.

We employ an efficient corps of engineers and designers to devise improvements and refinements.

We install these improvements and refinements as rapidly as our engineers develop them, instead of holding them back for introduction on the next year's model.

So the K-r-i-t owner, at the beginning of a so-called "new season," as at all other times, finds himself with a car in which the latest practical ideas have already been incorporated.

The K-r-i-t car—every K-r-i-t car—has been brought up to the current moment in the motor car industry.

We announce no sensational new model because every K-r-i-t car is new.

This policy is as old as the Krit Company.

We adopted it at the outset because we believe the buyer is entitled to the most modern in design, construction, or progress—no matter when he purchases his car.

Because of this policy we make no "new season" announcements; and will make none this year.

And because of this policy, the purchaser of any K-r-i-t, at any time, is assured of getting a car that embodies the latest and best in engineering practice and in design.

Where the K-r-i-t gets its extraordinary power, extreme durability and long life

The K-r-i-t's reputation for staunchness and extreme durability is not confined to a few isolated communities, as you probably have learned.

It is as wide as the nation; and the rougher the country, the more difficult the roads---the more firmly the K-r-i-t is established as the medium-priced car that has made good.

The chief of the reasons for this is, of course, the structural quality of the car.

But back of this, and overshadowing in importance every other consideration, lies the fact that every part essential to smooth running, long life, economy and comfort, is produced by and within the K-r-i-t organization.

In other words, the K-r-i-t at $900 is a manufactured car in a sense as binding and literal as the term implies when applied to the $4000 or $5000 car.

You see how this process of manufacturing, instead of buying parts ready-made and assembling them, saves money for the manufacturer.

And the saving, in this instance---in the shape of better materials, more careful workmanship, better operative qualities---goes into the K-r-i-t and makes it a vastly better value than the average $900 car.

We not only design the motor---we make it; cast the cylinders in one piece to give rigidity and preserve alignment; equip it with ball bearings and with connecting rod bearings 50 per cent larger than usual, to promote smooth running, silence and the greater development of power.

We make the clutch of multiple discs---a clutch that holds, and holds, and holds in sand and mud and on the hills; and yet starts the car as smoothly and easily as an electric glides away.

We make the transmission and rear axle, cut the gears from chrome nickel steel---the hardest and costliest metal known---and mount them on ball bearings.

We drop forge the front axle, thus assuring strength and stability in a most important member.

We make the transmission drive shaft of chrome vanadium steel, and specially heat-treat it for toughness and strength.

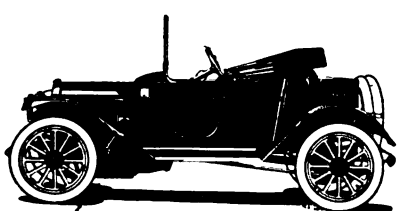
Turning to the factor of comfort, you find the touring car amply roomy for five grown persons---and equipped with full elliptic rear springs, another unusual feature for $900 to $1000 cars.

At almost every point throughout the K-r-i-t you encounter a value-fact that you have not found in other cars of the K-r-i-t price.

To be sure, you may succeed in getting one, or even several, of the K-r-i-t features in some other car of equal price.

But you can't get them all in any car save the K-r-i-t.

Confirm this by a visit to your nearest K-r-i-t dealer; or write for the catalog.



Model "KR" Roadster, Completely Equipped—$900

This car was introduced last January; and the demand which it immediately developed was so great that we are not yet abreast of our orders.

KRIT MOTOR CAR COMPANY

1302 Mount Elliott Avenue, DETROIT, MICH.

Dealers, please address **Geo. A. Crittenden,** Sales Manager.



Model "KD" Delivery Car, Completely Equipped—$900

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WANTED—General Manager who has demonstrated his ability and is in position to buy controlling interest in $50,000 motor truck business. This company has been manufacturing for over two years and is on a paying basis. The trucks are giving entire satisfaction. The present manager wishes to retire from the business. Address C, Automobile Journal Publishing Co., Pawtucket, R. I.

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If you could see your differential work you'd be mighty careful of its lubrication

IF we could see the actual workings of the human heart, we would swear off smoking and cut out heart weakening habits.

Not seeing, we make mistakes. But nature, the great compensator and adjuster counteracts our blunders.

If you could see the actual service working of the differential of your car, you'd be filled with wonder and alarm.

You'd never neglect its lubrication, or consciously use a poor lubricant.

Nature doesn't help a differential; it harms it in the guise of Friction.

Carelessly speaking, a differential is a conglomeration of cogs.

Carelessly considering, any oil or grease is a safe lubricant for a lot of cogs.

But accurately speaking, a differential represents the highest form of gear assembly with bevels, spurs and pinions, running on ball and roller bearings.

Its duty is severe—speed, load, direction, everything variable.

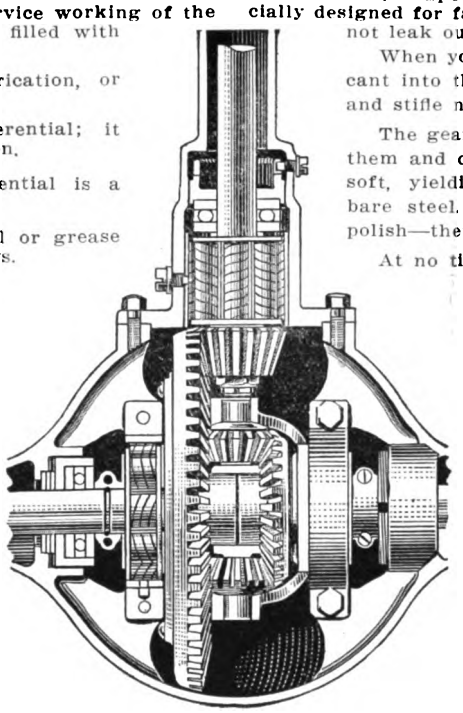
Each side of every tooth gets wear; the load is thrown on instantly, nine times out of ten from a standstill.

Perfect lubrication at any price is no extravagance in a differential.

It is a real economy to use the best lubricant you can buy.

Every tooth must be coated heavily with good bodied lubricant, not merely wet with oil or filmed with grease.

Keeping the teeth enveloped is only one duty of the lubricant; immersing the ball and roller bearings is another; remaining within the differential housing is another. The lubricant must not escape.



THE DIFFERENTIAL

Use "K-No. 000" Grade or "K-00 Special" Grade Non-Fluid Oil for your differential.

The K-No. 000 Grade is a fairly heavy bodied lubricant for use in differentials where the housing would allow a lighter lubricant to escape.

The K-No. 00 Special is a light bodied product especially designed for fairly oil tight housings. This will not leak out where ordinary oil would.

When you have put a supply of this lubricant into the housing, you snuff out friction and stifle noise.

The gear teeth pick it up and it clings to them and coats them. The gears mesh in a soft, yielding cushion—Steel never touches bare steel. The only wear is a slow oily polish—there is no rapid abrasion.

At no time, under hot weather conditions or hard steady drives, does Non-Fluid Oil melt. Nine grease lubricated differentials out of ten, leak, proving the melting of grease. All oil lubricated differentials leak. Often the lubricant follows the axle and makes its escape through the brake drums. The brakes slip, wheels are smeared and tires rot.

Non-Fluid Oil means a clean rear axle, and a perfectly lubricated differential. If you will inquire, you will find that worn out differential gears invariably accompany grease or oil lubrication.

With Non-Fluid Oil the differential outlasts the engine itself. Non-Fluid Oil is amazingly durable. The supply is depleted only by being actually rubbed out of existence by the gears.

The ball and roller bearings are kept bright and never become gum-bound as occurs with rancid grease. Pitting is impossible. Non-Fluid Oil is acidless.

If your gears show wear or make noise, or if your lubricant melts and leaks out, you had better alarm yourself into a trial of

All leading dealers handle Non-Fluid Oil. Ask your dealer, but insist upon the genuine.

TRADE MARK REGISTERED IN UNITED STATES PATENT OFFICE **NON-FLUID OIL**

In purchasing Non-Fluid Oil be sure the can is orange colored and bears this trade mark.

We are not talking of an expensive innovation. The actual yearly outlay for Non-Fluid Oil is less than for any other lubricant.

Post yourself further on the differential. And then post us a request for a free sample of either grade. Paste the attached coupon on a postal. Mention the grade you desire.

New York & New Jersey Lubricant Company

165 Broadway, New York

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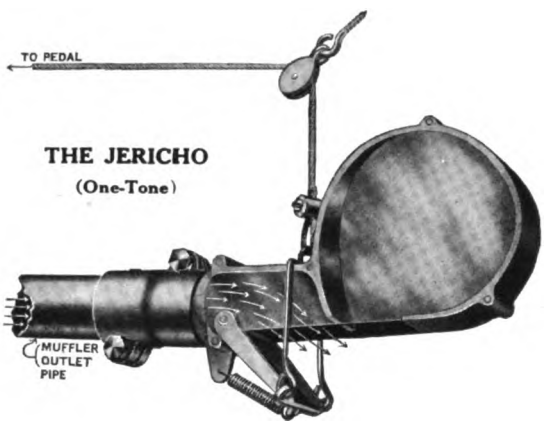
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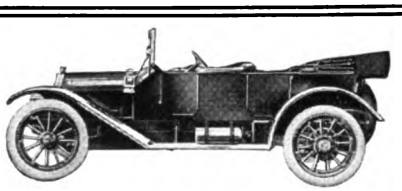
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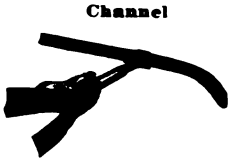


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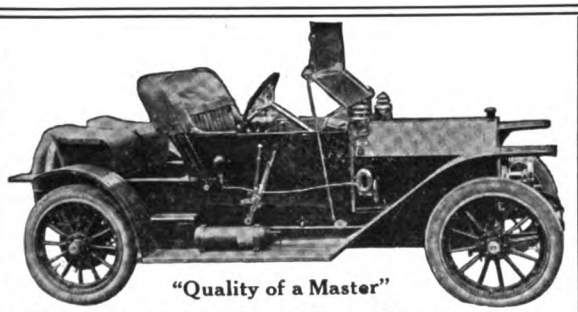


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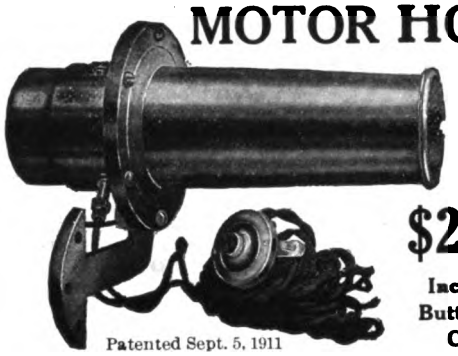
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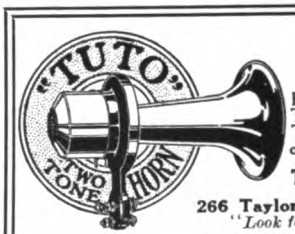
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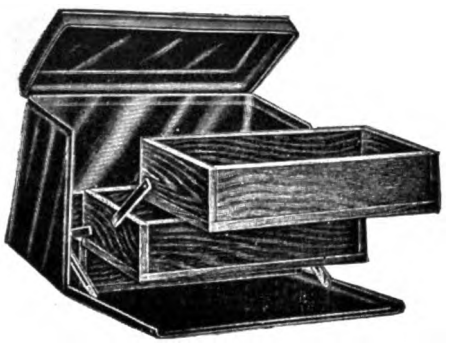
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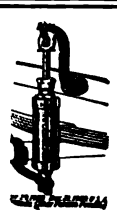
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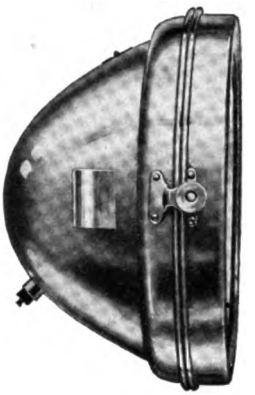
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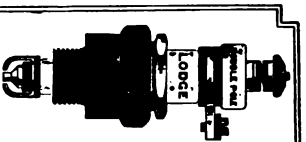
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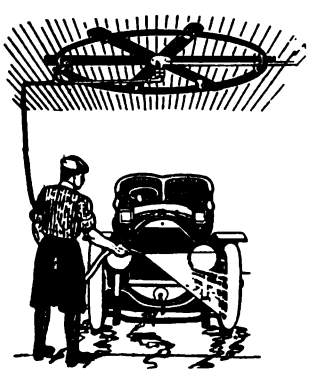
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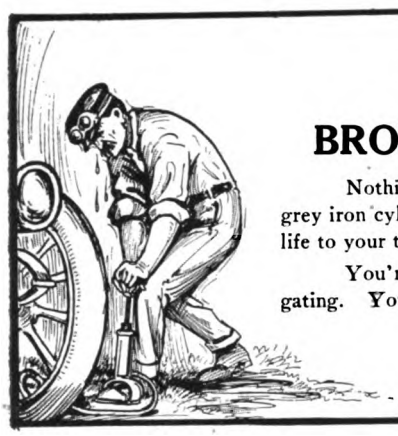
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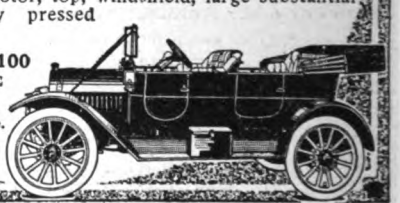
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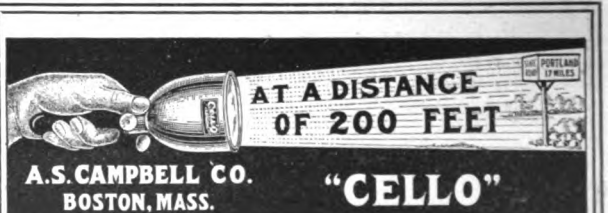
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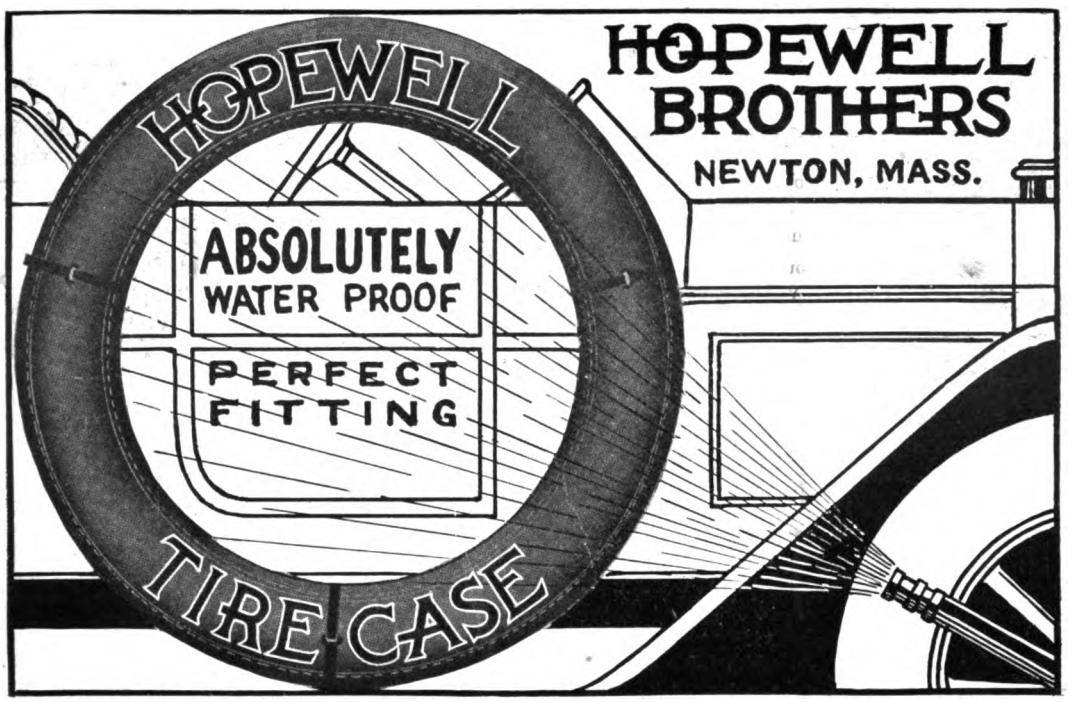
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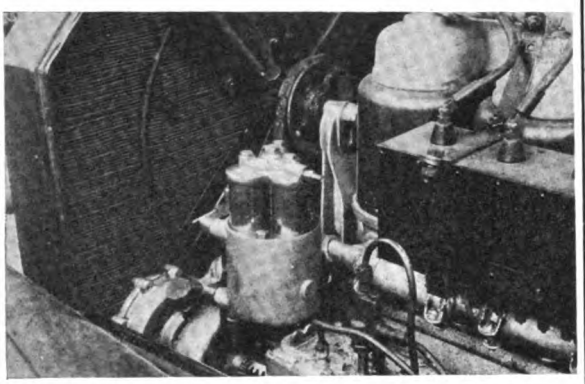
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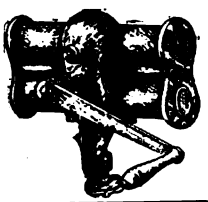
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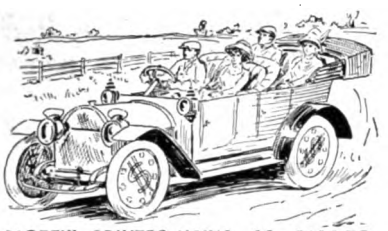
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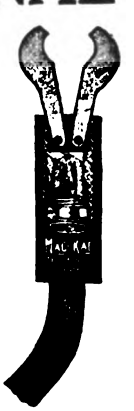
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Sampson Mfg. Co., Alden, 3 West 61st St., New York. (Sampson.)

Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)

United States Motor Co., 3 West 61st St., New York. (Sampson, Brush, Stoddard.)

Victor Motor Truck Co., 1010 Ontario St., Buffalo. (Victor.)

Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Anderson Electric Car Co., Detroit. (Anderson.)

Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York; 178 Devonshire St., Boston.

General Motors Truck Co., 1302 Jefferson Ave., East, Detroit. (G. M. C.)
Branches: See Cars—Gasoline Commercial.

General Vehicle Co., Long Island City, N. Y. (G. V.)

CARS—FIRE, POLICE AND MUNICIPAL SERVICE.

Atlas Motor Car Co., 104 Birnie Ave., Springfield, Mass. (Atlas.)
Branches: See Cars—Gasoline Pleasure.

Cartercar Co., Pontiac, Mich. (Cartercar.)

Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: See Cars—Electric Commercial.

Knox Automobile Co., Springfield, Mass. (Knox.)

Sampson Mfg. Co., Alden, 3 West 61st St., New York. (Sampson.)

United States Motor Co., 3 West 61st St., New York. (Sampson.)

Victor Motor Truck Co., 1010 Ontario St., Buffalo. (Victor.)

White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.

Willys-Overland Co., Toledo, O. (Overland.)

CEMENT, RUBBER.

Liberty Rubber Co., Orange, N. J. (Liberty Patching.)

CHAINS, TIRE AND ANTI-SKIDDING DEVICES.

Leather Tire Goods Co., Suspension Bridge Sta., Niagara Falls, N. Y. (Woodworth Treads, Kant-Skids.)

Weed Chain Tire Grip Co., 28 Moore St., New York. (Weed.)

CHAINS—TRANSMISSION OR DRIVING.

Miller, Chas. E., 97-103 Reade St., New York. (Brampton.)
Branches: See Accessory Manufacturers and Jobbers.)

CLOCKS FOR DASHBOARDS, ETC.

Boston Clock Co., 16 State St., Boston.
Chelsea Clock Co., 16 State St., Boston.

CLUTCHES—AUTOMOBILE FRICTION.

Bretz Co., J. S., 250 W. 54th St., New York. (Hartford cone.)

COILS.

Heinze Electric Co., Lowell, Mass.

CRANES AND HOISTS.

Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.

Prest-O-Lite Company (Prest-O-Carbon Remover.)
Branches: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Omaha, Philadelphia, Pittsburg, Providence, San Francisco, Seattle, St. Louis and St. Paul.

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

GAUGES.

Goodnow Manufacturing Co., 754 Old South Bldg., Boston. (Gasoline Gallon.)

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
Branches: In all principal cities.

GUNS, GREASE. (See Oil Pumps.)

HOISTS. (See Cranes.)

HORNS.

Automobile Supply Manufacturing Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)

Dean Electric Co., Elyria, O. (Tuto.)

Randall-Faichney Co., Boston. (Jericho, Jubilee.)

JACKS AND LIFTING DEVICES.

Canton Foundry & Machine Co., Canton, O. (Universal Combination Auto Jack and Emergency Truck.)

Hartford Suspension Co., 146 Bay St., Jersey City.
Branches: 1700 Broadway, 212-214 W. 88th St., New York; 325 Columbus Ave., Boston; 1437 Vine St., Philadelphia; 1458 Michigan Ave., Chicago; 289 Halsey St., Newark, N. J.; Ocean and Third Aves., Asbury Park, N. J.; Bretton Woods Garage, Bretton Woods, N. H.; 1524 Grand Ave., Kansas City, Mo.; 801 Woodward Ave., Detroit.

LAMP COVERS.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LAMPS—HEAD, TAIL AND SIDE.

Gray & Davis, 55 Lansdowne St., Boston. Bridgeport, Conn. (Old Sol.)

Hawthorne Manufacturing Co., 29 Spruce St.,

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

LIGHTING SYSTEMS, ELECTRIC.

Dean Electric Co., Elyria, O. (Dynalux.)

Geiszler Bros. Storage Battery Co., 514-520 W. 57th St., New York.

Gray & Davis, 55 Lansdowne St., Boston.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland.

Remy Electric Co., Anderson, Ind. (Remy.)

Sager Co., J. H., 271 South Ave., Rochester, N. Y.

LOCK SWITCHES. (See Switches.)

LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York. (Colonial.)
Branches: Boston, Fall River, Philadelphia.

Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)

Eagle Oil & Supply Co., 104 Broad St., Boston. (Eagleine No-Karbon.)

Fiske Bros. Refining Co., New York. (Lubroleine.)
Branch: Pittsburg, Penn.

Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.

Havoline Oil Co., 17 Battery Place, New York. (Havoline.)
Branches: Pacific Coast—Kohl Bldg., San Francisco; Western—People's Gas Bldg., Chicago; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O.; Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.

Hawes, Geo. A., 77 Pine St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.

Kellom & Co., Chas. F., 113 Arch St., Philadelphia. (Invader.)
Branch: 284 Columbus Ave., Boston.

Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York Lubricating Oil Co., 116 Broad St., New York. (Monogram.)
Branches: 126 Massachusetts Ave., Boston; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia; 1436 Michigan Ave., Chicago; 1111 Superior Ave., N. W., Cleveland; 435 Turk St., San Francisco; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle, Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.

New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York. (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 605 Brown Bros. Bldg., Philadelphia; 154 Exchange St., Bangor, Me., 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.

Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.

Bretz Co., J. S., 250 W. 54th St., New York. (U. & H.)

Kimball Manufacturing Co., Motor Mart, Boston. (Mea.)

K-W Ignition Co., 2829 Chester Ave., Cleveland.

Marburg Bros., 1786 Broadway, New York. (Mea.)

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Remy Electric Co., Anderson, Ind. (Remy.)
Splitdorf Electrical Co., Walton Ave., and 138th St., New York.
Branches: 1679 Broadway, New York; 1110 S. Michigan Ave., Chicago; Motor Mart, Boston; 430-36 Van Ness Ave., San Francisco; 368 Woodward Ave., Detroit; 1226 S. Olive St., Los Angeles, Cal.

MATS.

Sidwell Pedal Mat Co., 245 Columbus Ave., Boston. (Pedal.)

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Simplex.)

MIXING DEVICES, GASOLINE.

Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)
Liberty Rubber Co., Orange, N. J. (Motorcycle Rubber-Mend.)
Swenson, B. A., 298 Blackstone St., Providence. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Hazard Motor Manufacturing Co., 785 Coates St., Rochester, N. Y. (Hazard.)
Western Motor Co., Marion, Ind. (Rutenber.)

PATCHES.

Liberty Rubber Co., Orange, N. J. (Cementless.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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Randall-Faichney Co., Boston. (B-Line.)

PUMPS, TIRE.

Brown Co., The, Syracuse, N. Y. (Brown Impulse.)
Clarke Pump Co., 1489 Washington St., W. Newton, Mass. (Crown.)
Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demontachable.)
Branches: New York, Chicago, San Francisco.

RIM REMOVERS.

Wm. L. Tobey, 20 Lewis St., East Boston, Mass. (Q. D.)

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)
Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (L B A.)
Branches: 136 West 52nd St., New York; 1191 Woodward Ave., Detroit; 436 South Dearborn St., Chicago.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston. (Acme.)
Boyd, F. Shirley, 903 Boylston St., Boston.
Hartford Suspension Co., 146 Bay St., Jersey City. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.
"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")
Branches: 218 W. 84th St., New York; 222 Elliot St., Boston; Teck Building, Buffalo; 10 W. Eager St., Baltimore; 41 Dexter St., Pawtucket, R. I.
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1841 Broadway, New York; 55 Boylston St., Boston. (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Frontier Specialty Co., 734 Main St., Buffalo. (All-In-One.)
Hardy Co., R. E., 1134 Austin Ave., Chicago. (Sta-Rite.)
Janney, Steinmetz & Co., Philadelphia.
Kimball Manufacturing Co., Motor Mart, Boston. (Lodge Double-Pole.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Progressive Manufacturing Co., The, Torrington, Conn. (Black Eagle.)
Splitdorf Electrical Co., Walton Ave. and 138th St., New York.
Branches: See Magnetos and Magneto Supplies.

SPARK PLUG TERMINALS.

Randall-Faichney Co., Boston. (Mac-Kae Universal.)

SPEEDOMETERS.

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1480 Michigan Ave., Chicago; 852 Main St., Buffalo; 41 Washington Boulevard, Detroit; 544 Van Ness Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 829 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Stewart & Clark Manufacturing Co., 1828 Diversey Boulevard, Chicago. (Stewart.)
Branches: 1312 Michigan Ave., Chicago; 238 West 58th St., New York; 1211 Woodward Ave., Detroit; 307 Golden Gate Ave., San Francisco; 1212 South Main St., Los Angeles, Cal.; 608 North Broad St., Philadelphia; 514 North Capitol Ave., Indianapolis; 1825 Grand Ave., Kansas City; 45 South 10th St., Minneapolis; 1849 Euclid Ave., Cleveland.
Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.

TANKS; TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIMERS AND SPARK COMMUTATORS.

K-W Ignition Co., The, 2829 Chester Ave., Cleveland. (Master Vibrator.)

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TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.
Leather Tire Goods Co., Suspension Bridge Station, Niagara Falls, N. Y. (Woodworth treads, repair boots and emergency stops.)
Liberty Rubber Co., Orange, N. J. (Treadmend and Everstick.)
Page-Lester Co., 129 W. Van Buren St., Chicago. (Tire-Wad Rubber Putty.)
Tingley, C. O., & Co., Rahway, N. J. (C. O. T. Tire Solder.)

TIRE REPAIR OUTFITS.

Liberty Rubber Co., Orange, N. J. (Men-Do and Rubber-Mend.)

TIRES—CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston; 1781 Michigan Ave., Chicago; 905 First Ave., South, Minneapolis; 1529 Cleveland Place, Denver; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco; 917 E. Pike St., Seattle; 316 North Broad St., Philadelphia; 1197 Broadway, New York; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit; 1616 Grand Ave., Kansas City.
Diamond Rubber Co., Akron, O. (Diamond.)
Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston; 1305 Michigan Ave., Chicago; 842 Woodward Ave., Detroit; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York; 148 Chambers St., New York; 322 North Broad St., Philadelphia.
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 171½ Dorrance St., Providence.
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Shawmut Tire Co., 97 Bedford St., Boston.
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Philadelphia, Chicago, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tires—Casings and Inner Tubes.
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS. (See Cars, Commercial.)

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Manufacturing Co., 1756 Cranston St., Providence.

TURNTABLES.

Canton Foundry & Machine Co., Canton, O. (Universal.)
Lansing Co., formerly Lansing Wheelbarrow Co., Lansing, Mich.
Branches: Factory, Parkin, Ark.; 78 Cambridge St., Boston; Chicago, New York, Kansas City, Philadelphia, San Francisco, Minneapolis, St. Paul.
Portland Garage, Portland, Me., (Portland.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 250 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Williams Foundry & Machine Co., Akron, O.

WASHING DEVICES.

Perfect Manufacturing Co., Albany, N. Y.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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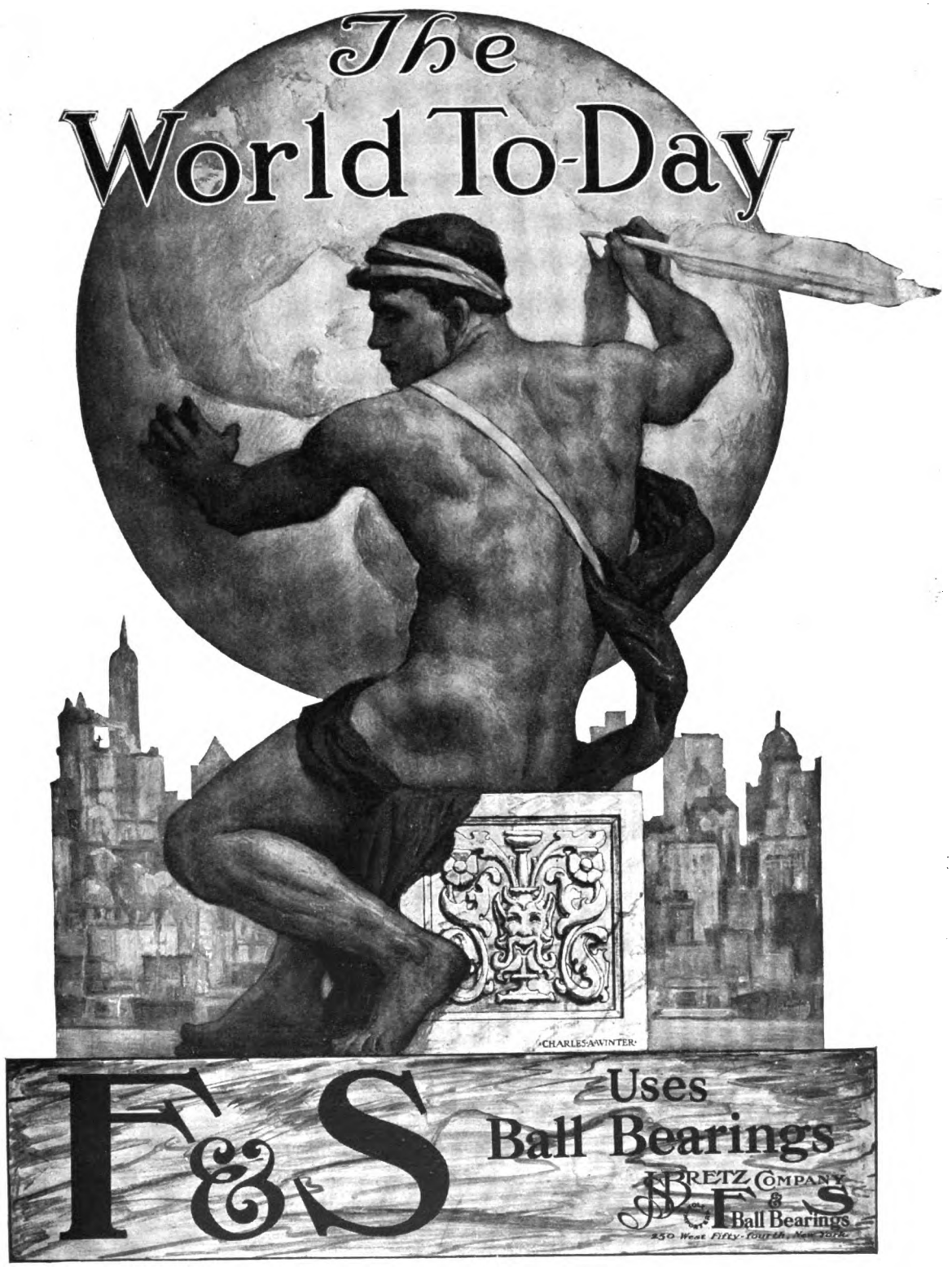
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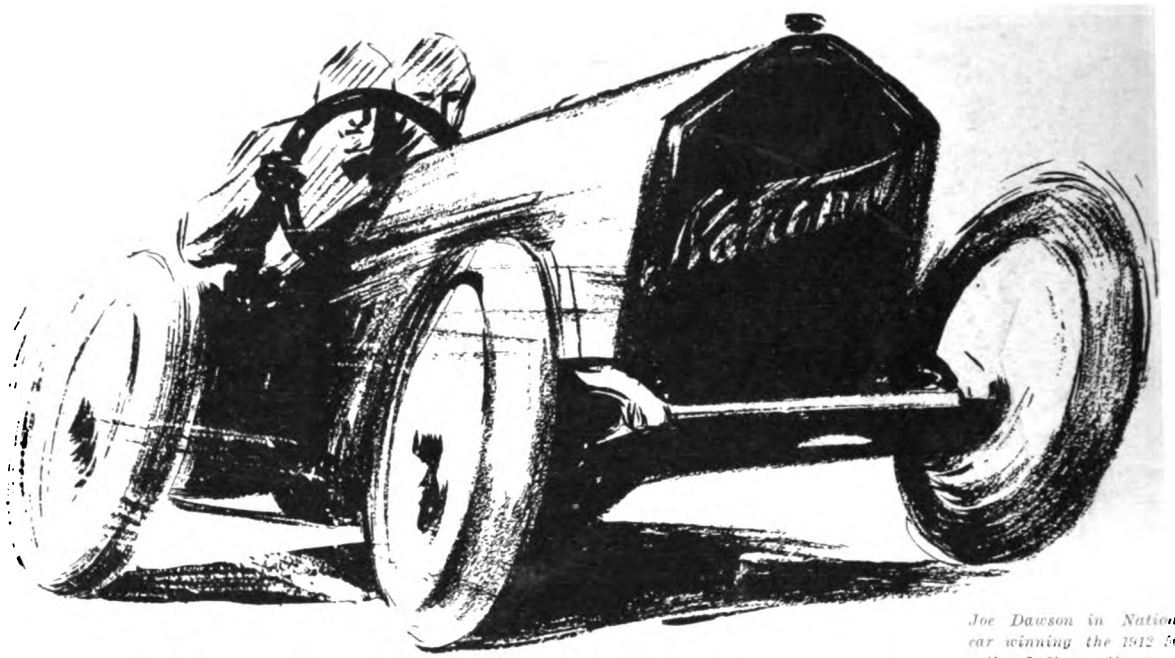
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Joe Dawson in National car winning the 1912 500-mile Indianapolis Speedway Race.

Indianapolis 500-mile Race for the second successive year a victory for the

Truffault-Hartford

SHOCK ABSORBER

Joe Dawson, in a National car equipped with Truffault-Hartford Shock Absorbers, finished first in the 1912 500-mile Indianapolis race in competition with the world's best cars and drivers. With this equipment only was it possible to maintain the tremendous speed-average of over 78 miles an hour.

It is significant that the first nine cars finishing were Truffault-Hartford equipped.

	Car	*Driver*	*Time*	*Shock Absorber*		*Car*	*Driver*	*Time*	*Shock Absorber*
1	National	Dawson	6:21:06	Hartford	5	Schacht	Endicott	6:46:28	Hartford
2	Fiat	Tetzlaff	6:31:29	Hartford	6	Stutz	Zengel	6:50:28	Hartford
3	Mercer	Hughes	6:34:56	Hartford	7	White	Jenkins	6:52:38	Hartford
4	Stutz	Merz	6:36:35	Hartford	8	Lozier	Horan	6:59:37	Hartford
					9	National	Wilcox	7:11:30	Hartford

The winning National, "Joe" Dawson up, made an average of 78.72 miles per hour for the 500 miles of the race.

The use of the Truffault-Hartford permits of maximum speed with minimum danger—a fact that explains its use by all of the leading professional drivers. It eliminates jolt, jar and vibration, saving car from excessive wear, tear and racking; is insurance against spring breakage; eases the strain on the tires by keeping them on the ground.

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VOL. XXXIII. No 12

AUTOMOBILE JOURNAL

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PAWTUCKET. R. I.

July 25, 1912

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Overland

WE want every prospective purchaser of an automobile to know that the Overland Model 60 costs $1200.

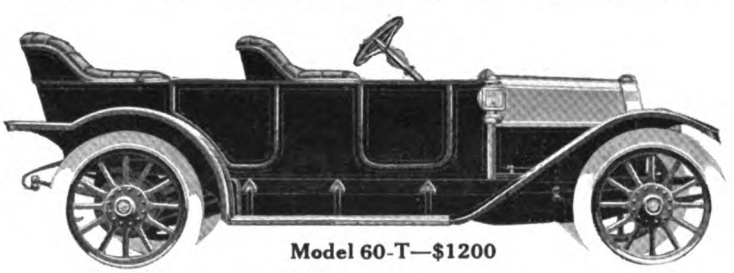
To sell you a Model 60 we want you to know the price first. We do not base our arguments on worthless special selling points in the manner of some manufacturers. Others will tell you of a thousand special features first of all. You may even have to ask the price.

You can get more automobile satisfaction for $1200 in an Overland Model 60 than for $1500 in any other line. That is why, when you come to inspect this car, we tell you the price first. Its merit is then self-evident.

The Overland Model 60 will never be equaled in low price until there is a duplication of the mammoth Willys-Overland production methods.

Ask for book K-47.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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COES

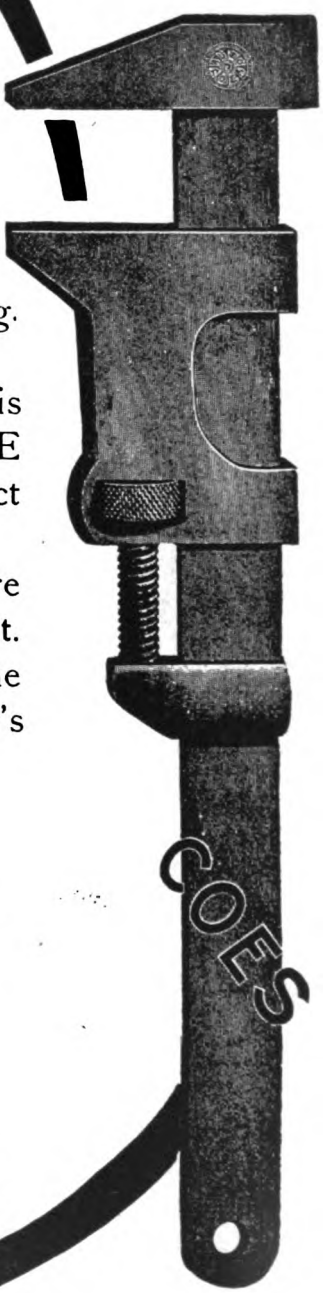
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.



Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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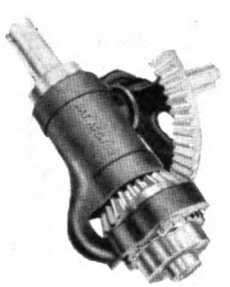
A Perfect Starter at Last!

Energetic Dealers Wanted

A rare business opportunity. Live dealers throughout the entire world wanted to represent us and to install the National Starter

The First Perfect Mechanical Starter

It has always been said that if a *perfect* starter could be built—a *dependable* starter—one that would start the engine from the seat and forever do away with dangerous cranking—that such a starter would revolutionize motoring—that it would add the final touch of perfection to the automobile,—and now, after years of experimenting, comes the first *perfect* mechanical engine starter—the NATIONAL STARTER—the *only* starter that is actually 100 per cent. efficient.



Works *every* time.

No batteries—no tanks—no wiring—no piping—no springs. Nothing but simple ball-bearing gearing.

Dealers in automobiles and accessories, and garage owners will instantly recognize the tremendous business possibilities of this new starter.

The Principle of the National

The National is built on a patented principle.

It is purely mechanical.

A simple pressure of the foot and the engine turns over—just like cranking.

The powerful leverage which is obtained through gear reduction turns the engine over easily—*so easily that you can start on the magneto just as readily as on the batteries.*

The National works equally well in hot or cold weather. It is *not* dependent upon acetylene gas, compressed air, gasoline, electricity or springs. It develops its entire energy through the slight pressure of your foot on the dash pedal—like a clutch. In case of back-fire the National automatically disengages.

We have subjected the National to the severest tests. We have tried it out in all sorts of weather and on all sorts of cars. We made it *prove* its merits.

And now we back every National with an ironclad guarantee for one year.

Easy to Install—Easy to Operate

The National can be installed on any car in about two hours' time. It is fastened to the front of the car in place of the crank. Total weight is about 15 pounds.

A ten year old child can operate the National easily. One pressure of the foot—the crank shaft turns—the engine starts. Just a simple mechanical operation.

A Big Business Proposition

The tremendous demand for a *perfect* starter makes the selling end of the National only a matter of proving its merits. *Thousands and thousands* of car owners will install the National as soon as they see it.

They'll want the advantages of the National for themselves as well as to enable the women-folks to drive.

You see the field is practically boundless.

Big business men consider this a big enough proposition to *open up special demonstrating salesrooms for the exclusive sale of the National.*

They realize the wonderful possibilities of the National.

The retail price of the National is $50.00 *completely installed.* Figure out approximately the number of cars in your territory and you will have an idea as to how broad a proposition this is.

Applications for Agencies Now Being Received

Already we have received thousands of applications for National agencies. We are literally *swamped* with requests. South America, England, Germany, France—energetic dealers in all these countries have applied for National agencies as well as thousands of American business men. But we are prepared to meet the tremendous demand.

We have practically unlimited manufacturing and financial resources.

Agencies for the National Starter are now being allotted. Applications will be handled in the order in which they are received.

Wire us, and come to Chicago if you can—let us show you just how the National is built—let us tell you in a personal interview the tremendous business possibilities of this proposition.

If you cannot come, write us. Full information and large descriptive circular can be had by signing and mailing the coupon.

THE NATIONAL STARTER
TRADE MARK

THE NATIONAL GAS ENGINE STARTER CO.
Dept. 553 B, 30-32 N. Dearborn St., CHICAGO, U. S. A.

Car Owners: *Write us for literature and name of nearest "National" dealer.*

Manufacturers: *Write us for literature and our offer to install the National as standard equipment.*

Coupon for Free Information.

The National Gas Engine Starter Co.,
Dept. 553 B, 30-32 N. Dearborn St., Chicago.

Gentlemen:
Please send me full particulars regarding a National Agency.

Name .....

Address .....

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If you could see your differential work you'd be mighty careful of its lubrication

IF we could see the actual workings of the human heart, we would swear off smoking and cut out heart weakening habits.

Not seeing, we make mistakes. But nature, the great compensator and adjuster counteracts our blunders.

If you could see the actual service working of the differential of your car, you'd be filled with wonder and alarm.

You'd never neglect its lubrication, or consciously use a poor lubricant.

Nature doesn't help a differential; it harms it in the guise of Friction.

Carelessly speaking, a differential is a conglomeration of cogs.

Carelessly considering, any oil or grease is a safe lubricant for a lot of cogs.

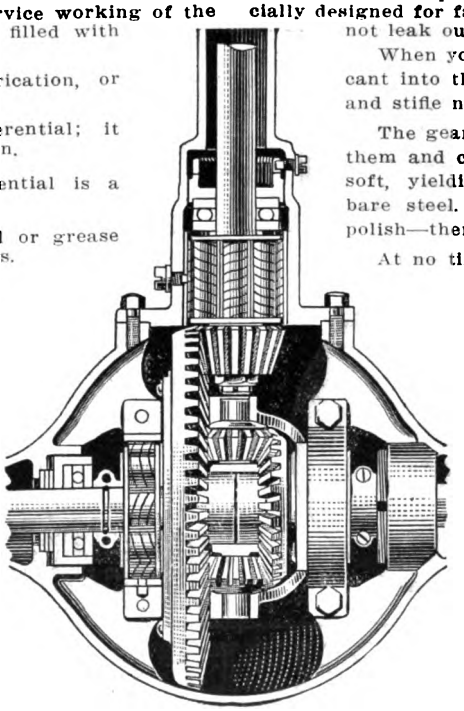
But accurately speaking, a differential represents the highest form of gear assembly with bevels, spurs and pinions, running on ball and roller bearings.

Its duty is severe—speed, load, direction, everything variable.

Each side of every tooth gets wear; the load is thrown on instantly, nine times out of ten from a standstill.

Perfect lubrication at any price is no extravagance in a differential.

It is a real economy to use the best lubricant you can buy.



THE DIFFERENTIAL

Every tooth must be coated heavily with good bodied lubricant, not merely wet with oil or filmed with grease.

Keeping the teeth enveloped is only one duty of the lubricant; immersing the ball and roller bearings is another; remaining within the differential housing is another. The lubricant must not escape.

Use "K-No. 000" Grade or "K-00 Special" Grade Non-Fluid Oil for your differential.

The K-No. 000 Grade is a fairly heavy bodied lubricant for use in differentials where the housing would allow a lighter lubricant to escape.

The K-No. 00 Special is a light bodied product especially designed for fairly oil tight housings. This will not leak out where ordinary oil would.

When you have put a supply of this lubricant into the housing, you snuff out friction and stifle noise.

The gear teeth pick it up and it clings to them and coats them. The gears mesh in a soft, yielding cushion—Steel never touches bare steel. The only wear is a slow oily polish—there is no rapid abrasion.

At no time, under hot weather conditions or hard steady drives, does Non-Fluid Oil melt. Nine grease lubricated differentials out of ten, leak, proving the melting of grease. All oil lubricated differentials leak. Often the lubricant follows the axle and makes its escape through the brake drums. The brakes slip, wheels are smeared and tires rot.

Non-Fluid Oil means a clean rear axle, and a perfectly lubricated differential. If you will inquire, you will find that worn out differential gears invariably accompany grease or oil lubrication.

With Non-Fluid Oil the differential outlasts the engine itself. Non-Fluid Oil is amazingly durable. The supply is depleted only by being actually rubbed out of existence by the gears.

The ball and roller bearings are kept bright and never become gum-bound as occurs with rancid grease. Pitting is impossible. Non-Fluid Oil is acidless.

If your gears show wear or make noise, or if your lubricant melts and leaks out, you had better alarm yourself into a trial of

All leading dealers handle Non-Fluid Oil. Ask your dealer, but insist upon the genuine.

TRADE MARK NON-FLUID OIL REGISTERED IN UNITED STATES PATENT OFFICE

In purchasing Non-Fluid Oil be sure the can is orange colored and bears this trade mark.

We are not talking of an expensive innovation. The actual yearly outlay for Non-Fluid Oil is less than for any other lubricant.

Post yourself further on the differential. And then post us a request for a free sample of either grade. Paste the attached coupon on a postal. Mention the grade you desire.

New York & New Jersey Lubricant Company

165 Broadway, New York

CHICAGO: 1430 Michigan Ave. PHILADELPHIA: 1416 Vine St.
Pacific Coast Distributors: HUGHSON & MERTON
LOS ANGELES, SAN FRANCISCO, PORTLAND, SEATTLE

Please send me free sample of..... Grade NON-FLUID OIL

Name .....

Address .....

Dealer .....

Address .....

N.E.A.J. 20

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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (Trade-mark)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3⅛ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

		"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA"	2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
	3⅛-in. Auto Clock.....	28.00	30.00	45.00	Only made in
	3⅛-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—Add $3.00 to above Price Lists. (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

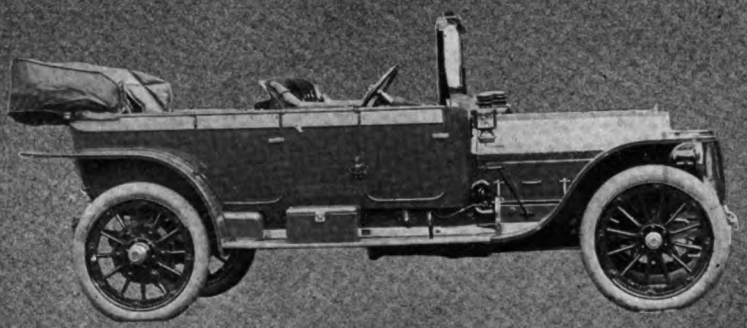
You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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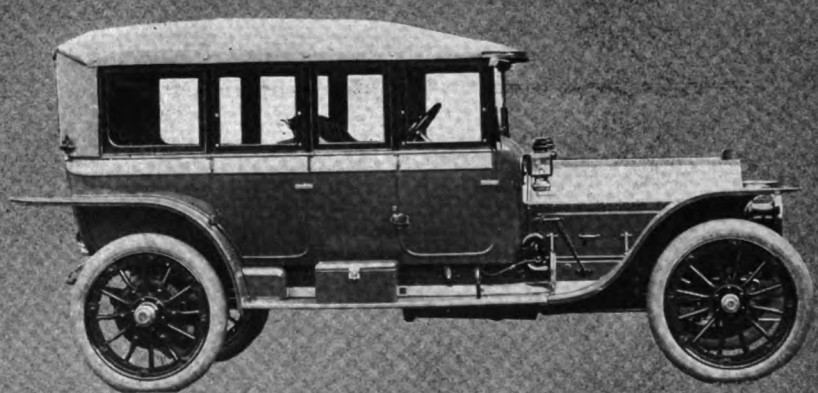
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

SPRINGFIELD METAL BODY CO.,
SPRINGFIELD, MASS.



SPRINGFIELD, MASSACHUSETTS.

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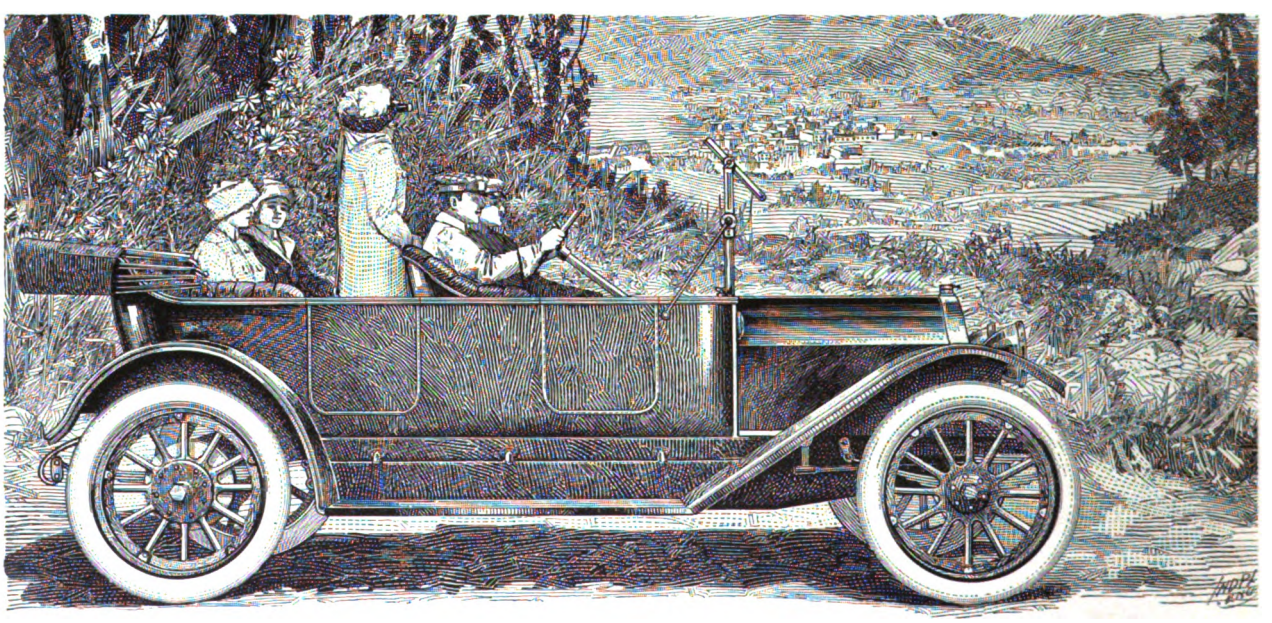
Silent Great Western FORTY 1913

Another Bullseye for 1913

Great Western Hits Highest Mark of Value

Last year we swung into the line of big sellers by a vigorous announcement of the advance 1912 features we had put into our car. This year we break all records by not only including a host of new up to the minute improvements, but also offer the 1913 Great Western, fully equipped **at $1,585 or $265 less than the previous model.**

With our increased output, cutting down factory expense, we are offering you a car at $1,585 which for beauty, power, speed, quiet operation, reliability, completeness and general all around satisfaction, compares with any $2,500 to $3,000 car in the world. It is not our policy to make only a few cars and charge you a big price for our name. Rather than that, we aspire to place dozens of Great Westerns in every community in the United States—owned by people who want the right kind of service and convenience out of their cars—but who are not averse to saving a thousand dollars or more at the outset.



The 1913 Great Western Touring Car

The 1913 line includes a Roadster, Four Passenger Touring Car, Five Passenger Touring Car and a Four Passenger Sedan for winter use.

Great Western Automobile

When Writing to Advertisers, Please Mention The Automobile Journal.

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1913 **Great Western** FORTY $1585

18 Years of Progress Back of This Sturdy Guaranteed Car

LUXURY, POWER *ABSOLUTE SILENCE*

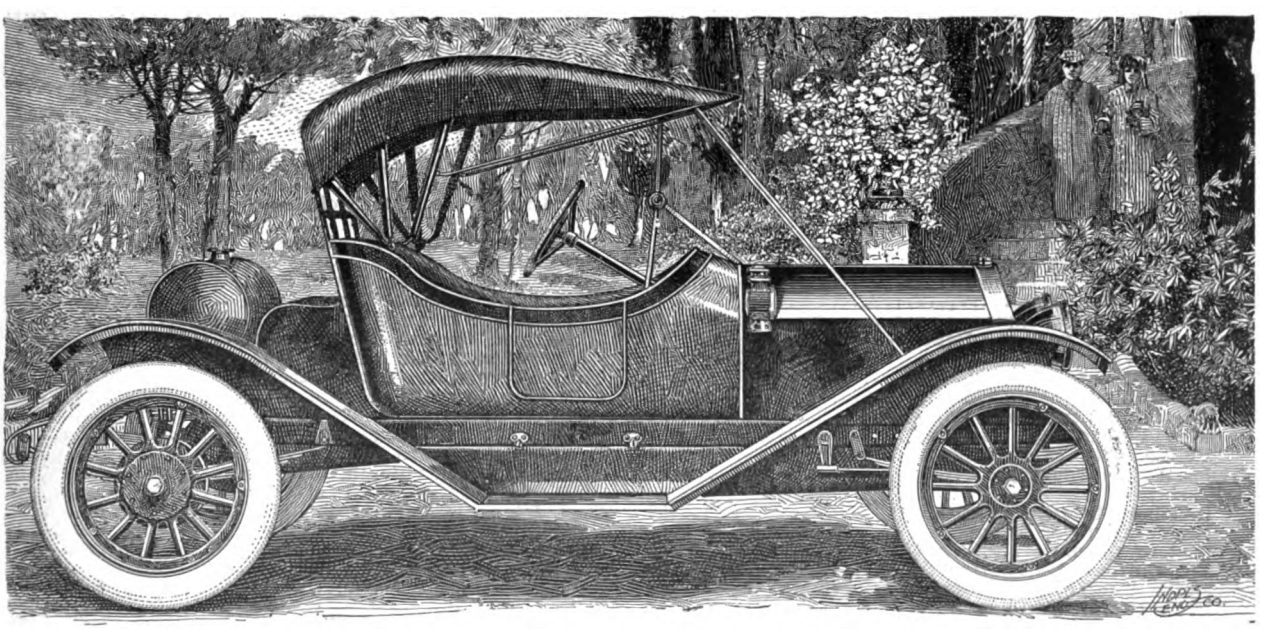
This year's Great Western is an amazing value, including all these great new features:

Presto Self-Starter---Electric Lights---Quiet Running Motor

Nickel and black trimmings throughout
Stewart & Clark Speedometer
Solar electric lights
Silky mohair top
Fairfield rubber dust hood
Rain vision ventilating wind shield
36 x 4 inches tires
Demountable rims
Typhoon electric signal
Foot and robe rails
Tool box and tools
L head 4½ x 5½ long stroke motor
Full 40 Horse Power
Accessible unit power plant
Enclosed valves all on one side
118 inch wheel base
Tire irons and extra rim
Gasoline tank gauge
Dee upholstering, hand-buffed leather
Invisible coil with lock switch
Jack, pump and tire repair kit
Full floating rear axle with large New Departure and Hyatt bearings
Large powerful double internal expanding brakes
Tie rod behind front axle
Cellular front radiator
Latest Remy magneto with kick switch
Easy riding Vanadium steel springs
Handsome body, deep blue color, black walnut trimmings, 18 processes of body finish

Nearly everybody has heard of the Great Western's wonderful record as official pathfinder, prize hill climber and official selection by the U. S. Government for Indian service in the West. These facts are absolute proofs of quality. Send for new 1913 catalog telling in detail all about this handsome, trustworthy car. A complimentary subscription to ***The Tattler,*** our interesting little monthly magazine, also on request.

Dealers: There's a great big sales activity stirring everywhere for the Great Western. It has the quality that attracts attention and makes people decide to buy. Our 1913 organization is being extended to cover every live town in the United States. We can take on a a few more hustling dealers who want to handle a fast selling car. Write today.



The 1913 Great Western Roadster

The 1913 line includes a Roadster, Four Passenger Touring Car, Five Passenger Touring Car and a four Passenger Sedan for winter use.

Company, Dept. 33, Peru, Ind.

When Writing Advertisers, Please Mention The Automobile Journal.

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The 1913 KisselKar surpasses every previous idea of car comfort. Every factor of comfort is incorporated in the 1913 KisselKar to a liberal degree not before equalled in any other automobile.

Every model has an extra generous wheelbase, which besides emphasizing the low, rangy design, bridges the irregularities of the road in a way that gives the KisselKar a steadier, milder and conspicuously rare riding comfort.

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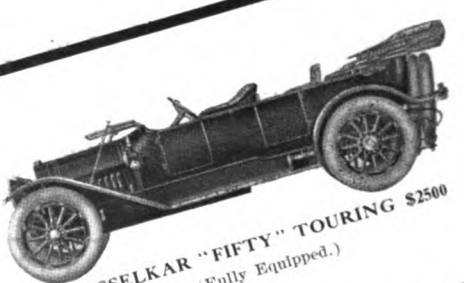
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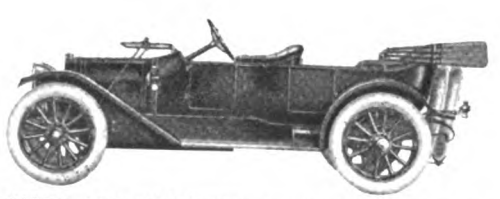
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The 1913 KisselKar catalog completely illustrates and describes the entire KisselKar line—all models ---two passenger, Semi-Touring, Semi-Racer, Runabout, Touring, Coupe, Limousine, and five passenger Coupe.

Kissel Motor Car Co.
174 Kissel Ave.
HARTFORD, WIS.

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1913

Flexible Power

The flexibility of the motor gives the KisselKar a wide range of throttle control which makes all ordinary driving a mere matter of shifting the throttle lever or pressing the foot accelerator. You can throttle down on "high" to a creeping pace in traffic and take hills at easy, normal speed without rushing or shifting gears. Gear shifting with a KisselKar is occasioned only by extremely difficult road condition. For all average driving, the flexible KisselKar motor drives smoothly and silently on "high" gear as fast or as slow as you want to go.

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Turn the switch at the front of the seat. Automatically it retards your spark beyond possibility of "back fire," causes the carburetor to release a "rich" mixture, switches the storage battery on to the dynamo-motor which begins action as a motor and turns over the engine. This action is positive. It is impossible to fail—turn the switch and your engine goes—every time. This starting system is powerful enough to run the car a considerable distance.

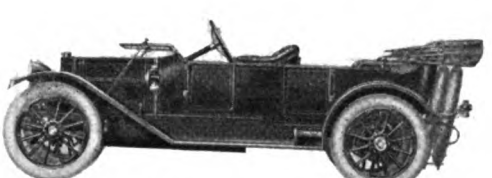
Now that the engine is started, the switch automatically resumes its normal position—the battery "cuts out" of the starting system—the magneto furnishes ignition—the dynamo-motor ceases to operate as a motor and begins running as a dynamo, charging the storage battery for lighting and future starting.

The complete operation of this system is automatic—one turn of the switch is all you have to do with starting.

The lighting system takes current from the batteries by Edison's three wire system, which permits the use of lamps of about twice the candle power ordinarily used.



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Kissel Motor Car Co.

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KisselKar Service

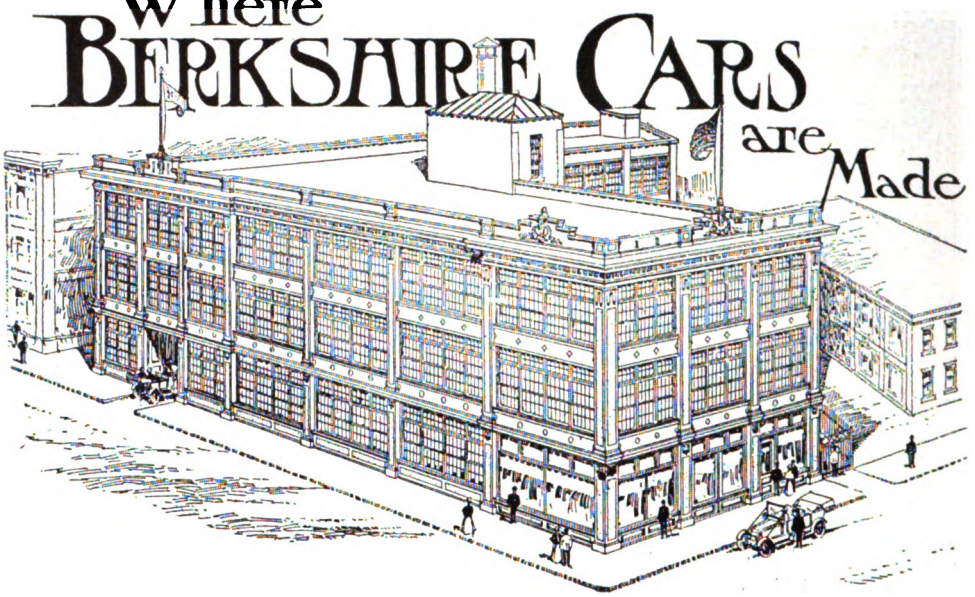
KisselKar service is supplied and directed by the manufacturers. Specially constructed and equipped buildings at principal points of the United States are maintained as service-centers, cooperating with selling representatives in giving a complete detailed service to every KisselKar owner. This national organization of service-centers brings the owner in close touch with the manufacturers. The result is unusually low running cost, low maintenance and slow depreciation, and the fullest realization of motoring pleasure. Following is a partial list of KisselKar branches and agencies:—

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Steering Gear—Worm and Segment type.
Body—All popular types.
Equipment—Complete.
Price—$3,000.

6 CYLINDER CARS

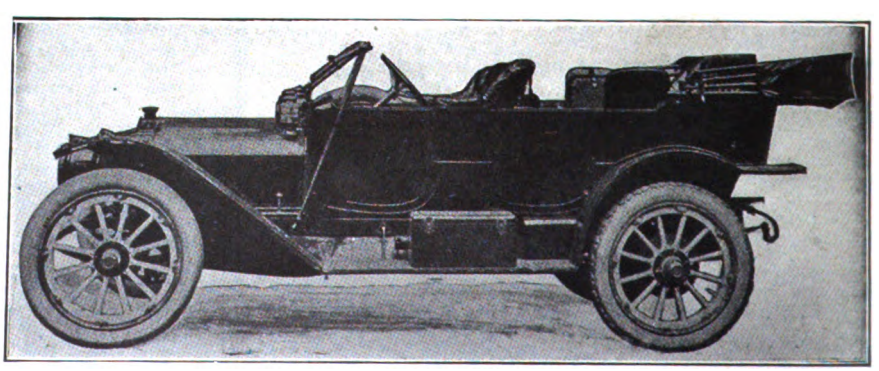
Motor—6 cylinder, 4 11-16 x 5½.
Clutch—Multiple Disc running in oil.
Gearset—Sliding selective, 4 speeds and reverse.
Rear Axle—Full floating type.
Brakes—Internal expanding, external contracting.
Front Axle—Mercedes type, I-Beam.
Wheels—Thirty-six inch.
Wheel Base—134 inches.
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Price—$4,000.

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1912 Model, 4 Cylinder, 35-40 H. P.

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THE AUTOMOBILE JOURNAL

VOL. XXXIII, No. 12 JULY 25, 1912 Price, $1.00 the Year

RHODE ISLAND'S TAR MACADAM HIGHWAYS.

About 45 Per Cent. of State Roads, Built or Building, So Constructed--Resurfacing the Water Bound Ways to Bring System to Highest Standard.

NO HIGHWAY construction or maintenance work throughout the world is more interesting, no road development is as significant, as that now progressing in the State of Rhode Island under the direction of its State Board of Public Roads and the supervision of Chief Engineer John Bristow. The road improvement is deserving the attention of every citizen, and every national, state and municipal official, because it is the inauguration of a policy that has been determined after careful experiment with materials and methods, and because the preservation of the roads already improved is regarded as important as the original construction.



Boston Post Road, Kingstown, R. I., a Stretch Built Four Years Ago by the Methods and With the Materials Now Adopted by the State Board of Public Roads.

The work is deeply significant in that, after practically six years' tests of road surfacing, a scientifically prepared binding material is used, one that was found the best adapted to the purpose of any that has been tested. The state has contracts already let, or to be let before Aug. 1, for the construction of 72.65 (approximately) miles of tarvia macadam, and the board in its work of maintenance purposes to resurface as much of the 225 miles of water bound macadam ways as the funds available will permit, besides keeping up to a high standard the surface of the 26 miles of tar macadam previously built.

The state board proposes to have every mile of highway under its jurisdiction surfaced with a binder that will resist both traffic and the elements. In this Rhode Island is in advance of every commonwealth of the United States, and of every national government of the world. The state system of roads has been carefully planned and the improvement has been systematic. The recommendations of the state board have been approved by the people and the Legislature, and there

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The West Barrington Road, a Section of Experimental Highway.

will be spent this year approximately $850,000, including the contracts let which may not be completed until 1913.

With the completion of the new work projected and the resurfacing as planned by the state board, there will be approximately 325 miles of tar macadam highway, comprising the main roads of the state, and connecting with the principal thoroughfares through the cities. No state work is done in the cities, save on the Plainfield pike through Cranston.

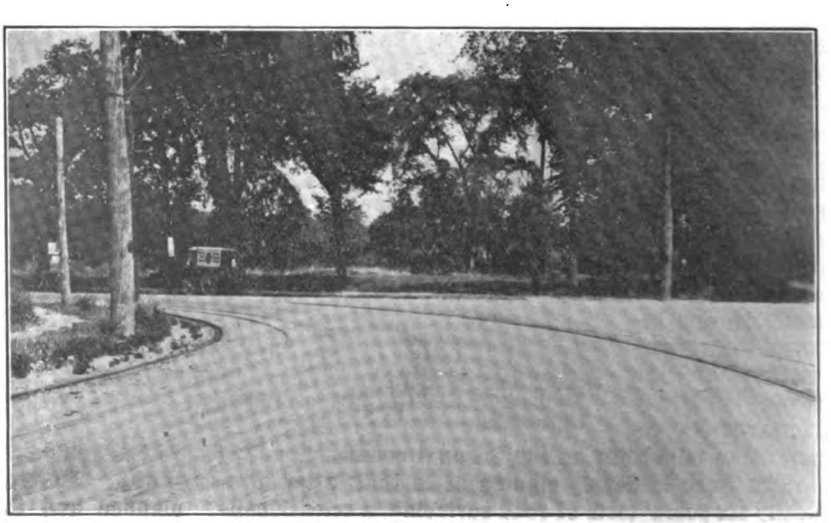
Much of the work now progressing is on roads that will afford direct connection with the trunk lines of other states. There will be no less than six that are available for travellers going or coming from eastern Connecticut, and equally good connections are made with the Massachusetts highways. To illustrate, one road will provide a more direct route from Providence to Westerly, than the old one following the shore of Narragansett bay and the ocean, and there will be three connections between the new and the old route. Similarly the majority of the other main ways will be cross connected. The roads generally converge at Providence. The traffic is well provided for on both sides of Narragansett bay and on the island of Rhode Island. There is as well a highway that extends north from Jamestown to Conanicut park on Conanicut island, in the town of Jamestown.

From these details it will be seen that the comparatively small mileage of state roads means a system in its fullest sense. As the total length of public roads in Rhode Island is about 2350 miles, the roads for which the appropriation has been made will give about 14 per cent. improved of all the highways over which the public can drive, a percentage very much larger than that in any other state of the union.

Rhode Island was by no means the first state to take up systematic highway building, but it was, and probably is today with one or two exceptions, the only one in which the supervising body is free to exercise its discretion as to methods. The only restriction on the board is that money once directly appropriated for a work must be expended for the specific purpose for which it was provided. The legislature makes annual appropriations, but bonds may be issued for specified or general purposes. The board consists of five members, and as there has been no change in its personnel since it was created, Feb. 1, 1902, its endeavors have been along well defined lines and in accord with public requirements determined by the board after careful examination of conditions and after much discussion within and without the board.

In 1906 the board began experiments to ascertain the efficiency of tar treated roads with the two-fold purpose of suppressing dust and resisting the wear of traffic. These experimental constructions were observed for four years and then the board declared itself satisfied with the results. Perhaps its position is best defined in the annual report for 1910. After stating that water bound macadam roads would not endure, it continues as follows:

"At the present stage of investigation the consensus of opinion appears to converge upon the use of a



A Much-Used Corner Constructed With Tar Materials—One of the Best Pieces of State Road in Rhode Island.

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Pouring the Heated Tarvia on the Evenly Distributed Stone Surfacing.

bituminous binder as the most practical remedy for overcoming the deficiencies characteristic of water bound macadam, although a wide difference of opinion exists among road builders as to the extent that this product should enter into the new construction in order to meet the requirements, and no one has yet pretended to lay down a rigid rule applicable to every case among conditions so diversified as those existing in different localities of our own country.

"Our own experience, however, with bituminous road building with such material as we have on hand, the details of which have been worked out by our engineering department and most heartily sustained by this board, has proved decidedly satisfactory, producing a dustless and in every way an ideal surface at an additional expense of from $1500 to $2000 a mile. Our first construction with a bituminous binder, after a test of nearly four years' use, appears as impervious to traffic and weather influences as when first laid; and this, too, with practically no care or expense incurred for maintenance or for allaying the dust.

"Apparently, this kind of construction for Rhode Island conditions not only gives the best satisfaction to the user and the people residing along the road who suffer from dust nuisance of common macadam, but for a term of years, is far the most economical when the cost of maintenance is considered."

This report stated that the bituminous macadam roads built in 1908 proved to be so satisfactory that in 1909 the construction of 21 miles of road to be built with a bituminous binder was authorized.

Relative to the method of construction the following statement is made in this report: "In all cases the work was done by the mixing method. With the exception of the addition of the bituminous mixture, the method of construction is similar to that employed in building an ordinary macadam road. After the subgrade has been thoroughly rolled the No. 1 broken stone varying in size from 1.25 to 2.5 inches in their longest dimensions, is spread to a depth of six inches and rolled to four inches. In two cases the surface of the No. 1 course was treated with about one gallon of bituminous material to the square yard, but ordinarily this application is omitted. The No. 2 stone varying in size from .5 to 1.75 inches in their longest dimensions is next deposited on dumping boards and thoroughly mixed with hot bituminous mixture with the aid of rakes and shovels until the stones are coated. The amount of bituminous material required for this purpose varied from 1.25 to 1.75 gallons a square yard, depending upon local conditions. The coated stones are then placed upon the No. 1 course to a depth of three inches and rolled to two inches. When this surface has been set up, a flush coat of bituminous material (about .75 gallon to the square yard) is applied by means of squeegees and screened chips varying in size from .125 to .25 inches in their longest dimensions are rolled in."

The bituminous material used during 1909 for mixing the stone was generally a coal tar or a mixture of coal tar and asphalt, varying from one of tar to three of asphalt to equal parts of tar and asphalt, and for a flush coat coal tar and a solid asphalt were



The Hand-Mixing Process—Turning Over the Stone to Insure a Thorough Coating of Tarvia.

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Placing the Tarviated Upper Course of Stone, Mixed by Hand, on the Well Rolled Lower Portion of the Roadbed.

used. Several small sections of road were constructed adjacent to each other of refined bituminous materials for experimental purposes and were carefully observed. Careful record of each experimental section of road was kept and study made of the cause of success or failure of any particular trial, the notes including the location of the road, length, width, thickness of stone, amount of crown, nature of subgrade, percentage of grade, dates covering construction, a census covering the amount and kind of traffic, form of construction, tests of the bituminous material, tests of the stone, and also all items incident to the cost of the road so that the costs a square yard could be obtained.

The standard width of state highway in Rhode Island is 14 feet of macadam with a shoulder three feet in width at either side, between the ditches or gutters or banks, and while some of the roads are wider in the village, the cost of the additional width is borne by the towns in which they are. Generally the town and the state jointly contract for the roadways that exceed the standard of width and the difference in cost between the standard roadway and what is actually built is paid by the state, which in turn is reimbursed by the town.

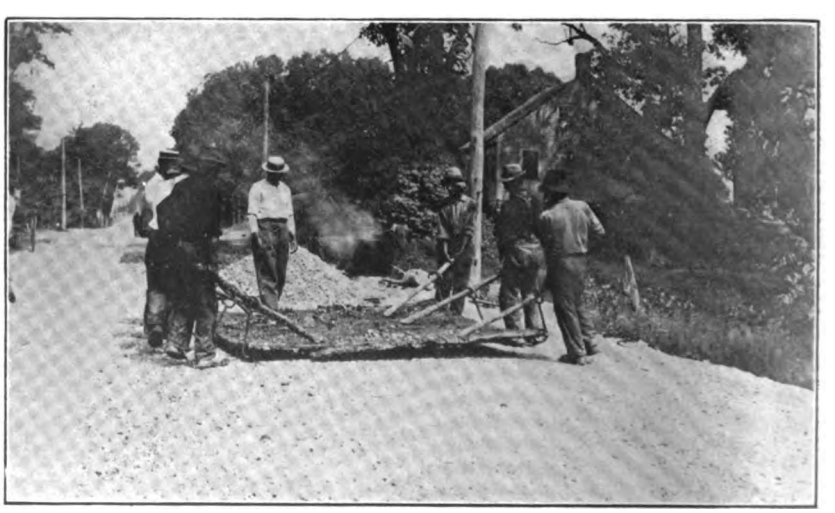
Considering the work that is now in progress reference can well be made to the annual report of the state board for 1911, which sets forth that there was during 1911 no new construction of the state system, owing to no appropriations, and that it was an anxious year for the board because of the utter impossibility of maintaining the state roads already built in a fairly passable condition with the limited means at its disposal. The report states:

"Perhaps it is needless to say, that under these circumstances, the prompt attention that much of our water bound macadam required early in the season, had to be omitted altogether, which accounts for their present badly torn condition, especially those sections that are subject to a heavy automobile travel and lying adjacent to the cities and the compact centres.

"On the other hand, it is gratifying to be able to report that little or no expense for maintenance was required upon the 26 miles of bituminous road now built, except upon two short sections which were finished with an asphalt painted surface at the time of construction and upon two short sections where the patent binder proved to be comparatively worthless. The former sections had to be sanded to absorb the superfluous asphalt appearing on the surface during warm weather, so as to prevent its adhesion to vehicles and persons using the road, while the last two sections had to be resurfaced with a straight tar binder.

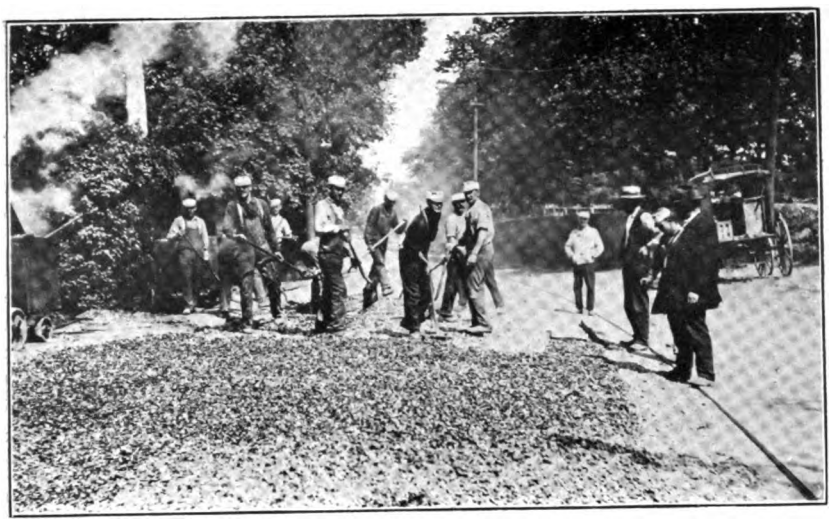
"After five years' experience with bituminous road construction, we are realizing more and more conclusively the great value of this kind of road when it is properly laid with the right kind of material. Economy in maintenance with a clean, mudless and dustless surface at all seasons of the year are some of the features which recommend it for general approval.

"The first section of bituminous road built by the board and opened to travel five years ago—built of



Mixing Gang Carrying the Mixing Platform Along the Roadway, Ahead of the Job.

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Laying the No. 2 Course of a State Highway, the Portable Heating Kettles and Hand Method of Preparation and Distribution Being Shown.

crude coal tar—remains comparatively intact without having required the slightest expense for maintenance and apparently is good for five years more under the same traffic conditions. Local defects which soon appeared on the surface of certain other sections of bituminous roads, built during later years, were readily accounted for and easily remedied at a trifling expense.

"Much, however, of the 225 miles of water bound macadam, now under the care and upkeep of the board, will require the earliest possible attention.

"We have learned from experience, as all the states and countries engaged in modern road building have learned, the uselessness of trying to maintain this latter class of roads for any length of time with a smooth and even surface, where the motor vehicle traffic is very great, by the methods heretofore employed. * * * We regard the restoration and maintenance of much of the water bound macadam already built of far greater importance than any proposed new construction * * * Wherever a bituminous road has not already been built, a much more substantial and durable surface than a water bound macadam is imperatively needed in view of the constantly growing travel upon it, especially the heavy motor truckage, which is fast increasing and extending further into the open country every year. The base or first course of broken stone on all these roads, except a few local defects, continues firm and in good condition to receive a new surface, notwithstanding much of it was built seven or eight years ago.

"After extended investigation of the subject and upon the advice of our chief engineer, we recommend that all these roads be given a new bituminous surface, similar to the best tar construction now built in the vicinity of Narragansett Pier in the south county.

"A new plan now being perfected whereby the mixing of the stone and the bitumen can be done at the crusher by machinery, will considerably hasten the work and diminish the cost incurred by the old method of mixing by hand on the road.

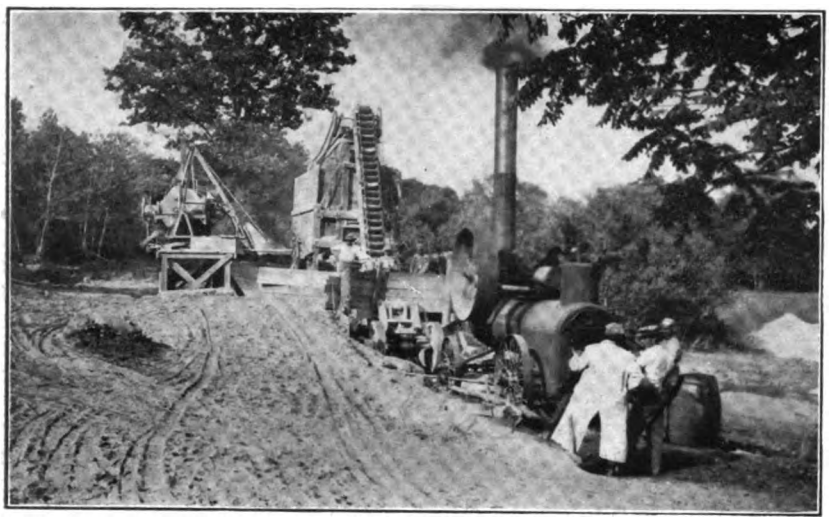
"Without entering the many details of appiying some 10 different ingredients in their various combinations employed in our experimental tests—these having been given in former reports—suffice it to say that we have been forced to the conclusion that the straight tar in a crude or refined state, is the most effective and economical binder to be used in building a macadam road surface and best suited to the climatic conditions and requirements of travel in our own state."

The state board made recommendation that 19 sections of road ranging from .5 mile to 18 miles be built, the estimated cost for the total of 72.65 miles being $555,082.72, an average of $7640.50 a mile. These estimates are for bituminous construction, and the last contracts covering 12.5 miles will be let July 31. The specifications for this road building call for a somewhat different size of stone than mentioned in a quotation from the 1909 report, in that the size of the No. 1 or lower course is from two to three inches in longest dimensions, and the No. 2 course from .25 inch to two inches in longest dimensions, and that the



Rolling the Tarviated Stone to Secure Consolidation, the Thorough Binding of the Road Surface Being Decidedly Clear.

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A Model Combination of Stone Crusher and a Machine for Mixing Road Material—A Bristow Bros. & Knowles Plant.

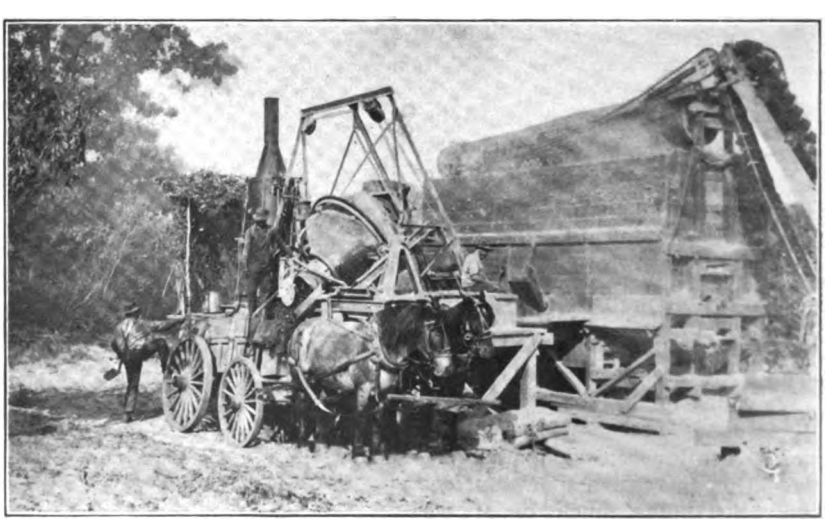
binding material be tarvia, a refined coal tar product that has been scientifically prepared for this work, and which was one of the materials with which extended experiment was made by the state board. The other specifications are unchanged. This affords a state road six inches in depth with a course of four inches of consolidated stone covered with a second course of stone thoroughly covered with tarvia, on which is a layer of stone screenings, thoroughly rolled.

The methods of doing the work vary on different jobs. All the first work of the board has been done by hand mixing, but it is now planned to use mixing machines wherever possible. At the present time some six machines are in use on state jobs either by contractors or by the state itself.

In the hand mixing work the stone is spread upon wooden platforms, which are moved along as the job progresses. The tarvia is then measured out and spread over the stone. The batch is turned over by men using heated shovels until every particle of stone is covered with tarvia. Men take the coated stone and place it by shovelfuls on the road. Another man with a rake levels the stone off until it is brought to the proper thickness. The road is then rolled and a seal coat of tarvia spread upon the road with brooms. A coating of pea stone follows, and the steam roller finishes the consolidation of the road. The tarvia is heated in kettles along side of the road. In the greater part of the jobs now being done by the state board it is shipped to the vicinity of the work in tank cars and barreled for storage.

On the jobs where mixing machines are used, a batch mixer of one-half or one ton capacity is employed. Usually much thought is given to the placing of the different parts of the plant so as to minimize the haul and handling of stone and other material. The stone crusher delivers stone into bins from which it is transferred by gravity to the batch mixer. The required quantity of tarvia is added and a small engine turns the mixer over for two to four minutes until every particle of stone is covered with tarvia. The batch is then discharged into a waiting dump wagon covered with a tarpaulin and is carted to the work, where it is deposited, to be raked as in the hand method. The mixing machines are provided with a torch fed by fuel oil, which heats the stone in the mixer when this is necessary. The machines are capable of turning out 20 to 30 cubic yards an hour, but as it is impossible to place this amount of stone they are not worked to their capacity. The machines are proving quite economical and are expected to save very quickly their first cost of about $2000. Several of the contractors, among them Bristow Bros. & Knowles, have adopted the machine method and the state is now using them at Bristol, Norwood and Chepachet.

While the contractors are building the new bituminous road the state board, which has an appropriation of $250,000 and the receipts from the automobile registration, which will closely approximate $100,000 this year, at its disposal, is carrying on the resurfacing of the water bound macadam roads of the state, and is transforming them into bituminous roads. This work is not contracted for, but is done by the state under



Discharging a Batch of the Heated, Tarviated Stone from a Mixer Into a Cart for Haulage to the Job.

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the direction of the state engineer and his assistants. In this resurfacing work the upper course of stone on the old road is sacrificed without disturbing the lower course. Whatever stone is necessary to remedy the defects in the surface is added, and after consolidating a fresh upper course of stone thoroughly mixed with tarvia, either by hand or machine, is put on and rolled to a two-inch thickness. Stone screenings with rolling complete the work. In this manner the roads are being transformed from badly worn macadam to roads that are as durable and free from dust and as satisfactory as the highways which have already been built with tar materials.

Just how much of this resurfacing will be accomplished this year is dependent upon circumstances and conditions. It is believed that there is available a sufficient fund to do the greater part, if not all of the work, and with the methods now in vogue it is probable that the estimate made, based upon the work of 1909, can be somewhat improved upon. Some part of this resurfacing may be deferred until next season, but the state board is carrying out its policy of transforming the ways as rapidly as possible, with the intention of minimizing maintenance cost, by having every inch of the state roads of bituminous macadam.

Because of the work on the highways this year motoring in Rhode Island may not be as pleasurable as in previous seasons, but the people of the state who motor have no criticism because of temporary inconvenience, and they and visitors alike are in fullest accord with a policy that is developing close to completion the best roads maintained by an American commonwealth.

PROMOTION FOR NASH.

Following the resignation of W. J. Mead as vice president of the General Motors Company, Detroit, to become president of the Amplex Motor Car Company, Mishawaka, Ind., comes the announcement that C. W. Nash, for the past two years vice president and general manager of the Buick Motor Company, Flint, Mich., a subsidiary of the General Motors Company, has been elected vice president to succeed Mr. Mead. This promotion does not mean that Mr. Nash will relinquish the management of the big Buick plant at Flint. On the contrary, he will continue to concentrate his attention and efforts upon the operation and further expansion of the Buick business, which, under his management, has maintained a foremost rank in the automobile industry.

NEW AMERICAN PLANT.

With the completion of the three-story brick and steel addition to its plant No. 2, the American Motors Company, Indianapolis, Ind., maker of American cars, now has what is believed to be the largest manufacturing plant in Indianapolis. This increase in factory space is said to be due to the unusual demand for the underslung types, produced by this concern.

At the beginning of the 1912 season it was found necessary practically to double the available space, and again just before the 1913 announcement, plans were made and the foundation laid for a further increase in this respect. This second addition is now completed and ready for occupancy. It is 85 by 120 feet, providing about 30,000 square feet of floor space. The equipment is new and of the latest design. One piece of machinery is a 36-ton hydraulic press to be used in connection with the sheet metal work and in shaping the bodies.

TWO NEW SCHACHT MODELS.

Two new models, distinctly different in body design but employing the same chassis, comprise the 1913 line of the Schacht Motor Car Company, Cincinnati, O., according to the recent announcement of the company. These will be known as model NS, a five-passenger touring car, and model KL, a roadster. Both will be equipped with fore doors, and will present all the latest refinements, including self-starter, electric lights, demountable rims and one extra rim, etc. Left hand drive with centre control is employed.

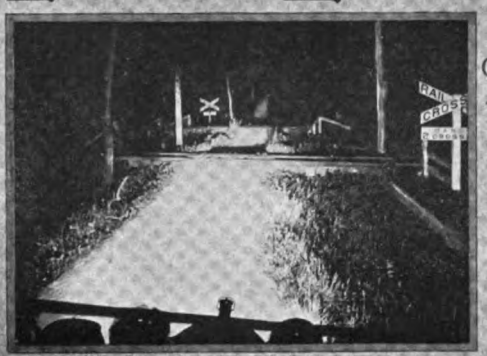
The chassis is practically of the same construction throughout as in the 1912 offering. However, the motor is a new design, being of the monobloc type, with three bearing crankshaft. The bore is 4.25 inches and the stroke, 5.5, making it practically a long stoke unit, and the rating is 45-50 horsepower. Other features include the use of the cellular radiator, full floating rear axle and larger brakes.

ATLAS ENGINE SALE.

Announcement is made that the Atlas Engine Works property in Indianapolis, Ind., will be sold under a superior court order, July 29. It is stated that a corporation in Detroit, which is desirous of establishing a plant in Indianapolis, will be among the bidders. In the event that this company shall be the successful bidder, the tentative terms of purchase are said to have been arranged as follows: The purchaser to assume the mortgage against the property which secures bonds aggregating $1,050,000; to pay $105,000 indebtedness secured by the bond issue of $150,000 and cancel the bonds, and to turn over to the receiver sufficient money to pay all mercantile accounts contracted since the creditors' committee took charge of the plant, as well as the salary rolls and receivership expenses, amounting to about $80,000. The upset price has been fixed at $80,000. The Detroit concern, it is claimed, would manufacture the Diesel and silent Knight engines as heretofore, and also a line of four-cylinder cars, employing from 5000 to 7000 men. There is no intention of removing the present plant now in operation to Detroit.

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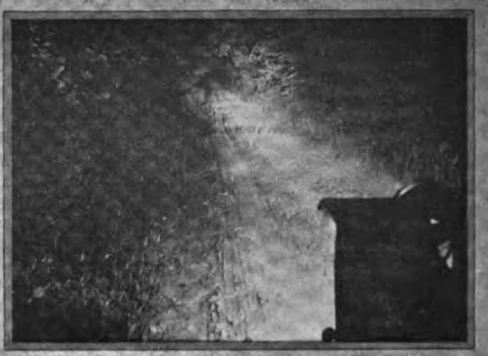
Electric Lighting of Motor Cars



Outlining Various Systems Employed and Methods of Operation.



By C. P. Shattuck



Part XI—The Holtzer-Cabot Dynamo System.

ONE of the fundamental principles of efficient lighting by electricity is that the voltage shall be steady, and that the filaments of the lamps be heated to and maintained in a predetermined incandescent state. Variations in the voltage or strength of the current impair the value of the bulbs as an illuminant, and this holds true irrespective of the source of energy, whether it be a storage battery or a mechanical generator. With either member supplying the current, it is obvious that should the voltage drop below that necessary for the proper operation of the lamps, their brilliancy would become dimmed, while on the other hand a marked increase in voltage would tend to destroy the filaments. Fluctuations in voltage are productive of flickering in the lights, an undesirable feature in motor car lighting.

As a source of electricity the storage battery is held by many engineers to make for the ideal lighting equipment for the automobile, provided, however, means are incorporated in the system for maintaining it in a properly charged condition, and that the charging be performed automatically in accordance with the requirements of the maker. Believing that a storage battery could be charged by a dynamo operated by the energy of the motor car, and the rate of charge so controlled as to obtain the greatest efficiency and life from the battery, the Holtzer-Cabot Electric Company, Boston, conducted a series of experiments extending over a period of two years to determine the best type of dynamo adapted for this particular service. From the outset the aim of the company was to produce a simple, durable system, one that could be easily installed and maintained, as well as being free from devices which could be tampered with by the inexperienced.

The early dynamos were of the differential wound type, driven by friction at high ratios, charging an 80 ampere-hour capacity battery, the dynamo being cut in at high motor speeds. These were installed on machines and although they gave fairly good service it was found that improvements could be made.

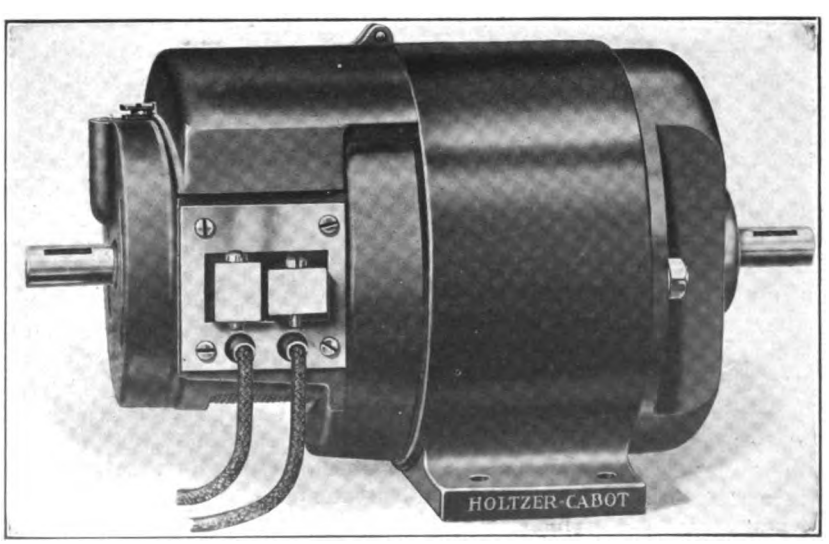


Fig. 69—The Holtzer-Cabot Lighting Dynamo, Noticeable for Its Simplicity, Generating Positively at High or Low Speeds and Self-Regulating.

The results of the practical tests, however, convinced the company that a practical and highly efficient equipment could be produced by designing a dynamo which would automatically and properly charge the battery without incorporating in the line any mechanical or electrical devices, the battery supplying all the current to the lamp, signal horn and ignition circuits. It is an easy matter to produce a dynamo which will charge a battery provided the generator is driven at a constant speed, but the difficulty encountered in designing a machine for the automobile has

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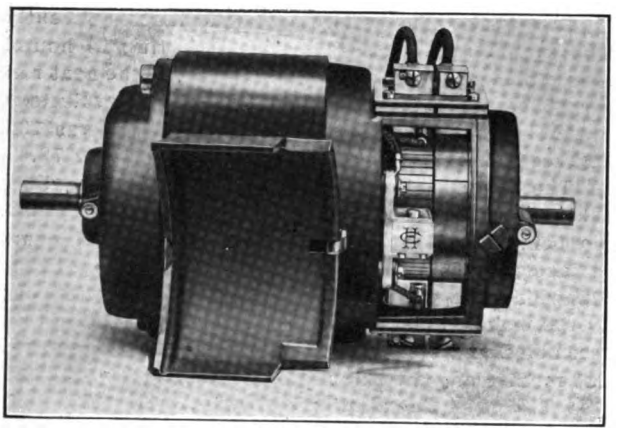


Fig. 70—Dynamo with Cover Removed to Illustrate the Accessibility of Components.

been to protect the dynamo and battery from the excess current generated at high speeds.

These obstacles have been overcome in the new Holtzer-Cabot dynamo, which is electrically regulated by the construction of the pole shoes, without extra windings or parts of any kind, the current generated at high speeds being controlled by self-induction. It is claimed by the designer that a high efficiency is also obtained at low motor speeds.

Features of System.

The features emphasized of the system are: A simple, compact, noiseless, durable dynamo, which may be operated in either direction and without regard to polarity; a machine generating positively at low speeds and requiring no adjustment or attention whatsoever; ease of installation, being equipped with means for driving at either end of the armature shaft; high efficiency and a steady and uninterrupted light at all speeds of the automobile and even when the latter is inoperative.

The material and workmanship incorporated in the dynamo is in keeping with the high grade maintained by the Holtzer-Cabot Electric Company, which has an extended experience in the construction of dynamos and motors and whose product is well and favorably known in the electrical world. That the dynamo is very compact will be noted by the outline dimension diagram at Fig. 74, which gives the extreme over-all length as less than 12 inches, this measurement including the extensions of the armature shaft, which are key seated to take standard Woodruff keys, an arrangement permitting the dynamo to be driven at either end.

The armature is of liberal size, being 3.5 inches in diameter, and is form wound, cotton insulated wire being treated with a special enamel, which is baked to render it impervious to heat or moisture. The commutator is highly sub-divided, having 50 segments, these being separated by carefully selected mica, and being 2.875 inches in diameter with one-inch face, a design making for perfect commutation and long life.

The armature shaft is of a high grade steel, .75 inch in diameter, carefully machined and finished, and rotates in imported Hess-Bright ball bearings, these being fitted at either end. These members are fully enclosed and protected from foreign elements, and engage with recesses in the two end housings which are held securely by bolts. The central housing is of laminated soft iron, which provides a maximum magnetic field, and is welded to the foot base, insuring rigidity as well as stability.

The location and peculiar construction of the pole shoes will be noted at Fig. 71, which also depicts the components of the dynamo. The pole piece is circular, constructed of tubing, accurately bored, and it will be seen that it is slotted. By certain modifications of these pole shoes the maximum current is limited to the amount desired.

Brushes and Holders.

The brushes utilized to collect current from the commutator and automatic switch, are of the French copper carbon type and are carefully ground, polished and fitted, being subjected to rigid inspection. A noteworthy feature of the construction of the brush holders is the method of retaining the spring. The latter is pleated, providing proper contact of the brushes, and that part held by the holder is provided with slots, so arranged that it is impossible to replace the brush in other than its proper holder and correct position.

A feature of the Holtzer-Cabot dynamo is the au-

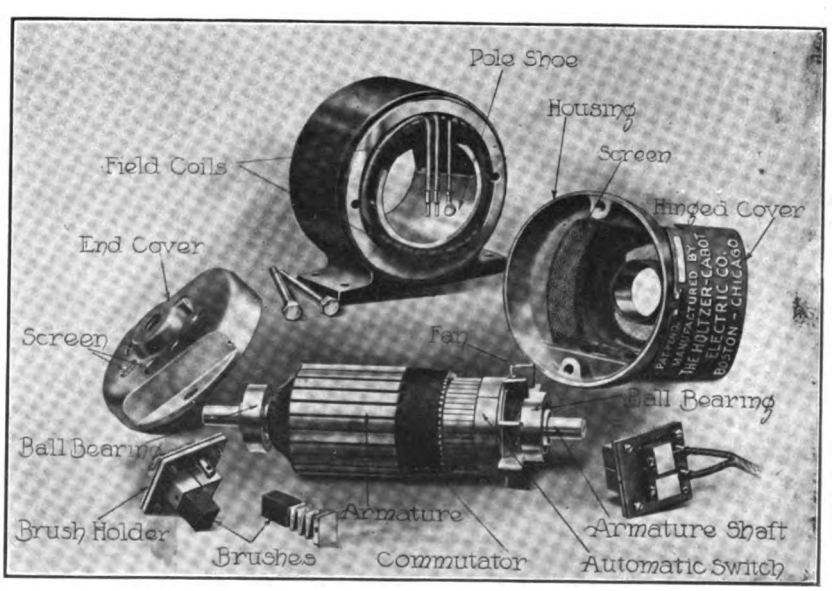


Fig 71—Depicting the Components of Dynamo in Which Is Incorporated the Best of Workmanship and Material.

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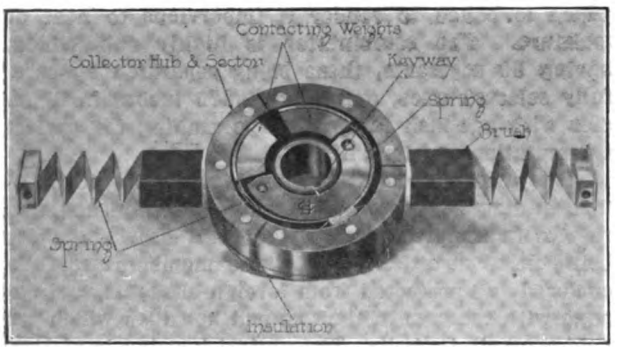


Fig. 72—Depicting Automatic Switch Operated by Centrifugal Force.—The Weights Are in Contact with Collector Ring from Which Current Flows Through Brushes.

tomatic switch which cuts in or out the battery when the speed of the dynamo falls below a stated number of revolutions. It operates on the centrifugal principle, is simple, and requires no attention whatsoever; in fact, after it is fitted to the armature shaft, it is impossible to tamper with it, as the actuating weights are enclosed and cannot be reached without disassembling the dynamo.

The simplicity of the device will be noted by its construction, which is depicted at Fig. 72. It comprises two rings, the outer being designated as the collector ring, which consists of three sections of hard drawn copper separated by mica insulation. Within the outside ring is another member, this being divided into three sectors, the largest being secured to the collector hub and carrying a spring. The two smaller sectors or contacting weights are secured to the spring which, when in normal position, prevents the weights from coming in contact with the outer sectors as depicted at Fig. 73. The bushing inside of the inner sector forms the hub of the structure and is provided with a keyway for attaching to the armature shaft, the position of the switch being outlined at Fig. 71.

Operation of Switch.

When the rotation of the armature shaft attains a predetermined speed, the weights move outward by centrifugal force, making contact with the collector ring. Current then flows through the brushes to the battery until the speed of the dynamo falls again, when the weights assume normal positions, breaking the contact. It is claimed that the contact is made and broken instantaneously and that after exhaustive tests on the bench and motor cars it was found that the switch was positive in its action, this being due to the design of the spring and the fact that the member was not in constant service.

Temperature of Dynamo.

The end plates are of open pattern fitted with screens and a small ventilating fan is mounted on the shaft. Since this feature of the design was adopted, however, the losses and consequent heating have been so greatly reduced as to make complete enclosing of the dynamo entirely practical.

In a heat and break-down test conducted recently by an automobile manufacturer and lasting 10 hours, it is stated that the chart showed that in the heat run the generator carried 12 amperes at 2100 revolutions a minute and that the maximum temperature was 132 degrees Fahrenheit, while that of the room was 72.

The commutator and collector are very accessible, a hinged cover on the top or front part of the dynamo being fitted for inspection purposes, and the armature may be taken out easily if desired without disturbing the wiring connections. It is pointed out by the maker, however, that each machine is carefully assembled and tested, and aside from lubrication will not require any attention from the user.

Installation and Drive.

Another feature of the dynamo is that it may be driven in either direction, and that each end of the armature shaft is provided with keyways, these being in perfect alignment, so that when the installation includes driving the magneto from the dynamo shaft, timing of the ignition is made easy. Drive may be by V belt or silent chain, but a direct drive from pump or magneto shaft should be secured where possible. To provide for the various motor constructions, dynamos are wound for engine speed drive, also 1.5 times engine speed drive for four and six-cylinder cars respectively. This rule applies in all cases where drive is from the magneto shaft, but if the dynamo connection is driven in any other way some care should be exercised to determine its speed in relation to the engine that the best selection of the two types may be made. Some variation from the ratios given is permissible.

Simplicity of System.

The simplicity of the system is depicted by the wiring diagram shown at Fig. 77, which makes provision for a group of lights, including two head, two

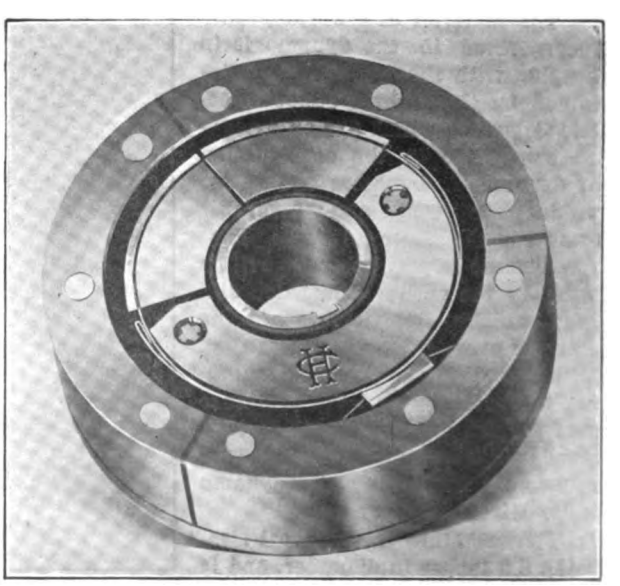


Fig. 73—Showing Automatic Switch with Contacting Weights Held in Normal Position by Spring.

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side, tail and dash lamps, also an electric horn operated by push button. All wires are led to a junction box which is numbered 1, 2, 3 and 4, respectively, the functions of these being outlined in the drawing. The No. 4 switch is utilized to disconnect the dynamo during daylight driving, being installed only in the event a battery of low capacity is employed.

The lamps utilized with the Holtzer-Cabot lighting system are six-volt Tungsten, and a lamp load equal to 60 candlepower is entirely satisfactory. Bulbs of 16 candlepower are employed with the headlights and four or six candlepower for the side and tail lamps. The company recommends the use of 5.5-volt bulbs with the headlights, claiming that greater efficiency is obtained thereby, and although these members may not be generally carried by electrical supply houses, the six-volt, 20 candlepower lamps will give practically the same results.

Battery.

In designing the system, it is pointed out that its success is due in a measure to the fact that the solution of a battery of the proper size will not heat up or

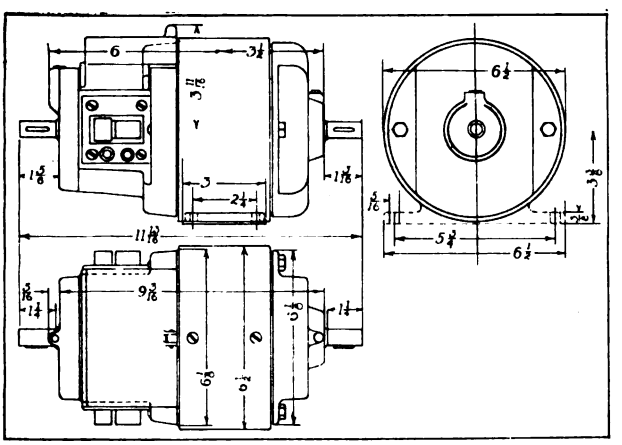


Fig. 74—The Dynamo Is Very Compact as Will Be Noted by Outline Dimension Diagram.

boil when being charged on a motor vehicle. This is attributed to the constant agitation of the electrolyte, also to the intermittent charging periods. Continuous charging does not hold true of the battery charged by a dynamo operated by the energy of the motor car.

It is also maintained that the selection of a battery is a very important factor in the lighting problem and to prevent excessive straining of the plates and causing a high rise in voltage (gas voltage) on the battery, the company uses and recommends cells having 120 to 150 ampere-hour capacity. The charging current of the dynamo is then selected and always maintained below the rated or normal charging current indicated by the maker.

The dynamo current in connection with the Edison battery is approximately 16 amperes, maximum, while the normal charging rate is 24 amperes, minimum. The dynamo current for the 150 ampere-hour Elba battery is approximately 12 amperes, maximum, while the stated charging rate is 15 amperes, maximum.

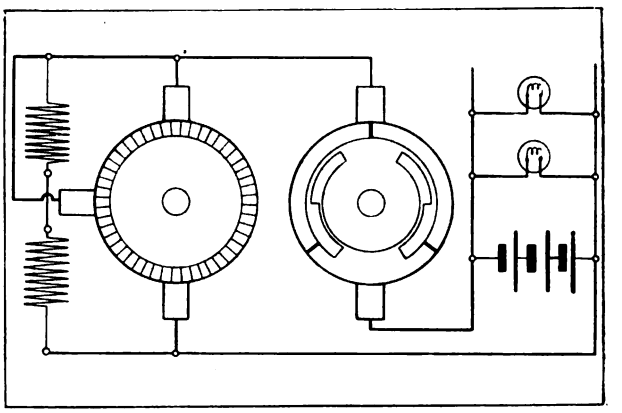


Fig. 75—Diagram of Circuit Connections Showing the Simplicity of System.

The Holtzer-Cabot Electric Company states that it has found by experience that the larger current output of its dynamo is absolutely necessary, but emphasizes the fact that it is always below the rated maximum charging current of the battery. This, it is stated, keeps down the temperature of the electrolyte, and insofar as lead batteries are concerned, prevents deterioration of the plates. The use of the B-6, 120 ampere-hour Edison battery is recommended by the company because of its design, as it may be left indefinitely in a charged or discharged condition without affecting its efficiency, and because of its long life is held to be more economical in the end. Any good acid battery may be employed, however, the make being optional with the purchaser.

Current and Speed Characteristics.

The current and speed characteristics of the dynamo are given in the chart depicted at Fig. 76 and it will be noted that the dynamo is cut in at 300 revolutions a minute, and that the rise in amperage is steady being held at the desired amperage at medium or excessive speeds.

In this instance the dynamo was driven at crankshaft speed which is satisfactory either with a four or six-cylinder motor. When driven at 1.5 times crankshaft speed the voltage showed six volts at 325 revolutions a minute of the armature shaft, and that at medium or high speed the voltage was held steady,

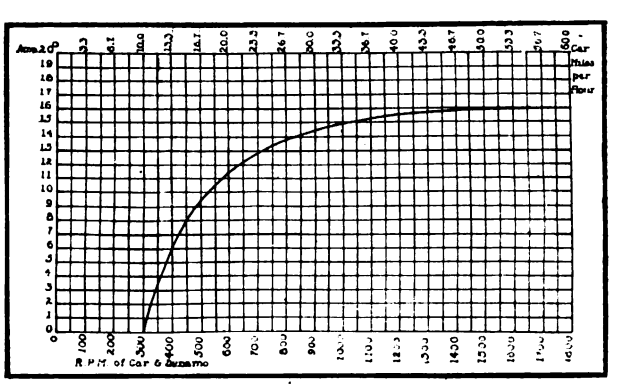


Fig. 76—Characteristic Curve of Dynamo Cut in at 10 Miles an Hour and Operating to Car Speed of 60 Miles.

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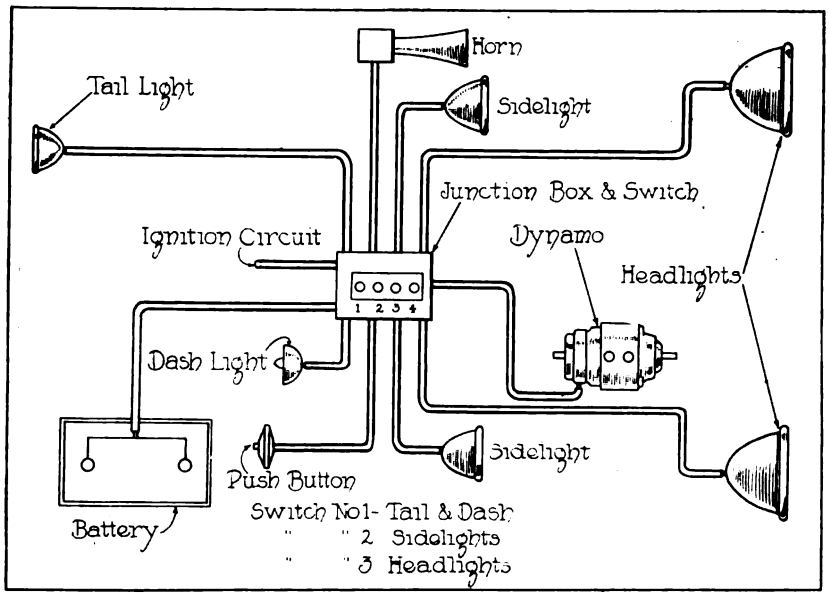


Fig. 77—The System Is Installed Easily, as Will Be Noted by the Wiring Diagram, and Wires to the Battery May Be Connected Without Regard to Polarity.

and without lamp loads was always under seven volts. The voltage and current characteristics of the dynamo with an Edison four-cell B-6 battery with lights burning and aggregating 48 and 60 candlepower shows but little variation, it being very steady. Tests with an Elba battery resulted similarly.

The Holtzer-Cabot dynamo lighting system will appeal to the discriminating motorist who desires a high grade, efficient, simple lighting system, one that will provide excellent service at all times, irrespective as to whether the automobile is operated more continuously in the day or night.

CALIFORNIA BANNER STATE.

Regarding the growth of the automobile industry in California, V. A. Longaker, general manager of the American Motors Company, Indianapolis, Ind., has prepared some figures of interest. According to him there is one automobile license number for every 30 inhabitants of the state. Recently the secretary of state announced that there are 75,675 machines licensed in the state. The population of the state in 1910 was 2,377,549. New York, with a population of 9,113,279 in 1910, recently reported having reached the 75,000 mark. Mr. Longaker, says:

"Placing the average cost of the automobile at $1200 (if you want to, you are privileged to scale down or up on this figure) those 75,675 California licenses mean an expenditure of $90,810,000. These statistics do not include motorcycles, ever increasing numbers of which are being sold to those who cannot afford a four-wheeler. Farmers are largely investors in motor cars now according to the licenses issued. Especially are they buying gasoline trucks for the multifarious activities of the ranch."

PERFEX MAKES APPEARANCE.

The Perfex car, designed and built under the direction of James Fouch, and made by the Perfex Motor Car Company of Los Angeles, Cal., recently made its appearance on the Pacific Coast. Considerable ceremony attended the introduction of the first car to the public, H. B. Gurley, assistant secretary of the Los Angeles chamber of commerce, breaking a bottle of Owens river water over the radiator as it left the factory. Several prominent easterners are said to be interested in the new concern, including Paul Brown, a broker and member of the New York exchange.

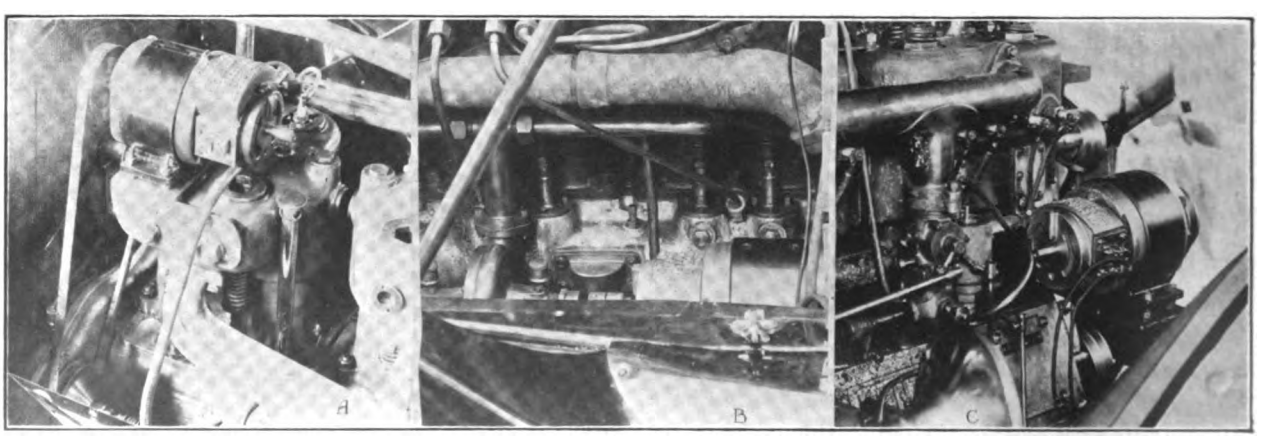
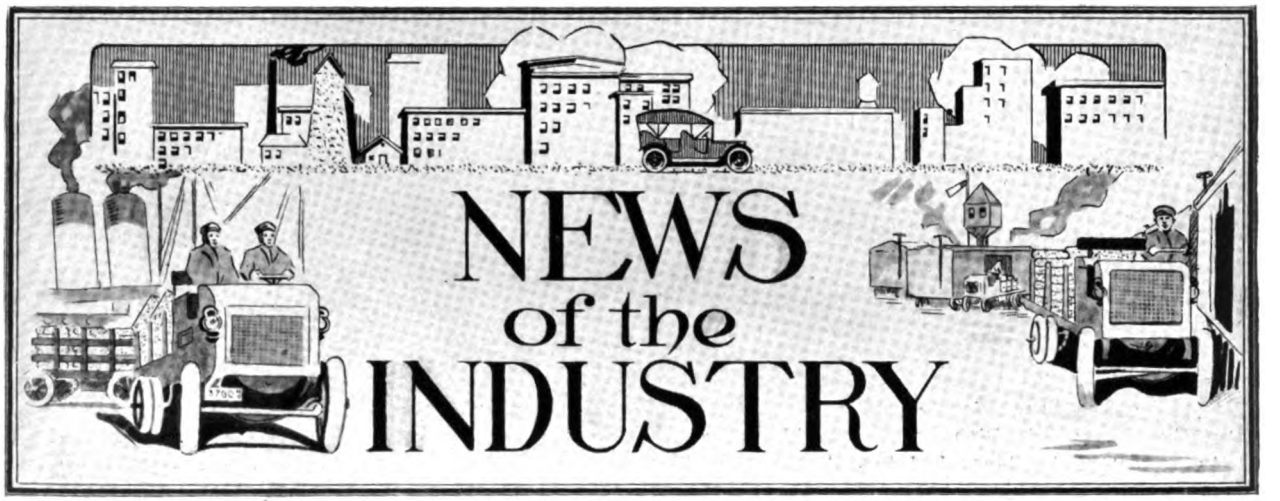


Fig 78—Outlining the Installation of Dynamo: A, Located on Cylinder and Driven by Belt from Pump Shaft; B, Dynamo Coupled Direct to Pump Shaft; C, Belt Driven from Crankshaft.

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CORBIN IN NEW FIELD.

New Britain Concern Announces Its Entrance into Manufacture of Speedometers.

Announcement has been made by the Corbin Screw Corporation, a division of the American Hardware Company, New Britain, Conn., that it will manufacture and place on the market the Corbin-Brown speedometer. The device has been known as the Brown speedometer, but under the new name will embody a number of invaluable features.

The Corbin-Brown instrument is the invention of Col. W. C. Brown of New York City, who will be sales manager of the speedometer department of the Corbin Screw Corporation. The advent of the Corbin concern into this field is significant because of its large capital, assets, and distributing branches and sales forces in New York, Philadelphia, Chicago and San Francisco.

STEWART TRUCK COMING.

Recently Organized Buffalo Concern Makes Announcement Relative to Its Product.

The new Stewart Motor Corporation, Buffalo, N. Y., recently formed by T. R. Lippard and R. G. Stewart, who withdrew from the Lippard-Stewart Motor Car Company, has secured the big plant recently vacated by the Niagara Machine & Tool Works at the corner of Randall and Superior streets, Buffalo. It will be put into condition for occupancy at once, orders for machinery, equipment, etc., now being placed from the temporary offices of the concern at 1056 Ellicott square. Every effort will be made to start manufacture at the earliest possible moment, so as to fill orders already received for early fall delivery.

The new company will manufacture light trucks. Mr. Lippard is president and general manager; Mr. Stewart, vice president and chief engineer; R. P. Lentz, for several years connected with the London & Lancashire Fire Insurance Company of Hartford, Conn., secretary and treasurer, and Robert W. Ingersoll, recent manager of the Firestone Tire & Rubber Company of Buffalo, sales manager.

The new product will be known as the Stewart truck, being named after Mr. Stewart, who also was the designer of the Lippard-Stewart truck. Automobile men who are acquainted with the designs of the new product, proclaims it ahead of anything that has ever been placed upon the market, and say it is bound to meet a ready sale.

PRESIDENT JAMIESON DEAD.

Head of Abbott Motor Company Succumbs in Pennsylvania Home After Long Illness.

Charles W. Jamieson, president of the Abbott Motor Company, Detroit, died at his home in Warren, Penn., early in the month, after an illness lasting over a year. He had been kept to his bed since last December. A short time ago strong hopes of recovery existed, and the announcement of his death came as a distinct shock to the industry. The management and future plans of the company will in no wise be affected, it is announced.

Mr. Jamelson became a heavy stockholder in the Abbott company on its reorganization two years ago. He was made president and had been one of the chief instruments in its development. His financial resources were large and he employed them freely in the Detroit enterprise. He was one of the largest independent oil refiners in the country; was president of the First National bank of Warren, and was heavily interested in mining and manufacturing.

For the past seven months the affairs of the Abbott company have been directed by F. M. Knapp of Warren, one of the directors, who will continue in charge.

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NEW OLDSMOBILE HEAD.

Oliver C. Hutchinson Leaves Marquette Company to Succeed W. J. Mead.

With the announcement that W. J. Mead, vice president and general manager of the Olds Motor Works, Lansing, Mich., had resigned to become president of the reorganized Amplex Motor Car Company, Mishawaka, Ind., came the information that Oliver C. Hutchinson, formerly head of the Marquette Company, Saginaw, Mich., had been promoted to succeed him.

Few men in the industry are better known to the trade throughout the country, but his most signal success has been in connection with the Marquette company, the product of which may be considered as one of the newest of the General Motors Company, having been placed in the market last year. The plans put under way by Mr. Hutchinson have caused this car to become as thoroughly entrenched as many of the older machines.



O. C. Hutchinson, General Manager, Olds Motor Works.

In connection with the promotion of Mr. Hutchinson, comes the statement that interesting announcements concerning the Oldsmobile line for 1913 may be expected in the near future when Mr. Hutchinson becomes thoroughly acquainted with his new duties.

WILLYS-GARFORD COMBINE.

President of Overland Concern Adds Garford Company to His Present Holdings.

The agreement between the Willys-Overland Company, Toledo, O., and the Garford Company, Elyria, O., whereby the former has marketed the products of the latter, was dissolved recently, and John N. Willys, president of the Willys-Overland Company, took over the controlling interest in the Garford company. Following the disposal of his interests, Mr. Garford sailed for Europe in company with M. D. Johnson of Cleveland, O., his attorney and business adviser.

Mr. Willys has been elected president of the Garford company, and George W. Bennett vice president, these being the positions thy hold in the parent Willys-Overland holding company. Vice President Bennett plans to spend one day a week at the Garford plant, as well as a day a week at the Gramm Motor Truck Company's factory in Lima, O., which recently also was secured by the Willys interests.

AUSTIN ADDS CAPITAL.

Maker of Well Known Car Reorganizes in Order to Increase Production Facilities.

Plans are under way for a reorganization of the Austin Automobile Company, Grand Rapids, Mich. For the past 10 years, James E. and Walter S. Austin, father and son, have conducted the business and have manufactured in limited quantities one of the most imposing cars that have come out of the West.

George H. Davidson and William R. Shelby of Grand Rapids have become interested with the Austins, and a $500,000 corporation will be organized. Of the capital, $300,000 will be represented by common stock and $200,000 by six per cent. preferred. It is planned to make the Austin product a greater factor in the automobile field than heretofore.

PREST-O-LITE PATENT.

Illinois Judge Makes Important Ruling Affecting Product of This Concern.

Justice Kohlsaat of the United States district court for the northern district of Illinois, has decided that the patent of the Prest-O-Lite Company of Indianapolis, Ind., is dead, despite the fact that seven United States district courts and one United States circuit court of appeals have decided that it is still entitled to a lease of existence for some five years. His decision was rendered in the action brought by the Prest-O-Lite people against the Searchlight Gas Company of Chicago, sustains his denial of a preliminary injunction, and until the case is fought out in the court of appeals, gives the Searchlight company the right to continue its business as heretofore, within that judicial district.

The line of suits hinges about a point of patent law. Prior to 1897 the statute held that a foreign patent taken out in the United States expired at the same time as the foreign patent, but the law was amended in that year. The application for the Claude & Hess patent, under which the Prest-O-Lite Company has manufactured its product, was made before 1897, but was not granted until Dec. 25, 1900. The English right officially expired June 30, 1910. The English and American patents are somewhat similar. The defense has contended that the Prest-O-Lite patent is the same as the English grant, and since application was made prior to 1897 it has expired. The Prest-O-Lite contention, which has thus far been upheld, is that the English grant covers a "process," while the American covers an "apparatus."

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COLE SALES DEPARTMENT.

Absorbs Henderson Selling Organization and Promotes Several Members.

Following the announcement a short time ago that the Cole Motor Car Company, Indianapolis, Ind., had absorbed the Henderson Motor Sales Company of the same city, came the news that Charles P. Henderson, who was at the head of the sales company, had been made general sales manager of the Cole company. H. C. Lathrop, who was secretary and treasurer of the sales company, is to have charge of the Indianapolis branch of the Cole company, with a large allotment of territory.

The large organization that surrounded Mr. Henderson and assisted him in the general success of the sales company, goes bodily to the Cole company, some advancements being made. Edward Harris, who was in charge of the promotion department, moves to the position of assistant sales manager; Jay D. Riker, who comes from the Parry Buggy Company, takes the promotion department; John A. Murphy, cashier of the sales company, becomes assistant secretary of the Cole Motor Car Company; E. E. Rogers remains in his same post; Homer McKee is advertising director; H. C. Bradfield takes the road as travelling newspaper consultant, while Harlow Hyde, a new man, has been taken on in charge of the detail work in the advertising department.

DUQUESNE CAR COMING.

Pittsburg Capitalists Organize Concern Which Will Locate in That City.

The Duquesne Motor Car Company, a close corporation, financed by a small number of leading business men in Pittsburg, Penn., has been formed, and will begin the manufacture of pleasure cars in the Pennsylvania city. About 250 men will be employed at the beginning, and it is planned to manufacture 500 pleasure cars as the first year's output.

Early in the campaign for the formation of the new company, the Industrial Development Commission of Pittsburg called attention to the fact that 45 per cent. of all the raw material used by automobile manufacturers was made in that city, and but few automobiles were manufactured there. The commission also called attention to the fact that the topography of Pittsburg would insure satisfactory results from any car that could withstand the tests made there. As a result of the commission's efforts the new concern was organized.

W. L. Rodgers, president of the Pittsburg Gage & Supply Company, is president. Oscar J. Howick, formerly designer for the Lozier Motor Company, Detroit, and Frank H. Morse, the engineer who developed the KisselKar, are associated with the new company, the former as designer and the latter as engineer. The company has established its plant at 30th and Liberty streets, where it occupies a floor area of 60,000 square feet.

The first model will be a four-cylinder, five-passenger car with 50 horsepower Wisconsin motor of the T head type. It will be equipped with an electric self-starter and electric lights. Designs are also being made for a six-cylinder, seven-passenger model. The company proposes to enter the field in the fall. The product will be known as the "Duquesne," and the trade mark will be the seal of the city of Pittsburg, enamelled in the colors of the city, black and orange.

The Duquesne Motor Car Company has a present nominal capitalization of $25,000, which will be shortly increased to $250,000. R. F. Rampsey of Pittsburg is the treasurer.

NEW GRAMM COMPANY.

Close Corporation Formed with Capital of $500,000 to Manufacture Trucks.

B. A. Gramm, who a short time ago retired from the Gramm Motor Truck Company, when John N. Willys, president of the Willys-Overland Company, Toledo, O., took over the former company, has become associated with M. Bernstein, a very wealthy and successful manufacturer in Lima, O., in a new corporation to be known as the Gramm-Bernstein Company. The capital stock of the new concern is $500,000, of which $300,000 is common and $200,000 preferred.

Fred Biszantz, designer and general superintendent, formerly with the Gramm company, and one of the best known men in his line in the country, is to be with the new organization. Mr. Bernstein, formerly a director in the Gramm company, is president; H. O. Bentley is secretary, and Mr. Gramm is vice president and general manager.

An excellent plant has been purchased in Lima. Additions are now under construction, which, when finished, will give a total of 125,000 square feet of floor space. The building is all of one story, steel constructed, with the most modern lighting system. Everything is light, airy and sanitary. The structures are located on the main line of the Pennsylvania and D., T. & I. tracks, providing the best facilities for shipping. Concerning the new company, Mr. Gramm states:

"We have been working up the business, and, no doubt, the country will expect the best trucks on the market from us, owing to our great experience in this business, having specialized in it for years. We are placed in a position where we have nothing to hold us back from producing the best. Already half of our next year's output is spoken for. Our aim is to build every truck a masterpiece, and produce the trucks in such a way that they will themselves become our best salesmen."

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ANOTHER BIG CONCERN.

W. C. Durant Said to Be Moving Spirit in $65,000,000 New York Corporation.

W. C. Durant, active head of the Little Motor Car Company of Flint, Mich., and of the Chevrolet Motor Car Company, Detroit, is said to be the principal moving spirit in the Republic Motor Company, recently formed in New York City with a capital stock of $65,000,000. It is claimed that the new concern is to build large factories in 10 of the leading cities of the country, which will serve as assembling plants for the Little and Chevrolet companies.

Quarters for the first plant in the long string were recently secured in New York, when the factory formerly occupied by Rothschild & Co., automobile body builder, which occupies the entire block front on 11th avenue, between 56th and 57th streets, was secured. R. L. Losey, who recently resigned his position as manager of the Indianapolis branch of the Buick Motor Company, is now in New York where he has a position as sales manager for the new Republic company.

PLANS FOR EXPANSION.

Republic Rubber Company Intends to Increase Capital Stock to $10,000,000.

Directors of the Republic Rubber Company, Youngstown, O., recently authorized the calling of a stockholders' meeting to be held early in August for the purpose of increasing the capital of the company from $4,000,000 to $10,000,000. The capital after the increase will consist of $6,000,000 common and $4,000,000 preferred.

No definite announcement has been made as to the amount of additional capital to be issued this year. It is understood, however, that the growth of the business will require new funds before another season.

The directors have also authorized the construction of a large modern reclaiming plant, which, with the completion of the five-story building now in course of erection, will give considerably greater capacity.

LONG OVERLAND TRIP.

Thirty Reo Enthusiasts from Iowa Visit Michigan Plant to Secure Their Cars.

Owing to the unexpected demand for Reo the Fifths, made by the Reo Motor Car Company, Lansing, Mich., the general sales agent, R. M. Owen & Co., of that city and New York, has been experiencing difficulty in securing shipping facilities for making deliveries as rapidly as purchasers would desire. Many new owners have felt compelled to visit the factory in order to take possession of their cars. An accompanying illustration shows 30 Reo enthusiasts thus employed.



Party of Reo Enthusiasts Leaving the Factory in Lansing, Mich., on Novel Overland Trip.

Early in the month R. M. Owen & Co., received a telegram from its representatives in Fort Dodge, Ia., conveying the information that 30 residents of that city were on their way to Lansing and had planned to drive their Reo the Fifths over the road to Fort Dodge. By special arrangements they were able to cure the 15 cars required and the homeward trip was begun.

The return route was by way of Grand Rapids, where the Reo caravan was entertained by W. D. Vandecar, the veteran local dealer. Thence the way led through Grand Haven, Chicago and the transcontinental route to Fort Dodge. The 600-mile trip was made without the slightest mishap to cars or passengers, and this is believed to be the first instance on record where so large a number of motorists has gone such a distance from their homes to an automobile factory in order to insure the receipt of their cars.

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FEW GOOD ROADS.

Noted British Highway Enthusiast Makes Interesting Comment on American Conditions.

Lord Montagu of Beaulieu, Eng., editor, and an enthusiastic motorist, recently returned to New York City from a several weeks' trip through the Middle West, the middle Atlantic states and Canada, where he made an exhaustive study of American roads and methods used in American road building. That the United States has plenty of automobiles, but comparatively few good highways is his opinion, expressed just before he was preparing to leave for his home country.

He commends the generous appropriations for road building in this country, but claims a mistake is made in that practically no provision for their maintenance is provided after they are once constructed. He points out that in England there is a regular maintenance tax laid upon the road users, and suggests the same idea for this country. He says that there are hundreds of foreign tourists who would come to America every year to enjoy the beautiful scenery, but for the fact that the roads generally are poor. He claims that if the travelling were good, foreigners would be willing to pay a tax of $1 for every 50 miles while touring here.

The best roads he encountered while on this side, he said, were in and around New York City, Boston, Mass., and Washington, D. C.

NEW YORK SHOWS.

Automobile Board of Trade Completes Plans for Two Exhibitions Next January.

At a recent meeting of the Automobile Board of Trade in New York City extensive plans were considered for the January automobile show, which will be conducted in two buildings—the new Grand Central Palace and the Madison Square Garden, with a single admission to both. It was definitely decided to open the demonstration the evening of Jan. 11, 1913, with an exhibition of pleasure cars in both buildings, continuing until Jan. 18. The commercial vehicle display will also be held in the two buildings and will follow that of pleasure cars, opening Jan. 20 and closing Jan. 25.

Resolutions were passed on the death of Alfred N. Mayo of the Knox Automobile Company, one of the oldest members of the board, and a leader in the automobile industry since its inception.

Those present were: M. L. Downs, Autocar Company; W. C. Leland, Buick Motor Company, Cadillac Motor Car Company, Cartercar Company, Elmore Manufacturing Company, Marquette Company, Oakland Motor Car Company, Olds Motor Works, Rapid Motor Vehicle Company, Reliance Motor Truck Company; Hugh Chalmers, Chalmers Motor Company; James C. Dryer, James Cunningham Son & Co.; G. H. Stilwell, H. H. Franklin Manufacturing Company; G. W. Bennett, Garford Company; E. W. Headington, Haynes Automobile Company; E. H. Broadwell, Hudson Motor Car Company; Howard M. Davis, Knox Automobile Company; W. S. M. Mead, Lozier Motor Company; W. C. Shepherd, Matheson Automobile Company; William T. White, Mercer Automobile Company; William E. Metzger, Metzger Motor Car Company; James M. Cram, Mitchell-Lewis Motor Company; W. H. VanDervoort, Moline Automobile Company; E. J. Moon, Moon Motor Car Company; George M. Dickson, National Motor Vehicle Company; C. C. Hanch, Nordyke & Marmon Company and Premier Motor Manufacturing Company; M. J. Budlong, Packard Motor Car Company; L. H. Kittredge, Peerless Motor Car Company; Charles Clifton, Pierce-Arrow Motor Car Company; George Pope, Pope Manufacturing Company; Oscar Stevenson, Pullman Motor Car Company; F. B. Stearns, F. B. Stearns Company; J. E. Quimby, E. R. Thomas Motor Car Company; Windsor T. White, the White Company; Alfred Reeves, United States Motor Company; John N. Willys, Willys-Overland Company; C. W. Churchill, Winton Motor Carriage Company; H. A. Bonnell, general manager.

ILLINOIS CENSUS FIGURES.

Report Shows the Industry Enjoyed Remarkable Growth During Five-Year Period.

During the five years, from 1904 to 1909, the automobile industry in Illinois shows a remarkable gain, according to the report of the 13th census recently issued by Director E. Dana Durand. The establishments increased from 12 to 65, and the value of the product from $357,000 to $7,154,000. The number of people employed in 1904 was 167 and in 1909, 2382. The following tables give comparative figures that show the growth:

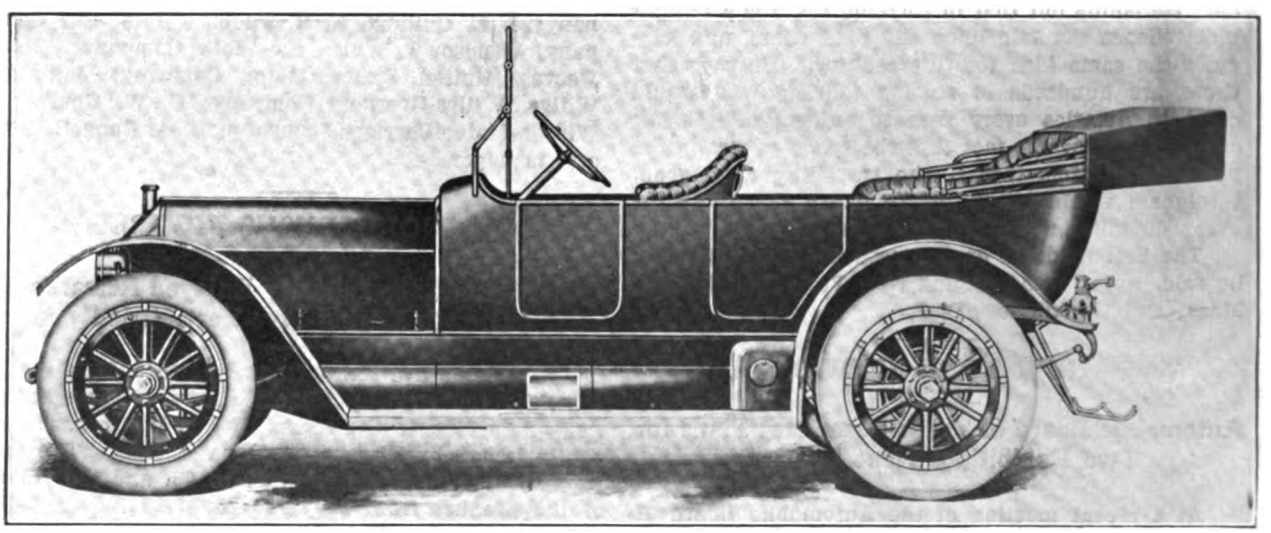
State of Illinois.	1904.	1909.
Number of establishments	12	65
Persons engaged	192	2,804
Proprietors	8	41
Salaried employees	17	381
Wage earners	167	2,382
Primary horsepower	136	1,786
Capital invested	$401,000	$4,084,000
Salaries paid	28,000	426,000
Wages paid	107,000	1,653,000
Cost of materials	112,000	3,979,000
Value of products	357,000	7,154,000
Value added by manufacture	245,000	3,175,000
City of Chicago.		
Number of establishments	11	41
Persons engaged	190	1,725
Proprietors	7	17
Salaried employees	17	248
Wage earners	166	1,460
Primary horsepower	....	734
Capital invested	$399,000	$2,094,000
Salaries paid	28,000	305,000
Wages paid	106,000	1,131,000
Cost of materials	111,000	1,707,000
Value of products	354,000	3,940,000
Value added by manufacture	243,000	2,233,000

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NEW SIX-CYLINDER IN 1913 KNOX LINE.

THE announcement of the Knox Automobile Company, Springfield, Mass., of the pleasure cars that it will produce for the 1913 season is to the effect that the three models built for 1912 will be continued, with certain refinements, and that there will be a new production, known as model 46, a six-cylinder machine of 46 horsepower, S. A. E. rating, which will have a distinct innovation in radiator and hood design.

Model 46 will have a somewhat unusual appearance, which will give a racy effect, and yet it will not be sufficiently pronounced to create adverse comment. As viewed from the side or from the front the sloping radiator, which will have a rather longer head and a slightly peaked or cone appearance, will attract decided attention. It will have all the Knox features and, of course, the expectation is that it will meet with a large measure of approval from motorists.



Model 46, the 46 Horsepower Six-Cylinder Chassis Added to the Knox Automobile Company's Line for 1913, 130-Inch Wheelbase.

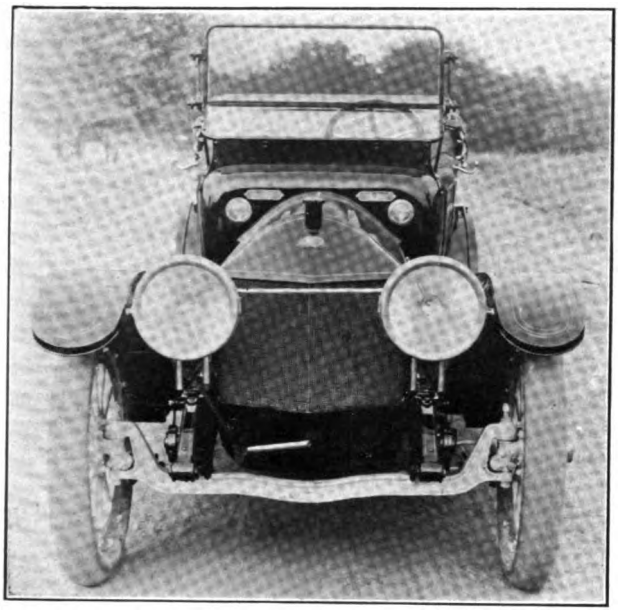
The model R becomes model 44, model R-45 becomes model 45, and model S, the 60 horsepower six-cylinder, becomes model 66. These chassis are furnished with the varying types of bodies built by the company. The finish is up to the Knox standard and the equipment with each is complete, though this may be varied at the purchaser's option.

The following description will deal particularly with model 46, but it will be understood that this can be applied generally to all the other chassis. The motors of the other models have the same bore and stroke, five-inch bore and 5.5-inch stroke, aside from wheelbase and tires with variance of chassis length and wheel proportions, and some minor details. Emphasis is placed upon the fact that Knox machines have been continued with few modifications, this being regarded as practical demonstration of the stability of construction and the soundness of the engineering principles on which the chassis were designed. In addition to the refinement of the chassis the bodies have been perfected and it is maintained that these are more than ever entitled to commendation as work of the highest class.

The motor of model 46 is six-cylinder, water-cooled, and is with a bore of 4.375 inches and stroke of 5.5 inches, this being a bore to stroke ratio of one to 1.257, and the longest stroke motor (in ratio) ever built to Knox design. The rating by the S. A. E. formula is 45.9375, so it will be seen that the claim of 46 horsepower by the maker is decidedly conservative. The probabilities are that the power will closely approach 60, at maximum speed. The power plant is of the well known Knox unit design, in which a large yoke carries the exposed flywheel and clutch, and supports the gearset case in the transmission, so that while the assembly may be removed from the chassis as a unit, it is also practical to take out either the flywheel or the clutch without disassembling the engine or the gearset. The entire power plant may be removed from the chassis by the removal of four bolts, one at either side of the yoke at the rear, and the two trunnion bolts in the centre of the forward cross frame member. Besides this it is necessary to uncouple the forward universal joint, the exhaust pipe connection, the wiring of the ignition system and the throttle and brake connections, a comparatively simple process.

The cylinders of the six-cylinder motors are cast in pairs, these being of a superior quality of fine gray iron. They are of the I type, so-called, being plain cylinders with the water jackets integral. The water jacket spaces are large and extend practically the full

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Model 46 Head-On, Showing New Design of Radiator, Dash and Front Axle, All Characteristic of This Machine.

length of the expansion chamber. The heads are cast separately and these are with the water jackets integral, the water chambers being divided by a horizontal web extending nearly the entire width of the head. The pistons are of the same material as the cylinders and heads.

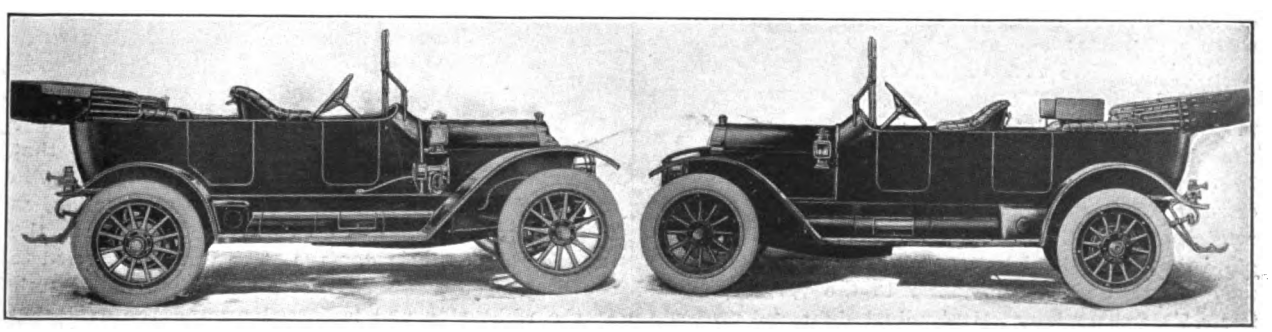
The cylinders are bored and aged, after which they are reamed, ground and polished, purpose being to eliminate any roughened surface to which carbon deposits might adhere. The heads are quite as carefully machined and finished. The cylinder casting is machined with a deep groove encircling the unit and the head is machined with a tongue that exactly fits the groove, so that with a copper asbestos gasket fitting the groove when the cylinder head is drawn down to the cylinder by the heavy retaining bolts a perfect gas tight joint is formed. The valves are carried in the head and are removed with that member, making it possible to completely clean the cylinder of carbon with comparative ease, while replacing a valve is a matter of little labor or effort.

The pistons are turned and ground to exact fit, they being channelled for four bevel-split rings of the eccentric form, three of these being fitted near the top and above the wristpin, and one close to the base of the piston. This insures a high degree of compression and a retention of a sufficient quantity of lubricant at all times.

The crankcase is a special aluminum alloy casting that has a lower or bottom section that forms the oil reservoir. This deepens at the rear of the case. The forward web carries the main bearing and there is a cover that encases the timing gears. Two transverse webs divide the case vertically, these carrying the centre main bearings. The top of the crankcase is heavy and the bottoms of the cylinders are machined to fit the openings, this affording the depth of the thickness of the crankcase below the wide retaining flanges, and making a specially firm seat for the cylinder units. At either side of the crankcase is bolted the heavy aluminum alloy arms that form the sides of the yoke supporting the clutch and transmission, two large bolts securing these to the crankcase, and between the rear ends of the yoke arms the gearset case of the transmission is bolted. About midway of the length of the yoke arms are bosses, where the yoke is bolted to the chassis frame side members. When assembled this forms a unit that is absolutely rigid and mechanically correct.

The crankshaft is a high grade alloy steel drop forging that is specially heat treated and is finished and ground to size. There are four main bearings of large size, effectually maintaining the shaft rigid and true. The camshaft is an alloy steel drop forging with the cams and the two spiral gears cut integral with the shaft. The cams and bearing surfaces are ground to exact size and the shaft is hardened. The shaft is carried in three phosphor bronze bearings, the centre bearing being in halves and designed to be taken up by filing the edges. The connecting rods are nickel steel drop forgings and the big end bearing caps are secured by two bolts at either side, with three thicknesses of shims between the bushings that adjustment for wear may be made. The wristpin end is with a solid eye into which the bushing is forced by pressure.

The main engine bearings and the connecting rod



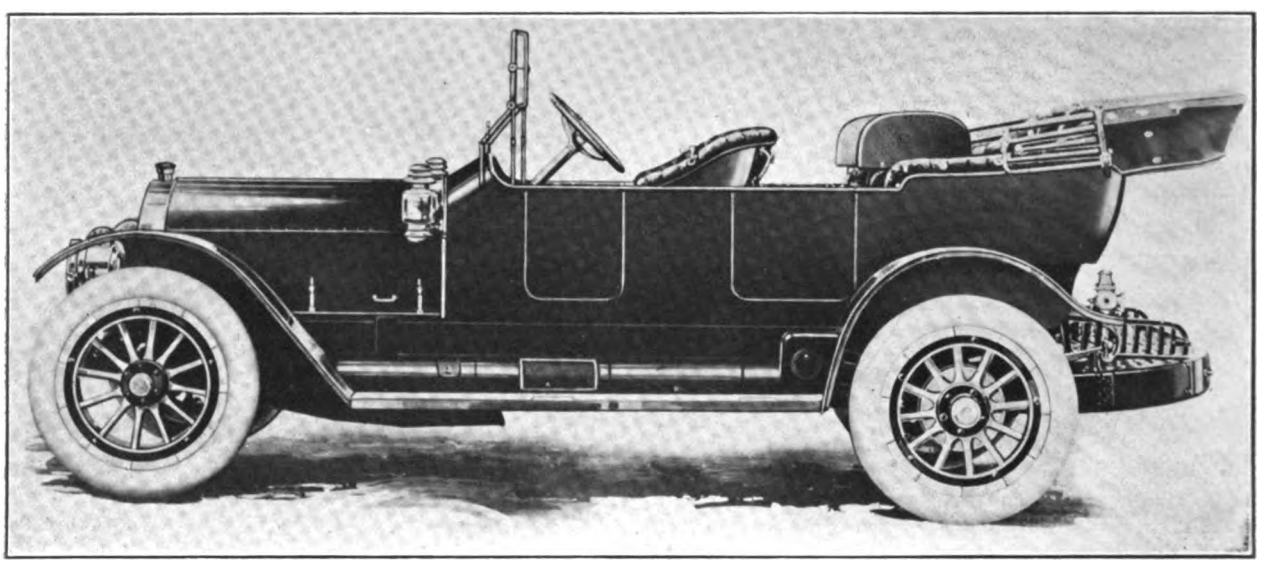
Model 44, the Smallest Powered Knox Chassis and Touring Body, 122-Inch Wheelbase.

Model 45, Fitted With a Seven-Passenger Touring Equipment, 126-Inch Wheelbase.

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bearings are of special bearing metal, which are carefully scraped to a fit. The wristpins are of special steel, hardened and ground, and these are firmly secured in the piston bosses. The valve tappets are carried in guides bolted to the engine case and the rods at the base have a yoke in which is inserted a hardened steel roller that engages with the cam below. The guides are formed with shoulders to permit the yokes to lift, and at the tops of the guides are collars threaded into the guides. The ends of the tappets have hardened adjusting screws, and the lower ends of the pushrods have fittings that receive the upper ends of the tappets, with helical springs interposed between collars on the pushrods and the tappet guides, always maintaining the relation between the pushrods and the tappets and preventing noise, as the tappets and cams are always in contact. The upper ends of the pushrods have fittings with hardened cup shaped sockets which are adjustable by screws for length to vary the valve openings, the adjustment being secured by lock nuts. The rocker arms have ball shaped ends that fit into the sockets at the ends of the pushrods. The valves are of nickel steel and they are carried in large guides that may be renewed when worn. The valve springs are above the head and are adjustable for tension. The sockets at the top of the pushrods are filled with lubricant and with the springs employed there is no lost motion, little wear and an entire absence of noise. The rocker arms are lubricated by grease cups. The head of the cylinder unit is enclosed with an aluminum case that is held by the bolt retaining the cylinder head, and this is covered by a plate that is retained by two wing nuts, so that access may be made almost instantly to the valve mechanism. This cover is practically dust tight and prevents abrasive material collecting on the rods and rockers, and valves, and causing undue wear and noise.

The camshaft is at the right side of the motor and at the forward end of this is a carrier, and to this is bolted a sprocket for a silent chain. In the carrier are two rows of nine holes each diametrically opposed. Similarly the sprocket has two rows of 10 holes each diametrically opposed. There is thus a vernier adjustment, as the bolts attaching the sprocket to the carrier may be moved to give practically every desired valve adjustment without changing the sprocket chain, this being a feature that will be appreciated by every motorist. The main engine shaft extension carries two silent chain sprockets, the inner sprocket being the larger, and from this is driven the outside shaft that operates the magneto and the dynamo, the outside shaft turning 1.5 times as fast as the engine shaft. The camshaft is driven from the outer sprocket on the crankshaft and this turns at half the time of the crankshaft. This form of drive eliminates the noise that is inherent in any type of gear, either spur or spiral, and it is said to be perfectly silent under any condition of operation. Beside this timing is greatly simplified. Exceptionally wide, coarse pitch chains are used and as they are thoroughly stretched before assembly it is held that in practise they will run indefinitely without developing any serious back lash.

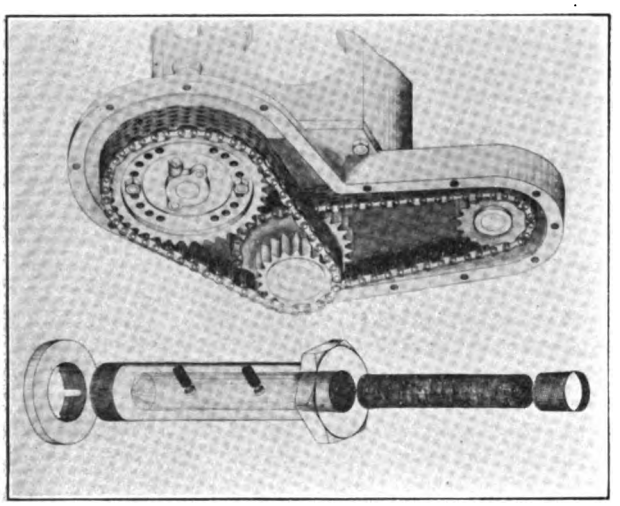


Model 66, the Largest Knox Six-Cylinder Chassis, 60 Horsepower, With a Touring Body Adapted for Seven Passengers, 134-Inch Wheelbase.

The motor is cooled by a circulation of water through the jackets and the radiator, driven by a large pump of centrifugal type, which is so designed that the rotor or impelling member of the pump will slip on the shaft in the event of a serious obstruction, as of ice formed in the pump chamber, to preserve the impeller blades from damage. The water is carried to the base of the water jackets of each cylinder unit at the right side and is forced around the explosion chamber. Thence it rises to the top and the overflow is carried by force and thermal action to the U shaped

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yokes at the left side connecting the cylinder jackets with the cylinder head jackets. The water enters the lower chambers of the head, crosses them and cools



Silent Chain Drive of Knox Camshaft and Magneto Shaft, and the Detail of the Self-Lubricating Spring Bolt.

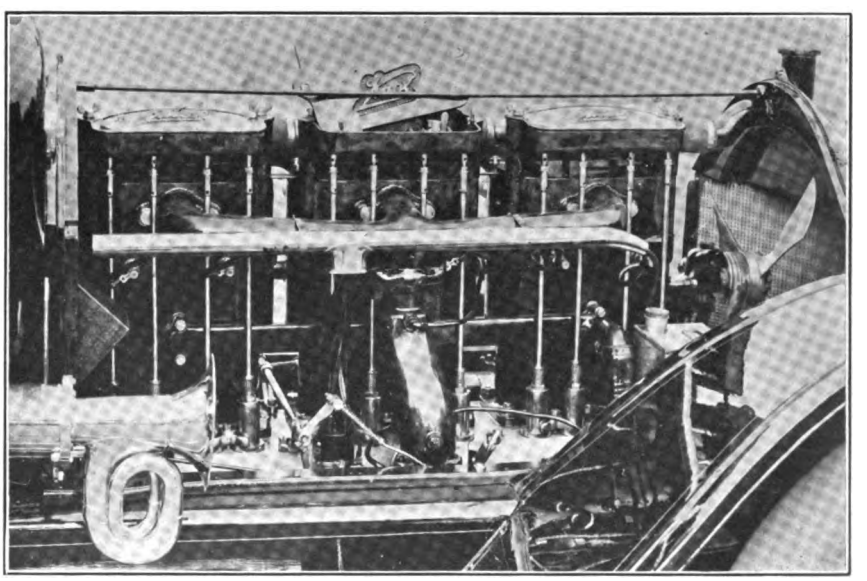
the valve chambers, and then recrosses the heads and is carried forward through flexible rubber unions between each cylinder unit and the radiator. The construction of the water connections may be noted from the illustration of the motor.

The radiator header slopes forward from the front line of the hood at an angle of about 45 degrees. Instead of the usual tubing at right angles to the chassis frame side members the radiator is coned from the centre to the sides, the angle being about 15 degrees, and it is thickest in the apex of the cone. The effect is not too pronounced and is decidedly pleasing. The illustration gives a very good idea of the construction. The water pump is driven by a spiral gear from the camshaft. There is a three-bladed fan mounted on a shaft that is carried in a bracket on the forward cylinder unit, and the wide flat belt, impervious to water or oil, may be given any desired tension by an adjustment at the bracket.

The lubrication of the motor is by an improved De Dion system. The bottom of the crankcase forms the oil reservoir and from this at the ride side is a vertical shaft driven by spiral gears by the camshaft, that actuates the rotary oil pump. The lubricant is drawn through a strainer into the oil well and forced through a main supply pipe at the left side of the engine case, and through four pipes to the main engine bearings, which are constantly flooded with oil. The crankshaft is drilled with channels from the main bearings to the wristpin bearings, and the connecting rods are drilled with channels from the big to the small end bearings. Once each revolution the oil tubes register with the channels in the crankshaft and the holes in the wristpins register with the holes in the connecting rod big end bearings, so that with each impulse of the rotary pump the channels are filled and the main, crankpin, and wristpin bearings are thoroughly lubricated. Similar leads from the main supply tube lubricate the camshaft bearings. The oil thrown off by the centrifugal motion of the shafts insures abundant lubricity for the cylinder and piston walls. The oil pump is protected in the event of an obstruction, as is the water pump impeller. A pressure gauge on the footboard registers the oil system pressure, which may be varied as desired by an adjustable spring by-pass at the left side of the motor. The oil screen may be easily cleaned when desired. The filler cap and oil level cock are at the left side. A gallon of oil will afford lubrication for at least 500 miles.

The ignition is by two complete systems, the one being with a Bosch magneto driven by an outside shaft located at the left side of the motor, with the wiring leads from the magneto to a series of spark plugs at that side, and by a battery, coil and distributor, the distributor being driven by an extension of the vertical shaft that drives the oil pump at the right side of the motor. Either one or both may be used.

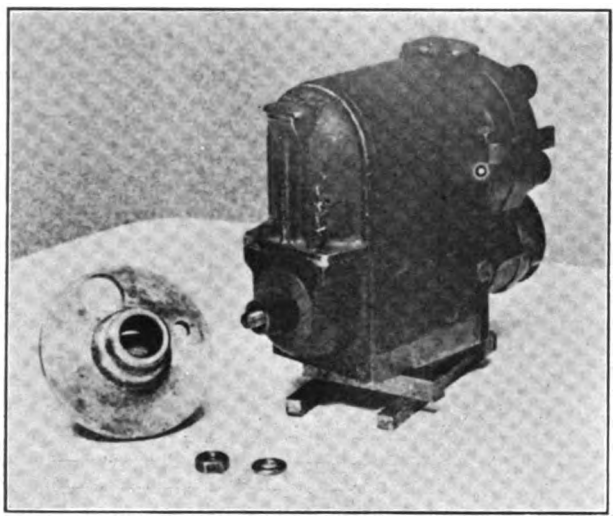
The clutch is a three-plate type with the centre plate carrying a series of cork inserts, and it is used without lubrication. Being contained in the flywheel and enclosed from dirt and water it is not susceptible



Right Side of the Long Stroke Motor of the Model 46 Knox Chassis, Showing the Water and Fuel Intake Manifolds, and the Distributor Wiring.

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to the usual influences that cause slipping and wear. It is maintained to be very efficient. The gearset is of the selective type, with three forward speeds and



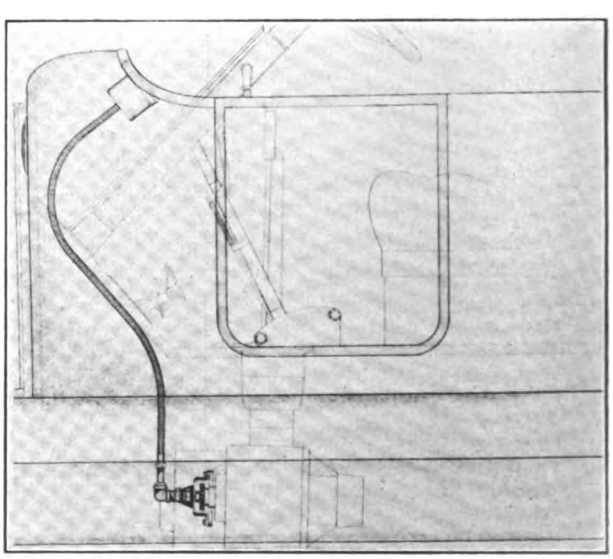
The Flexible Leather-Faced Coupling Between the Magneto and the Lighting Dynamo in the Knox Power Plant, That Eliminates All Driving Stresses.

reverse, and the case is secured in the yoke ends by four bolts, tongues and grooves insuring its rigidness. The shafts and gears are of nickel steel. The shafts are large and the main shaft is carried in double sets of annular ball bearings to insure against wear and side leverage pressure. The main set of driving gears are spiral cut to minimize noise in operation. The cover supporting the control lever is adapted so that either side or centre position for the lever may be obtained as desired.

There has been no change made in the driving system, this being by propeller shaft with two universal joints to the floating rear axle. The rear axle has a main differential housing of cast steel into which the axle tubes are anchored. The construction is strengthened by a strong truss rod beneath it. The shell may be opened by removing a cover plate at the rear, and the differential and the bevel gear, which are assembled as a unit in a cast steel cage, may be removed or examined. The gears are of large size and are of alloy steel, and the pinion gear and pinion shaft are of the same material. The rear wheels are mounted on imported annular ball bearings. The driving axles are of high grade alloy steel and clutches at the outer ends engage with the flange plates of the wheel hubs. The front axle is a drop forged alloy steel I section with a greater drop at the ends and less curve at the centre, this bringing the front spring correspondingly lower. The steering pivots and the axle spindles are fitted with Timken roller bearings of generous size. The wheels are an artillery type, of second growth hickory, and these are fitted with 37 by five-inch tires with demountable rims.

The springs are of a special alloy steel, those forward being 42 inches length and two inches width, and the rear springs being 54 inches length and 2.25 inches width. The forward set is semi-elliptic and the rear set three-quarters elliptic, the upper section of the rear springs being longer than in previous designs and with the forward ends scrolled, the scroll being formed to contact with a heavy rubber buffer attached to the lower half of the spring when a certain degree of deflection has been reached, this absorbing some of the shock and relieving the spring of excess strain. With previous models the forward ends of the lower halves of the rear springs were hung from the hangers by shackles, which necessitated the use of radius rods to preserve the relation of the rear axle with the chassis frame, these rods extending from the axle to the frame side members. With the model 46 design the forward ends of the rear springs are attached rigidly to the hangers and the rear ends are shackled, this permitting the drive to be through the torsion rod that parallels the driving shaft and the springs. The spring bolts are self-lubricating, being of inch diameter drilled with a half-inch channel nearly the entire length, with two small holes from this channel through one side of the wall of the bolt. The channel and the two holes are filled with felt rolls, which are saturated with oil. The outer end of the channel is closed with a plug that is screwed into the threaded end, and the compression forces the oil from the felt rolls in sufficient quantity to lubricate the spring eye for a long time and effectually prevent wear.

The steering gear is of the irreversible type, operated by a double right and left thread with a rocker



The Knox Method of Driving the Speedometer from a Gearing Attached to the Main Shaft, Securing the Mean Movement of the Traction Wheels.

action at the base, to which is secured the alloy steel rocker shaft. The column consists of two telescoped tubes, the one operating the throttle and the other

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the distributor through miter gears at the lower end. Positive adjustment for wear is made by a large nut located just above the gear housing, the adjusting nut being firmly secured by a bolt and a binder collar. The bell crank shaft and the pivot levers are large and of alloy steel. The drag link is straight and the socket ends are adjustable for wear. The front end is fitted with a double acting spring that reduces the shock and prevents rattle. The tiebar is placed back of the front axle and is well protected. The steering wheel is mahogany with an aluminum spider. The control is by spark and throttle levers above the steering wheel and by foot accelerator. The foot and brake and clutch pedals are adjustable and may be operated with slight pressure. The drive may be right side or left side, with the gearset and the emergency brake levers at the side or centrally located. The service brake is an external contracting band applied by a pedal and the emergency brake is internal expanding shoes operated by a hand lever. The internal brake shoes are faced with Raybestos and are held clear of the drums by springs when not set. The brake shoes may be adjusted from the outside. The brake drums have been increased in diameter and width of face and are extremely effective.

Because of the change in the suspension the chassis frame is 1.5 inches lower than with previous models, this reducing the centre of gravity and minimizing side sway, while the clearance is unchanged.

The body design has been considerably changed in that it is wider at the front, with a less pronounced angle to the cowl, and the dash is wider and higher. Instead of ventilators in the corners of the dash these now parallel the top of the dash at either side of the hood and the dash lamps of the electric type are inset into the dash with small, corrugated lenses. The upper body line is straight and the sides of the rear seat are low. The rear seat is lowered and the width increased, and the rear doors are considerably widened at the top, this making greater convenience for the passengers entering or alighting from the car.

The lighting is by a dynamo that is mounted at the left side of the engine case and is connected with the magneto driving shaft extension by a coupling in which a heavy leather disc eliminates all noise, the connection being very efficient. The magneto shaft is made with a tapered serrated joint coupling, so that very accurate timing of the magneto is possible without changing the timing sprockets or silent chains. With the dynamo all of the lamps are lighted by electric current. There is option by which electric dash and tail lamps are lighted from a battery and gas head lamps used. The car is fitted with a Perkins starter and the gas tank is concealed in one of the boxes built into and forming a part of the skirt between the running boards and the chassis frame. The electric and gas lamps may be lighted and regulated from the driver's seat, this being a material convenience.

An innovation is the driving of the speedometer from a gear attached to the main driving shaft directly behind the gearset case, which permits the use of a short direct flexible shaft and minimizes possibilities for failure, while the reading is given as the mean of the mileage of the rear wheels. Because of the stationary and permanent nature of the driving shaft the speedometer indicator is practically free from vibration and there is no variance because of curves, this affording more accurate recording of the work of the engine, there being registration of the slip of the rear wheels.

The machines are thoroughly equipped in every sense and the upholstery and the finish are equal to the extremely high standard for which Knox automobiles have become widely known. Model 46 chassis are equipped with six and seven-passenger torpedo, two, three or four-passenger raceabout, and seven-passenger limousine and landaulet bodies. There is option of any one of 10 different colors and the upholstery may be hand buffed leather, either black or in tone to match the finish, or special fabric, and the metal work may be either nickel or brass. All the bodies are the Knox design, of aluminum and wood frames.

THE NEW MICHIGAN.

Formal adoption of the specifications for the 1913 Michigan, the product of the Michigan Buggy Company, Kalamazoo, Mich., has been made but the details are carefully guarded, as it is not the intention of the company to make announcement concerning the new car for a few weeks. The specifications are the work of Chief Engineer W. H. Cameron, who recently joined the Michigan forces, having formerly been with the Willys-Overland Company, Toledo, O.

The company authorizes the statement that the car will remain in the medium price class, although several high priced features are to be incorporated in its design. Two models will be produced, utilizing one chassis—a touring car to be known as model R and a roadster designated as model S. President F. B. Law of the company makes the following statement:

"At present we can only say that we have included a long list of features that automobile men have said could never be figured into a medium priced car. Some of these features are now used only on the famous high priced cars of America and Europe. As manufacturers on a large scale for 30 years, the problem of costs is one of long experience with us. We have solved the cost problem so many times when other manufacturers said it could not be done that we are loath to concede impossibilities in the automobile.

"It has been our ambition from the very first to bring more and more of high priced practise into the medium priced car, as represented by the Mighty Michigan. We have added something every year. But our 1913 car eclipses even our own expectations. We have a surprise—really a staggering surprise—in store."

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NATIONAL CONTEST AND RACING NEWS.

Tetzlaff Wins Twice with Fiat in Recent Tacoma Road Events---New Prizes for American Automobile Association's Annual Tour---Rockingham Park Plans---Farm and Ranch Endurance Trials---Meets in Other Centres.

Although mention was made in the last issue of The Automobile Journal concerning the results of the road racing at Tacoma, Wash., July 5-6, the dispatches were so confusing that announcement was made that additional information would be presented later. It develops that the original schedule was maintained, throughout, and that no 500-mile event was substituted, as the first dispatches would indicate.

Teddy Tetzlaff, driving the same Fiat car, with which he won the Santa Monica road race in California, May 4, and finished second in the 500-mile race on the Indianapolis speedway, Memorial Day, was twice a winner, taking the 200-mile event of the first day and the 250-mile free-for-all the second day.

Particular interest attaches to the accessories and supplies utilized on this car in these two races. As was the case in both of the previous events, the car was shod with Miller tires, made by the Miller Rubber Company, Akron, O. It was equipped with Bosch ignition, magneto and plugs, made by the Bosch Magneto Company, New York City, and it may be added that the same Dixon's graphite grease, without change or addition, was utilized in all four events. This latter result is especially gratifying to the Joseph Dixon Crucible Company, Jersey City, N. J., maker of this lubricant.

The winner of the 100-mile event was Robert Evans in a Flanders special. Poltun in a Mercer was the victor in the 150-mile race, for cars of 231-300 inches, being the only driver of the four to enter who finished. Earl Cooper in a Stutz won the 150-mile event for cars of 301-450 inches. Returning to the matter of ignition for a moment, Bosch magnetos were fitted to the cars finishing in first and second place in the free-for-all, and first, second and third in the 200-mile event. Bosch plugs were utilized on the cars finishing first, second and third in the light car race. The summary of the meet follows:

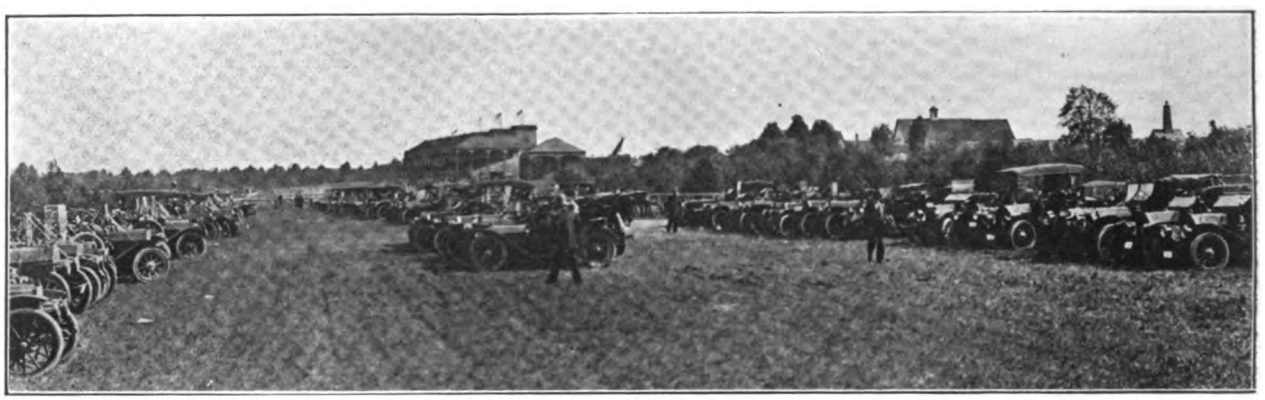
FRIDAY, JULY 5.

100 Miles, Under 231 Inches.

Car	Driver	Time
Flanders Special,	Evans	1:38:20.00
Flanders Special,	Tower	1:39:04.35
Maxwell,	Zoermann	1:42:19.50

150 Miles, 231-300 Inches.

Mercer,	Poltun	2:25:13:00



Automobiles Parked in Front of the Clubhouse at Rockingham Park, Salem, N. H., During the Progress of the Recent Race Meet.

200 Miles, Under 600 Inches.

Fiat,	Tetzlaff	2:54:31.00
Knox,	Mulford	.....
National,	Devore	.....

150 Miles, 301-450 Inches.

Stutz,	Cooper	2:15:00.00
National,	Devore	.....
Pope-Hartford,	Rossi	.....

SATURDAY, JULY 6.

250 Miles, Free-for-All.

Fiat,	Tetzlaff	3:47:00.45
Benz,	Bergdoll	3:50:49.85
National,	Devore	3:52:28.90

PLANS FOR ROCKINGHAM PARK.

New England and the East is decidedly interested in the plans laid by the management of Rockingham park, Salem, N. H., for another big race meet, Oct. 12. Incidentally it may be remarked that the annual Rockingham fair will be held here, Aug. 20-24, at which time it is hoped that a series of automobile races may be provided.

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The park is conveniently located being within 34 miles of Boston, and within easy access of Worcester, Lynn and Newburyport, Mass.; Nashua, Manchester, Exeter and Portsmouth, N. H. The roads are exceptionally good, and already the clubhouse, a picture of which is shown herewith, has been made the rendezvous of numerous parties of motoring tourists.

The success which greeted the opening meet on this track, June 8, is expected to be repeated at the October meeting. Already several well known drivers have signified their intention of competing in the events scheduled. Arrangements are in the hands of James F. Kerr, 67 Milk street, Boston, to whom all communications should be addressed.

ADDITIONAL PRIZES FOR TOUR.

The committee having in charge the arrangements for the start of the national reliability tour of the American Automobile Association received advices recently from President Robert P. Hooper to the effect that in addition to the National, the Anderson and Glidden trophies, there would be offered a number of cups by New Orleans and Memphis people for other classes. The route has not been definitely decided upon except that Detroit, Memphis, New Orleans will be three points, with Indianapolis a possible fourth.

The tour committee at Detroit has notified the A. A. A. that Oct. 3, the original date selected for the start of the tour, in the belief that President Taft and Speaker Clark would be there for the National Good Roads Congress, is inimical to that city. The Detroiters have asked that the date be set any time after the close of the state fair in that city, Sept. 21.

The Detroit committee was regularly organized at a recent meeting, when the following officers were elected: President, Robert K. Davis; secretary, F. E. Spooner; treasurer, Leonard Davis. William E. Metzger and Howard Watrous are the other members of the committee, and another appointee from the Board of Commerce is to be made at a later date. The special committee in charge of the tour includes Col. Frank M. Joyce of Minneapolis, Lewis R. Speare of Boston, William E. Metzger of Detroit, John A. Wilson of Franklin, Penn., and W. E. Moyer of Des Moines, Ia.

PIERCE-ARROW IS FIRST.

A Pierce-Arrow car, made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y., was the winner of the recent reliability contest from Camden to Wildwood, N. J. The third car to finish was a Michigan, made by the Michigan Buggy Company, Kalamazoo, Mich. The distance was over a course of 108 miles in length, and more than 100 cars took part.

FARM AND RANCH TRIALS.

An accompanying illustration shows the Case car, which acted as pathfinder for the Farm and Ranch endurance run, scheduled to take place from Dallas to San Antonio, Tex., and return, July 22-27. The car was fitted with Goodyear tires, made by the Goodyear Tire & Rubber Company, Akron, O., and although it was compelled to traverse districts in which the roads were far from being of the best, no difficulty was experienced.

About 70 contestants left Dallas on the morning of July 22, the first night stop being Waco. Other controls of this nature were established at Austin, San Antonio, Taylor, Mexia and Austin. The total distance to be covered is approximately 700 miles. Several prizes have been offered by local dealers, and the entry list was open only to cars owned and operated by farmers and ranchmen.



Case Pathfinder Equipped with Goodyear Tires, Negotiating Poor Roads Preparatory for Farm and Ranch Tour in Texas.

OVER SHORTER COURSE.

The races on the beach at Galveston, Tex., Aug. 8, 9 and 10 are to be run over a shorter course this year than heretofore, this being 2.5 miles and making a full lap five miles. This will insure that the cars will pass the grand stand at more frequent intervals. In former years one criticism of the Ormond-Daytona course, about 20 miles in length, was that it was too long for the races to be exciting.

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LOCK NUT WASHER HINT.

A repairman was called on to fit some form of locking device to the bolts securing the flanged extension of the flywheel of the motor to a similar member of a planetary transmission. The owner complained that lock and other types of washers worked loose. The problem was solved easily by the workman who proceeded to take a piece of .0625-inch sheet metal which he cut to the size of the locking nut.

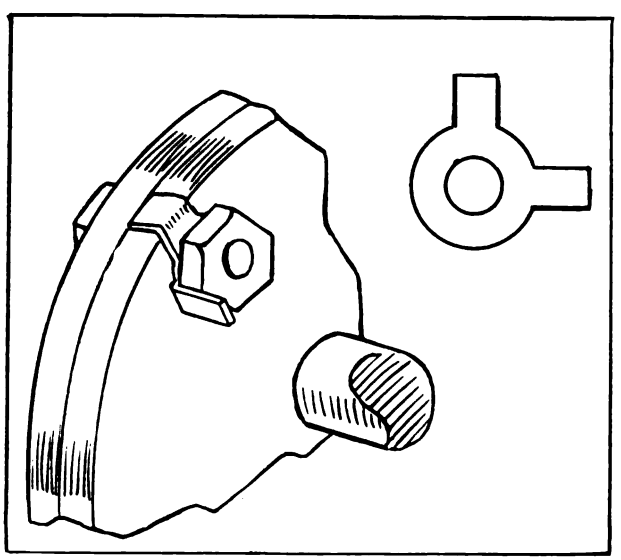


Fig. 1—Locking Device Constructed of Sheet Metal, Having Flanges to Prevent Nut from Turning.

Two arms or extensions were left on the metal and a hole drilled to fit the bolt. The device was slipped over the bolt and the nut screwed up tightly after which one of the ends of the attachment was bent over the flange of the wheel as depicted at Fig. 1, and the other projection bent to the face of the nut. This arrangement worked satisfactorily as the flange member on the nut prevented the latter from moving while the body of the washer was prevented from turning by the other extension gripping the rim of the wheel.

UNIVERSAL VISE AND SURFACE TABLE.

The ordinary bench vise has its disadvantages when handling certain parts as the workman is compelled to operate in a cramped position. Some repairmen overcome the difficulty by fitting special attachments which lighten the labors as well as save considerable time.

A vise having a universal adjustment which makes it possible to hold odd shaped as well as ordinary parts, is being marketed by the Victor Vise Company, Springfield, O., and is presented at Fig. 2 A. Angular adjustment is made possible by means of a swivelling base, and in addition the device may be raised or lowered to any convenient height. It may also be rotated about the axis of its supporting column. These various adjustments permit the workman to obtain the best light on line or prick punch marks indicating finished surfaces, as well as eliminate stooping and awkward positions.

A rigid position is secured easily by a single clamping lever and when a vertical adjustment is made, the vise is automatically held until the lever is tightened by a locking collar on the stem. The device is made in four styles and a like number of sizes.

At C is shown an accessory to the vise and this surface or table member can be mounted to the base as depicted. The plate may also be detached from the stem and utilized on the bench the same as an ordinary surface plate. They are manufactured to suit individual requirements.

SAFETY LATHE DOG.

Those familiar with the operation of the lathe have at some time had their clothing catch upon the unguarded set screw with which the ordinary lathe dog is equipped. This is especially true when filing. Elmer J. Michaud, South Windham, Conn., is mar-

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keting a safety lathe dog which is so shaped that the machinist is protected. The tail of the dog is curved in front of the set screw on the leading side, this being located according to the direction of rotation. The tool is easily attached and replaced. The safety dog is illustrated at Fig. 2 B, and an ordinary member at C.

NAVALTUM, A NEW ALUMINUM.

"Aluminum ceased to be a metallurgical curiosity some 27 years ago," says the Commercial Motor. "Disappointment, however, succeeded the glowing expectations of those who first of all spoke and wrote about it. It retained its lightness but failed to meet many requirements in engineering work. Other metals and their alloys progressed in favor and use with engineers; aluminum stood still. Saved by its low specific gravity alone, its relative weakness, brittleness and liability to disintegration owing to fatigue remained inseparable drawbacks to its extended use. Certain promising alloys did not retain their initial characteristics, after a year or so had elapsed.

"A new aluminum, which is, strictly speaking, not an alloy, but aluminum treated with a flux, is about to be exploited under the name of Navaltum, by a company which has been registered in England with the title of Navaltum, Ltd.

"Ordinary aluminum is changed into a higher order of its own self with a result that is comparable to the Bessemer conversion of iron into steel. Its texture, structure and physical properties are changed while its lightness is not impaired; in fact, in some cases the specific gravity falls. The resulting metal, Navaltum, is found in its cast condition to have greater strength than the best gun metal, combined with the ductility of malleable iron. In its drawn or rolled condition, it possesses a strength nearly equal to that of mild steel, with all the annealing qualities of copper; it is not corroded by salt water or dilute acids, and does not tarnish in the atmosphere. These are the claims made for the new metal.

"Navaltum is found to cast like ordinary aluminum, brass or gun metal; no special furnace or precaution is necessary, and the castings have perfectly clean edges in the fine lines of the moulds. The breaking strain is from 16 tons upward, and the specific gravity about 2.6.

"The metal can be drawn cold, either as bars, angles, tubes or wire, as readily as brass or copper, and with no special precautions, and can be annealed in exactly the same manner. It machines as readily as any other metal, and can be quite easily worked dry. Its remarkable convenience for tooling and manipulation permits sea resisting plates and castings of Navaltum to be put together with rivets or screws of the same material, thus eliminating electrolytic action. Rivets can be made of it, and the finest threaded screws can be cut perfectly down to a diameter of .125 inch. It is thought it will prove an excellent anti-friction metal. It can also be soldered and welded. Tests made on a sheet of Navaltum, rolled down cold from a one-inch slab, without annealing, to .002 inch in thickness, gave a test of 16 tons tensile strength."

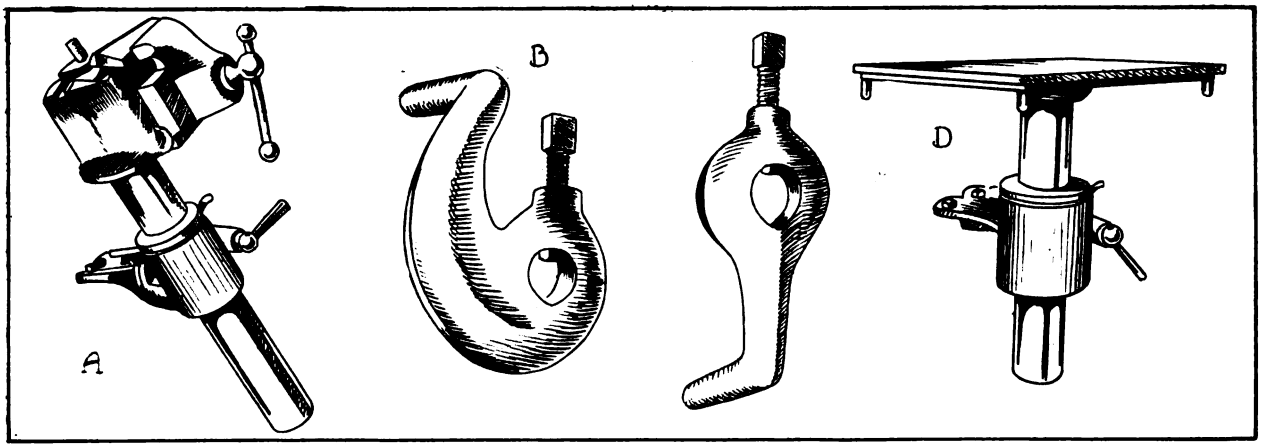


Fig. 2—Mechanical Devices of Value to the Repair Shop: A, Universal Adjustable Vise; B, Safety Lathe Dog; C, Ordinary Member; D, Surface late Utilized with Universal Vise.

CURTIS AIR COMPRESSOR.

The progressive garage or repair shop does not rely upon the manually operated tire pump, the utilization of which means a considerable loss of time. Then again, the member becomes misplaced when most needed. By having a tank of compressed air the garage is in a position to render efficient service to its customers and it really is economy as the attendant is not called upon to hunt for the ordinary member.

With a compressor it is an easy matter to keep the storage tank filled with air, ready for service. The Curtis & Co. Manufacturing Company, St. Louis, Mo., is producing an air-cooled compressor in two sizes, adapted for the public service station and private garage, these having a bore and stroke of two by 2.5 and three by 3.5 inches, respectively. The device is depicted at Fig. 3, A and B, the latter view outlining

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its construction. Water-cooled types are also manufactured, these having a bore and stroke of three by 3.5, 3.5 by 3.5 and four by 4.5 inches, respectively.

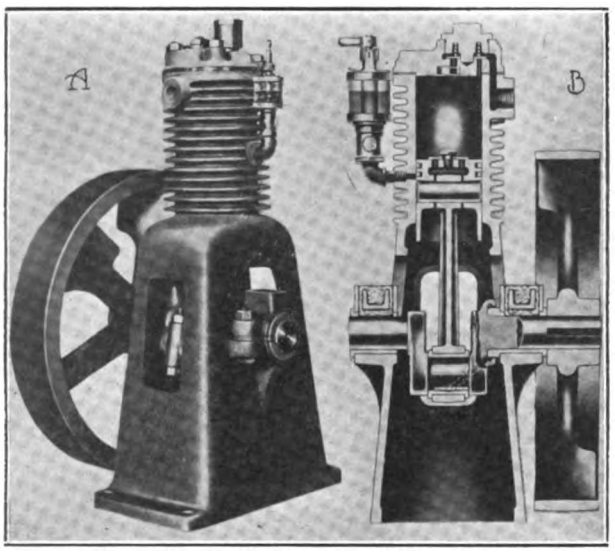


Fig. 3—Curtis Air Compressor, Made in Several Sizes, Both Air and Water-Cooled and Operated by Belt.

Either design lends itself readily for belting directly to line shaft or motor, according to its installation.

The vertical, up-plunger type of pump is employed, the maker pointing out that this construction eliminates grease or oil being carried over into the receiver and thence to the tires. Several new features are noticeable in the new compressor, these including a springless inlet valve on the piston head; fan shaped arms on the flywheel, which direct a current of air onto the cooling fins, etc. Lubrication is by a gravity feed oil cup on the side of the cylinder, the device supplying lubricant to the piston and wristpin. The crankshaft is of ample dimensions and throughout the best of material and workmanship are employed.

UTILIZING BROKEN DRILLS.

A repairman in drilling a hole broke the drill, and not having an extra one and being unable to leave the shop to secure a new one, adopted the kink shown at Fig. 5 B. A bush was made having the same diameter as the shank of the drill and the latter inserted. When placed in the chuck, the pressure of the feed held the broken ends together and the work was completed successfully.

SEBASTIAN LATHE.

As the increase in business warrants the expenditure the small repair shop adds a lathe to its equipment, a valuable addition as much work formerly sent elsewhere is turned out quicker and economy effected. Many times a job is held up waiting for a small piece of machine work sent outside.

The Sebastian Lathe Company, Cincinnati, O., makes a specialty of lathes and tools and produces a number of the former, one that is specially adapted for the garage being shown at Fig. 4. It is low priced, constructed of high grade material throughout, has screw, rod and power cross feeds, and cuts standard threads with furnished gears from five to 36. The head stocks are sturdily constructed and the spindles are hollow, made of a high grade steel and operate in phosphor bronze boxes.

The cone pulleys have four steps and with the back gear give eight changes of speed. The tail stocks are of the cut-under pattern, allowing the compound rest to swing parallel with the ways and over the base of the tail stock, with room to operate the feed screw handles. They have adjustable side movement for taper turning, heavy spindles and self-discharging centres. The carriages are of the most approved design, rigid and substantial, and T slots are arranged in both front and rear arms.

When it is desired to utilize the cross feeds separately, the carriages may be clamped solidly to the bed by a simple device. The cross feed screws are graduated to .001 inch. Plain or compound rests are supplied and these are interchangeable. The tool posts are cut from a solid bar, and the lead screws are cut carefully from a master screw, insuring accuracy. The countershafts have improved friction clutch pulleys with large surfaces, and ample provision is made for lubrication. The pulleys of the countershaft are nine inches in diameter with three-inch face and are designed to run at 190 revolutions a minute.

The dimensions of the lathe are as follows: Swings over bed, 13 inches; swings over carriage, 7.5 inches; length of bed, six feet; takes between centres, 40

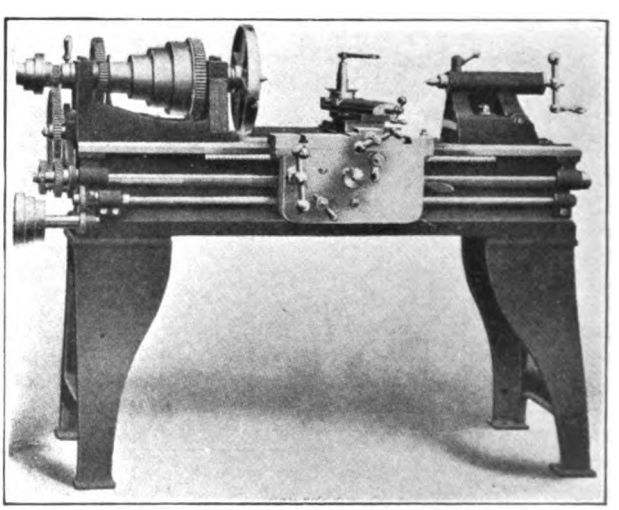


Fig. 4—Sebastian 15-Inch Lathe, Designed Especially for Automobile Work.

inches; diameter of spindle nose, 2.125 inches; threads of spindle nose, eight inches; hole through spindle. 1.3135 inches; size of tools, .5 and one inch; ratio

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of back gear, 7.5 to one; diameter of tail spindle, 1.5625 inches; compound rest travels, 4.25 inches; capacity of centre rest, 3.5 inches. Hand rest and chuck plate are extra. A set of 10 tools is provided with the lathe.

CHAIN ADJUSTING DEVICE.

An operator of a commercial vehicle equipped with chain drive, had a chain break while on the road some distance from the nearest repair shop. Lacking the proper equipment to effect a repair, considerable time was lost before the broken link was removed and the separated ends brought together. The latter proved the most difficult as the tool kit did not include a chain tightener.

Being mechanically inclined the driver produced the device shown at Fig. 5 A. The stock consisted of a piece of .5-inch round steel, the ends of which were heated and forged to the shape depicted in the drawing. The metal was then cut in two and a right hand thread cut on one piece and a left hand on the other, for a distance of about .75 inch. A .5-inch coupling was next procured and filed hexagonal to permit the use of a wrench. The method of using the chain tightener is outlined in the drawing.

HOW TO SOFTEN FILES.

Occasionally a file will be purchased which upon trial is found to be tempered too hard and which tears the work. This trouble may be overcome by softening the tool. Cover the member with a thin coating of light oil and hold it over the fire until the lubricant blazes. As soon as the flame runs all over the file, it should be plunged into water.

HAVOLINE TOUR BOOK ISSUED.

The Havoline Oil Company, 17 Battery place, New York City, recently issued the first of a series of 15 "Havoline Tours." The book comprehensively covers routes in New York, New Jersey and Connecticut, with a few side trips into Canada. Twenty-five routes are listed, pointing out not only the well established roads, but also many others that have been opened recently as a result of the campaign for road improvement in this section. Twenty-five maps are also shown. Copies of the route book may be obtained by addressing the Havoline company.

BAKER PLANT FOR CANADA.

The Baker Motor Vehicle Company of Cleveland, O., has formed a new company, it is announced, called the Baker Motor Vehicle Company, Ltd., of Canada, and it is said will build an additional plant in Toronto, Can. The Cleveland company manufactures both pleasure and commercial cars, while the new Canadian company is to confine its product to pleasure cars. Officers of the Cleveland company are: President, R. C. White; vice president and general manager, F. R. White; secretary and treasurer, R. C. Norton; directors, Bascom Little, D. Z. Norton, C. C. Bolton, C. W. Bingham and George H. Kelley. Officers of the Canadian company will include some of these men and members of the well known Walker family of Walkersville, Ont., will be interested. O. B. Henderson, sales manager of the Cleveland company, will hold the same position with the Dominion concern.

MOTZ TIRES ARE CHOSEN.

That the cushion tire is the proper thing for the electric motor vehicle would appear evident from a recent announcement by the Motz Tire & Rubber Company, Akron, O., maker of the Motz cushion tires, in which it states that of the 25 makers of electric vehicles, 22 are equipping their output with its product. It is claimed that Motz tires are as easy riding as properly inflated pneumatics, due entirely to the construction. The double treads are notched, giving a non-skid feature, also distributing the weight to the undercut sides. The latter are supported by slantwise elastic bridges which give and yield like the air in pneumatic tires.

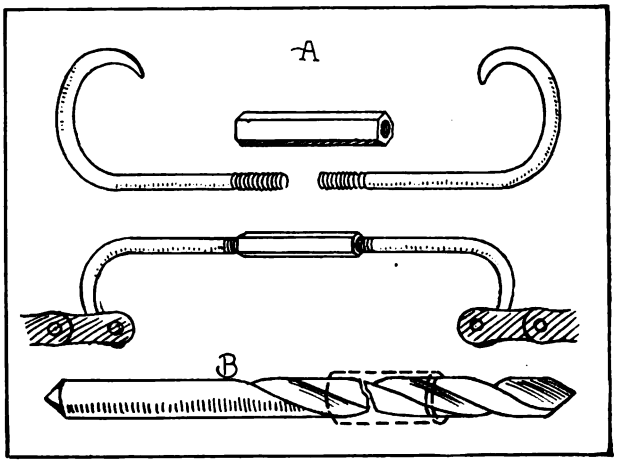
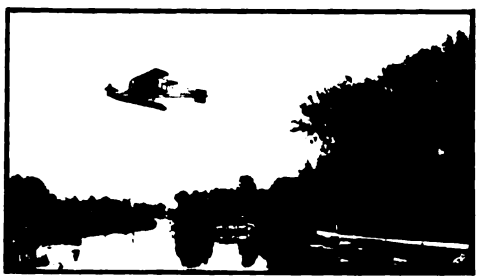


Fig. 5—Suggestions for the Repairman: A, Easily Constructed Chain Tightener; B, Method of Fitting Bush to Broken Twist Drill.

TUTTLE RESIGNS AS MANAGER.

Harry Tuttle recently tendered his resignation as service manager of the Dayton Motor Car Company, Dayton, O., the same to take effect Aug. 1. He is one of the best known men in the automobile business in the Middle West, and has a large circle of friends who will wish him success in his new field—the organization of an automobile parts company. Announcement regarding the new concern will probably be made within a short time.

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In The Aviation Field

With the Manufacturer and Operator in America and Abroad

Mlle. Helene Dutrieu, perhaps the best known of the French women flyers, has taken up the hydraeroplane. She has been trying out a new design by Henri Farman at Lake Engheim. Heretofore, Farman has been transforming his biplanes into hydraeroplanes by the attachment of pontoons, but his latest attempt is said to have been constructed throughout as an hydraeroplane, the first of this kind to be produced abroad.

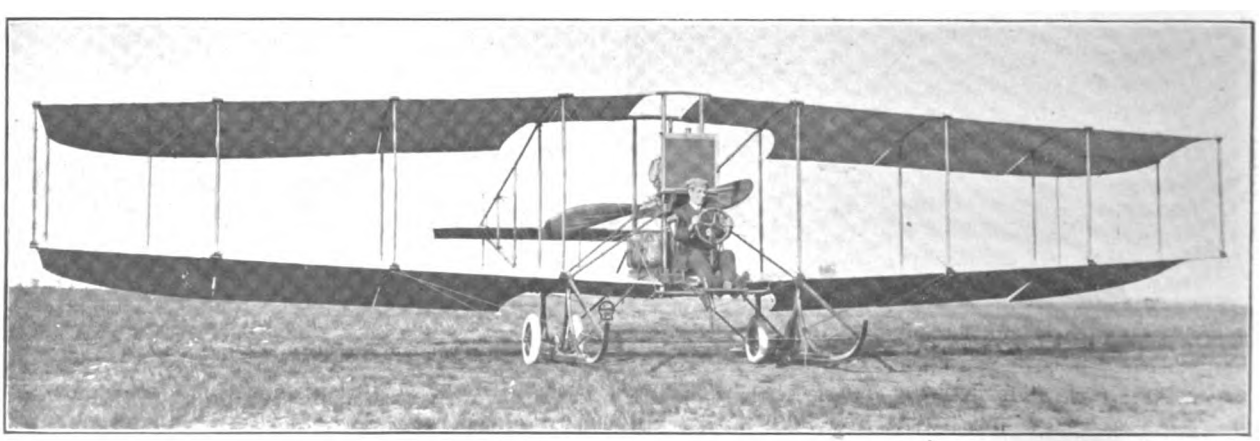
Germany appears to be making decided progress in the matter of passenger carrying flights. Not so many months since the Germans were supposed to be giving all of their time and attention to the development of the dirigible balloon, but since one of their army officials visited the annual manoeuvres in France, the people of that country have taken more interest in the aeroplane. Several times of late, new passenger records have been made by German flyers.

Early in the month, Johann Schirmeister took four passengers for a duration flight of 33:42, at Leipsic. This exceeds the record of 32:33 made by Hoffman at Johannisthal, March 8. The same day, K. Grulich took two passengers aloft for 2:41:00, exceeding his own previous mark of 2:02:00. Although no mention of the machines is made in the dispatches from abroad, it is presumed that these flights were made with Harlan monoplanes, particularly as Grulich has been employing a machine of that make.

The flying fields on Long Island have been utilized by a number of designers in testing new aeroplane productions, and one which has been given decided attention of late is the Christmas biplane, manufactured by the Christmas Aeroplane Company, Washington, D. C. An accompanying illustration shows this machine ready for flight, proving beyond doubt that it is a practical invention.

The wings are set at a double dihedral angle, with an opening about two feet wide in the centre of the top plane, this being for the relief of air currents. The trailing edges of the planes are extremely flexible, and this is claimed to produce an automatically balanced machine.

Two seats are provided, these being placed immediately in front of the engine and in the centre between the two main planes. The controlling gear consists of a semi-circular wheel, which works the ailerons by a rotating movement, the vertical rudder by a twisting movement, and the wing warping by a fore and aft movement. The motor is a seven-cylin-



One of the Flyers at the Nassau Boulevard Field on Long Island, Trying Out the Christmas Biplane.

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der, 50 horsepower Gyro, made by the Gyro Motor Company, also of Washington.

In all probability the fifth international race for the Gordon-Bennett cup in 1913 will held as a cross country event. Final decision will be made by the Federation Internationale Aeronautique at its meeting in Paris, next January. At the recent conference in Vienna, the matter was brought up by the British representatives. France alone favored continuing the enclosed aerodrome flights. America and Great Britain have long been in favor of the change.

In the death of Hubert Latham, France loses one of its pioneer aviators, a man who was well known in America and one who had many disappointments. He was killed by a wild buffalo during a hunt in the African Sudan, July 15.

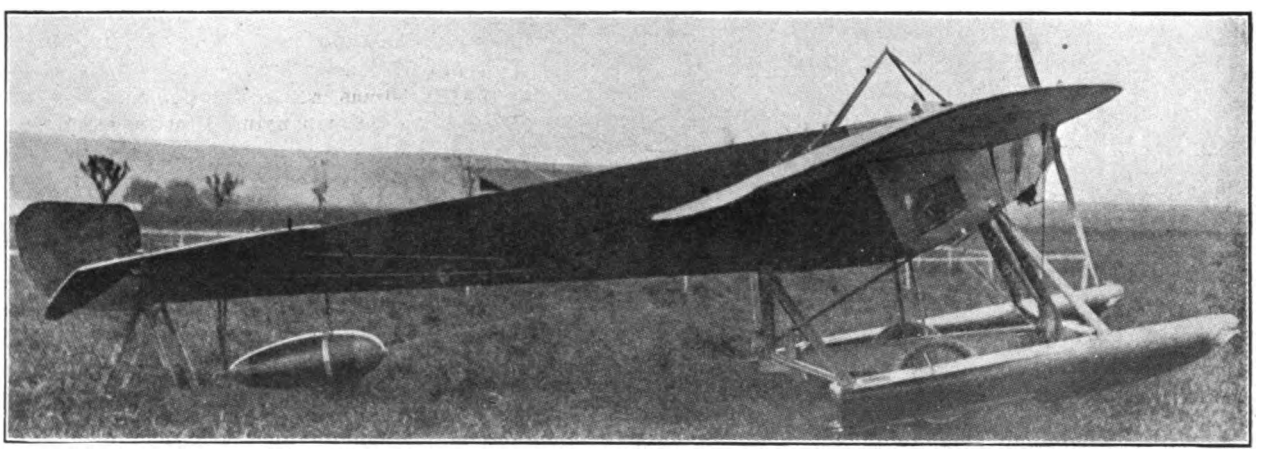
Latham was born in Paris in 1883, of English parents and a relative of the German imperial chancellor, Dr. von Bethmann-Hollwegg. He was a skillful mechanic, and became interested in aerial navigation soon after the appearance of the Antoinette monoplane. While many other aviators considered this machine too large to be flown with success in high speed events, he was loyal to his first choice and continued to drive Antoinettes until his retirement.

He was among the first to attempt to cross the English channel, but always was prevented from attaining success in this respect. His initial attempt was made July 19, 1909, when he was thrown into the sea because of the failure of his motor. A similar fate resulted from his second venture. A number of times he narrowly escaped death while flying.

Burgess Co. & Curtis, Marblehead, Mass., engaged upon the construction of a biplane for the Aero Club of Illinois, which is expected to be flown in the fourth international race in September, has received word that the big 14 cylinder, 160 horsepower revolving Gnome engine has been completed and will be given its preliminary tests Aug. 1. It is expected that the new machine, equipped with this motor, will be capable of making a speed of 120 miles an hour.

Aeroplanes are to be used for the first time in militia manoeuvres in America during "the defense of New York City" in Connecticut next month. Both the attacking and defending armies will be accompanied by aviators, two on each side, who will be assigned to duty as aerial scouts, with instructions to keep the respective commanding officers informed as to the movements of the "enemy."

France has been decidedly interested in hydraeroplaning ever since Hugh Robinson and Louis Paulhan began demonstrating Curtiss machines of this type in that country. In the recent meet at Monaco, it will be remembered that a number of French machines were flown equipped with pontoons. One of the latest French products to appear thus equipped is the Nieuport. From an accompanying illustration it will be seen that the Nieuport hydraeroplane does not differ materially, in the main, from the Nieuport monoplane, with which Charles Terres Weymann won the Gordon-Bennett cup in the third international race of last year. In fact, it would appear that the only change was in the addition of the pontoons and the curiously shaped float at the rear.



Nieuport Monoplane, Fitted as an Hydraeroplane, by the Addition of Pontoons and a Novel Rear Float.

The Japanese army has bought three Curtiss hydraeroplanes of the Curtiss Aeroplane Company, Hammondsport, N. Y. Japan already owns four monoplanes and six biplanes, making its total aeroplane strength 13. It also owns one native and two Parseval dirigibles. Three Japanese aviators have been sent to Hammondsport to learn the operation of the new machines purchased.

While the Aero Club of America is withholding the names of those who have submitted specifications in the $15,000 contest for a machine to defend the Gordon-Bennett cup in the fourth international race at Chicago, it is announced that three were received.

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IN THE HEART OF THE MAINE WOODS



A FEW years ago Aroostook county, Maine, was an unknown wilderness. This applies in a measure to large portions of the district today, although the automobile has done much to overcome this, along the New Brunswick border. Not many sections of America, with the same population, area and conditions can muster more motor cars, and its roads are rapidly becoming such as to attract large numbers of tourists.

Beyond the fact that this is the very centre of the Maine woods, and that it is famed for the finest potatoes in the world, most motorists know little of Aroostook county. It follows from the above statement that not all of the district is covered with woods, although doubtless these virgin forests will have their appeal for the venturesome tourist. Fishing and hunting may be considered as ideal, and the entire section has been noted for years as a camping ground for vacationists.

TOUR NO. 33.

Tour No. 33 is designed to occupy five days, leaving from and returning to Bangor, from which point connection may be made with Vacation Tour No. 1 outlined in the Sixth Annual Touring Number. This feature will appeal to many tourists from sections outside of New England, since it will be possible to add this trip to any of the others presented in that number. The night stops are at Houlton and Fort Kent, Me.; Woodstock, N. B., and Calais, Me. Of course, it is possible to return to Bangor over the outward route, if preferred, reducing the necessary time at least one full day.

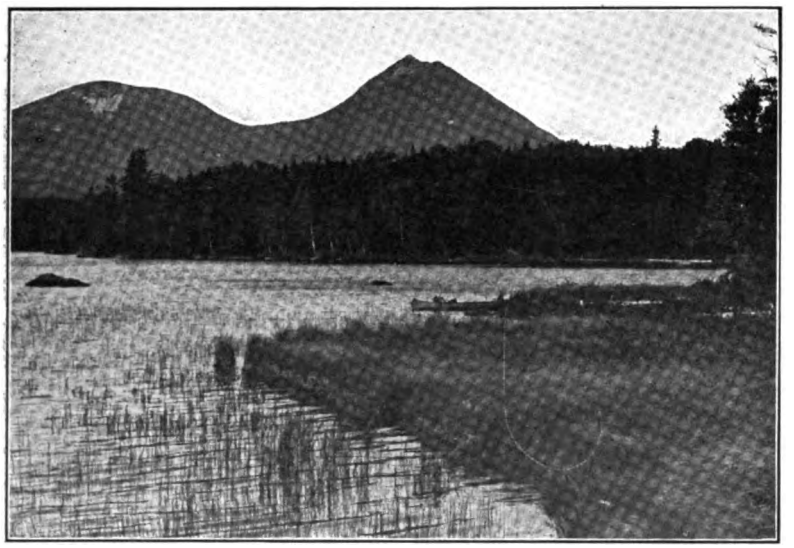
The way leads from Bangor along the Penobscot river to Veazie, the surface of the river being covered with booms and immense rafts of timber, floated down from the Moosehead lake region and toward Mt. Katahdin, glimpses of which may be had from the distance. Accompanying the lumber in the river are the numerous saw mills along its banks. This is particularly true of Oldtown, but first mention should be made of Orono, the seat of the State Agricultural College.

Oldtown is said to possess the largest lumber mill in the world, where over 100 saws are at work turning the rude logs, which come in at one side, into planks, these being rafted down the river to Bangor. On an island near the town is the home of the Tarratine Indians, one of the three tribes of the Etchemin nation. Although the most powerful and warlike of the northern tribes, the Tarratines rarely attacked the colonists. After a series of wrong and insults, however, they visited the settlements and inflicted such terrible damage that Maine became tributary to



View of Spencer Mountain from Lobster Lake in Central Maine.

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Mt. Katahdin, Maine's Highest Peak, as Seen from Kidney Pond.

them by the Peace of Casco. The treaty of 1726 contains the substance of their present relations with the state. They own the islands in the Penobscot, and have a revenue of some $7000 from the commonwealth. A ferry boat will take the tourist to their island home, and the visit is well worth while.

Leaving Oldtown, the route passes through a succession of thinly populated towns, Costigan, Olamon, Passadumkeag, Lincoln and Winn, to Mattawamkeag, a small village at the confluence of the Penobscot and Mattawamkeag rivers. Most of the inhabitants of these towns are engaged in lumbering. The last named village offers quite the best view of Mt. Katahdin, of volcanic origin, and Maine's chief claim to mountain scenery. From its rugged top may be seen all the lakes, rivers and woods of northern Maine, spread out like a map below. It is in the centre of the best moose country of the state, and a peak about which very little was known until quite recently.

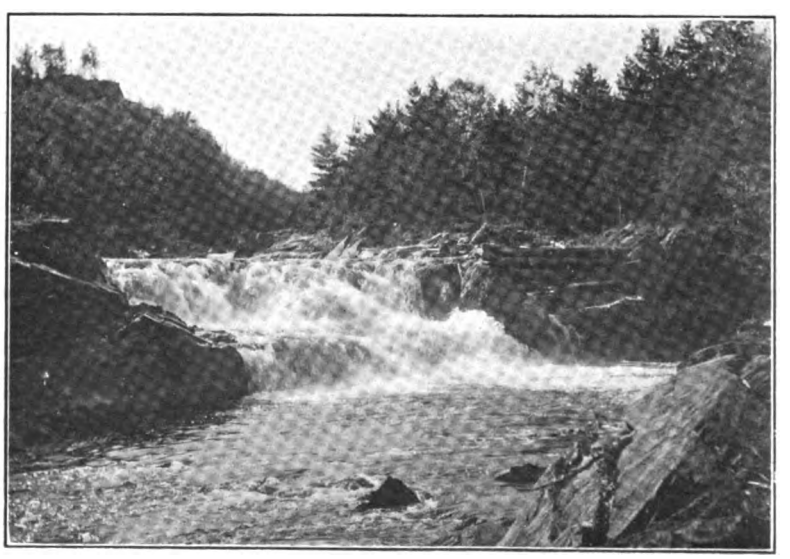
From this point the tour passes through the heart of the Maine woods, abounding in spruce, cedar, hemlock, yellow and white birch, and maple. Splendid mills are to be found nearly all of the way, and particularly at Haynesville. Several important ponds are within easy access of the road, and the many streams throughout this district plunge on their way to the Atlantic over a succession of beautiful falls.

The night stop is at Houlton, the principal city of the country and noted for its beauty, its splendid homes and its hospitable people. Besides being engaged in the lumber business, Houlton is one of the principal markets for the famous Aroostook county potatoes. The soil in and about the city is wonderfully fertile, and the product is justly considered the finest in the world.

Presque Isle is the centre of the rich farming lands, which cover 500,000 acres. There also is good fishing and plenty of interesting scenery in the vicinity. Many Swedes have settled north of Presque Isle, as may be gathered from the name—New Sweden. Another extensive lumbering establishment is located at Van Buren, and lumbering also is carried on at Grand Isle. Madawaska was settled by the French, who were expelled from Arcadia in 1755. Twelve miles distant is New Fairfield, a famous starch centre.

Fort Kent, the second night stop, is the most northern town in the United States. It is located at the confluence of Fish river and the St. John. Five miles away is Eagle lake, and dozens of other handsome bodies of water are in the immediate vicinity. All of these, as well as the many streams, are filled with big, gamy trout, and many salmon are caught in their season.

The return trip follows the outward itinerary to Van Buren, thence across the border into Grand Falls, N. B. Still other descendants of the Arcadians will be found in this vicinity. Here also the St. John river is contracted into a narrow gorge be-



Grand Falls, Webster Stream, One of Many Cataracts in Northern Maine.

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tween lofty cliffs and plunges over a succession of rocky steps, the first in the series being a sheer drop of 40 feet.

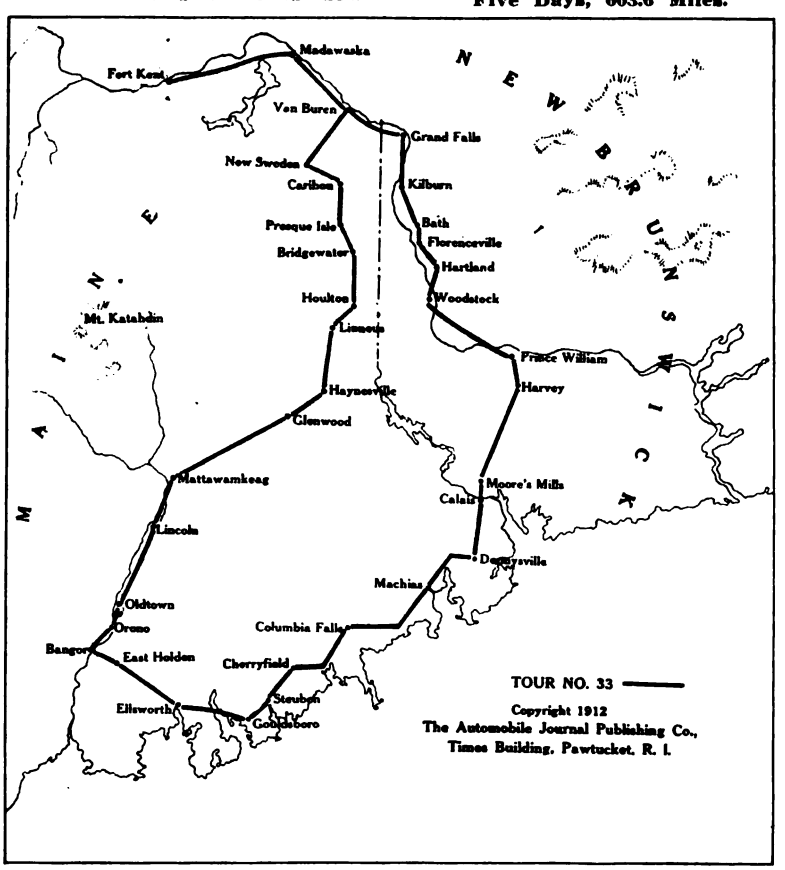
Woodstock, the third night stop, is the shire town of Carleton county, New Brunswick, and is pleasantly situated on the banks of the St. John river, 150 miles from its mouth. From this point, it is possible to connect with the outward trip at Houlton, if desired. The return over this route is down the St. John to within 15 miles of Fredericton, thence across country studded with handsome lakes and fertile farms, to Harvey. The night stop is at Calais, Me., after visiting St. Stephen, N. B.

The last day's route is practically a reversal of the itinerary given for the first day in Tour No. 32, from Bangor to St. John, N. B., and listed in the Sixth Annual Touring Number, in which an alternate route from Calais is presented. It may be added that the information contained herein may be supplemented by the use of the route book published by the Maine State Automobile Association, which may be secured by addressing the secretary at 12 Monument square, Portland, Me.

TOUR NO. 33.

Bangor, Me. — Houlton, Me. — Fort Kent, Me.—Woodsock, N. B.— Calais, Me.—Bangor.

Five Days, 603.6 Miles.



First Day, Bangor to Houlton, Me., 117 Miles.

Bangor to	Miles to	Total Miles
Veazie	4.3	4.3
Orono	3.6	7.9
Oldtown	6.1	14.0
Costigan	5.7	19.7
Olamon	8.5	28.2
Passadumkeag	4.3	32.5
South Lincoln	11.4	43.9
Lincoln	5.5	49.4
Lincoln Centre	1.9	51.3
Winn	8.9	60.2
Mattawamkeag	2.3	62.5
Molunkus	7.5	70.0
Macwahoc	2.4	72.4
Glenwood	12.1	84.5
Haynesville	7.4	91.9
Linneus	16.9	107.8
Houlton	9.2	117.0

Second Day, Houlton to Fort Kent, Me., 117.4 Miles.

Houlton to	Miles to	Total Miles
Monticello	12.5	12.5
Bridgewater	7.6	20.1
Blaine	6.1	26.2
Mars Hill	1.0	27.2
Presque Isle	14.0	41.2
Caribou	12.9	54.1
New Sweden	8.9	63.0
Van Buren	9.0	72.0
Grand Isle	12.4	82.4
Madawaska	6.5	88.9
Frenchville	8.1	97.0
Fort Kent	20.4	117.4

Third Day, Fort Kent to Woodstock, N. B., 131.2 Miles.

Fort Kent to	Miles to	Total Miles
Van Buren	45.4	45.4
Grand Falls, N. B.	12.4	57.8
Aroostook Junction	18.0	75.8
Andover	5.7	81.5
Perth	0.9	82.4
Kilburn	7.3	89.7
Upper Kent	7.8	97.5
Bath	3.7	101.2
Bristol	3.6	104.8
Florenceville	2.8	107.6
Hartland	11.2	118.8
Victoria	2.5	121.3
Upper Woodstock	8.0	129.3
Woodstock	1.9	131.2

Fourth Day, Woodstock to Calais, Me., 102 Miles.

Woodstock to	Miles to	Total Miles
Temple	16.7	16.7
Hawkshaw	9.0	25.7
Prince William	15.0	40.7
Long	5.0	45.7
Harvey	8.6	54.3
York Mills	7.6	61.9
Thomas Corner	3.5	65.4
Brockway	9.9	75.3
Lawrence	7.0	82.3
Meadows	4.9	87.2
Moore's Mills	6.3	93.5
St. Stephen	7.7	101.2
Calais, Me.	0.8	102.0

Fifth Day, Calais to Bangor, Me., 136 Miles.

Calais to	Miles to	Total Miles
Milltown	2.0	2.0
Charlotte	12.7	14.7
Dennysville	10.3	25.0
Marion	4.5	29.5
Gardner Corners	9.4	38.9
East Machias	4.1	43.0
Machias	4.5	47.5
Jonesboro	7.5	55.0
Columbia Falls	9.5	64.5
Harrington	5.3	69.8
Cherryfield	6.2	76.0
Smithville	6.1	82.1
Steuben	1.9	84.0
Gouldsboro	4.9	88.9
West Gouldsboro	2.6	91.5
East Sullivan	4.0	95.5
Sullivan	3.0	98.5
West Sullivan	1.6	100.1
Hancock	1.1	101.2
North Hancock	2.8	104.0
Ellsworth	6.5	110.5
North Ellsworth	5.0	115.5
Nicolin	1.4	116.9
East Dedham	3.2	120.1
East Holden	6.9	127.0
Hart's Corners	1.5	128.5
Holden	1.7	130.2
Brewer	4.8	135.0
Bangor	1.0	136.0

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CORRESPONDENCE WITH THE READER

The Automobile Journal cordially invites the owner, driver, repairman, sales agent and manufacturer to discuss subjects pertinent to the motor car, motorcycle and aeroplane in these columns, believing that the automobile industry and those closely allied with it will be benefited thereby. Complete information dealing with the construction, operation, maintenance and repair of these machines will be published upon the receipt of a communication addressed to the editor of The Automobile Journal. Suggestions or discussions of a mechanical nature, or those facilitating repairs and adjustments, should be accompanied by a rough sketch which will be redrawn for publication. Detailed touring information will be supplied by The Automobile Journal's Touring Bureau upon request. All communications should be accompanied by the full name and address of the sender, but for publication purposes the name will not be used unless desired.

Tires Wear Quickly.

(1406)—Of late I have been having trouble with a tire on one front wheel wearing out quickly. The rubber is nearly gone. The shoe on the other wheel was put on at the same time and is in good shape. What is the cause of the wear? SUBSCRIBER.

Newgate, Conn., July 6.

The wheel is out of alignment; that is, it does not travel in a straight line, causing the shoe to "scuff" or drag. This will wear out the tread very rapidly unless the trouble is corrected. It is possible that the steering knuckle or tierod has become bent through striking an obstruction in the road or running too close to a curbstone. The wheels should be aligned at once as the shoes will be ruined in a short time.

Providence to Clayton, N. Y.

(1407)—Being a regular subscriber to The Automobile Journal I would appreciate a routing from Providence to Clayton, N. Y. Also, please give me the mileage between Providence and Rochester, N. Y. SUBSCRIBER.

Providence, R. I., July 11.

While there is a shorter route from Providence to Pittsfield, Mass., the following itinerary is recommended because of the better roads. Having reference to the Sixth Annual Touring Number: Take Tour No. 13 from Providence to Worcester, Mass.; Tour No. 22 to Springfield, Mass.; Tour No. 23 to Pittsfield, Mass., the first night stop, the day's mileage being 151.9. Leaving Pittsfield the second day, follow Tour No. 52 to Albany, N. Y. and Transcontinental Tour A to Utica, the second night stop, with a mileage of 131.7 miles. The third day's route is as follows:

Utica to	Miles to	Total Miles
Deerfield	1.4	1.4
Rome	14.9	16.3
Delta	5.9	22.2
Stokes	1.7	23.9
West Branch	4.7	28.6
Ava	3.5	32.1
West Leyden	2.8	34.9
Mohawk Hill	4.7	39.6
Constableville	4.0	43.6
Turin	4.8	48.4
Houseville	4.0	52.4
Martinsburg	4.2	56.6
Lowville	3.6	60.2
Denmark	9.1	69.3
Carthage	6.1	75.4
Heaving	4.2	79.6
Fells Mills	4.7	84.3
Black River	3.2	87.5
Watertown	6.6	94.1
Brownville	4.2	98.3
Depauville	11.2	109.5
Clayton Center	4.1	113.6
Clayton	3.7	117.3

For the trip from Providence to Rochester, follow the above itinerary to Utica, and continue Transcontinental Tour A to Rochester, a distance of 138.8 miles, or a total distance from Providence of 422.4 miles. By utilizing Tour No. 23 from Providence to Pittsfield, this mileage may be reduced by 14.3 miles, but the better roads over the route suggested will more than make up for this additional distance.

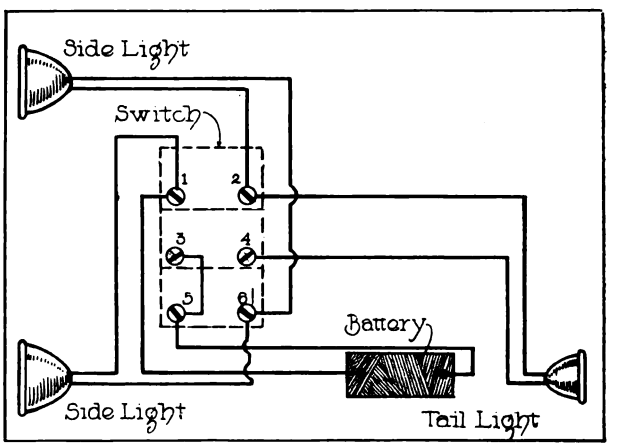


Fig. 1—Wiring Plan for Lighting Side and Tail Lights by Dry Cells, Also Outlining Three-Gang Switch Providing for Service of One or All Lamps.

Lighting with Dry Cells.

(1408)—I am considering the installation of electric lighting on my model T Ford car and understand that the magneto can be employed to supply electricity to the headlights when the machine is running. I wish, however, to do away with the use of kerosene lights, using electrics in these members by fitting connections for the lamps. I understand that the maker of the Columbia dry cells manufactures a battery for this purpose and that it is considerably cheaper than a lighting battery of the acid type. Will you please furnish me full information regarding this battery, also how best to wire the side and tail lights? I want to cut out the side lamps when the magneto is working, but have the electric tail lamp. Also is there not some method of wiring whereby the amount of electricity may be cut down allowing the lamps to burn dimly when the car is standing still? FORD.

Providence, R. I., July 15.

The magneto of the Ford car may be utilized to

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supply current for the headlights as suggested and many owners are obtaining satisfactory results from such equipment. The gas lamps may be converted into electric units by fitting a parabola reflector and there are several designs upon the market. By utilizing these devices, the acetylene lights may be used if desired by removing the electric members and the arrangement practically makes for a dual lighting system. The straight electric lamps are not very expensive and some automobilists prefer these members.

The magneto cannot be employed to furnish current for the side and tail light when the machine is not operating and many Ford operators utilize the kerosene lamps. Electric adapters or converters may be fitted to the oil lamps and current supplied by dry cells or a storage battery. The amount of lighting service would depend upon the size of the bulbs used and amperage of the cells or battery. The storage battery, designed especially for lighting, is favored by many as these members may be obtained in 120 ampere-hour capacity, which would supply current for many hours before requiring recharging.

Dry cells may be employed, however, and the maker of the Columbia cells manufactures a multiple battery which is said to be very efficient and is not expensive. At Fig. 1 is presented a wiring diagram recommended by the company, which provides for two side and tail lights. The installation requires a three-gang switch operated by a push button arrangement, which provides six combinations of lighting. By pushing in one button all the lamps burn in series dimly which consumes about one-fifth of the current utilized when the members are operating at their maximum efficiency. Another button lights the left side light and another both members. It is also possible to burn only the tail light or all members in a group.

The maker of the Columbia multiple battery states that the member will give a minimum of 50 hours continuous burning when six-volt, two candlepower Tungsten lamps are utilized and that as the cells will not be called upon to supply such service the battery will recuperate through rest. With the lamps burning dimly, it is stated that a minimum of 300 hours service will be obtained for all three lamps and that this is equal to 60 nights of five hours each.

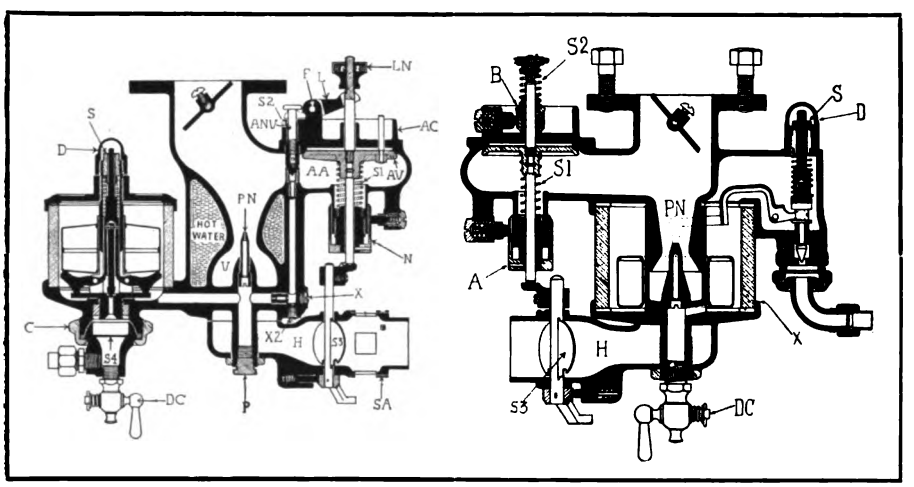


Fig. 2—Depicting the Components of Stromberg Carburetor and Adjusting Mechanism—Model B Is Shown at the Right and C at Left.

Adjusting Stromberg Carburetor.

(1409)—My motor car is fitted with a Stromberg carburetor which became filled with dirt through not straining the gasoline. I took the carburetor down to clean it and since replacing it on the machine, it does not act right. Not having adjusted one of these members and having lost my instruction book am writing for information as to its adjustment. CONSTANT READER.

Stonington, Conn., July 13.

In disassembling the carburetor it is probable that the adjustment of the speeds was changed. As the model was not stated, the method of setting both B and C are given herein. At Fig. 2 is presented the components of both types that of B being the right and C at the left in the drawing.

To adjust model B, turn on the gasoline and note the level of the fluid in the float chamber. It should be about .9375 inch lower than the lower edge of the glass marked X. This level is adjusted properly at the factory and should not require any attention. If wrong remove the dust cap D and turn the adjusting screw S until the proper level is obtained. If the fluid be too high, screw the nut down. If too low screw the nut up.

Next start the motor by closing the valve S 3 in the hot air horn H. The engine should start on the second or third crank. To adjust the low speed turn nut A until the spring S 1, which is the low speed spring, seats the valve lightly. Note that the high speed spring S 2 above B is free and does not come into contact with the nut on top of the auxiliary air valve stem. Next turn the nut A up or down until the motor idles properly.

To set the high speed, advance the spark and open the throttle. If the motor backfires through the carburetor, turn the high speed adjusting nut B up until the backfiring stops. If, however, with this adjustment and running at low speeds the motor operates erratically, the mixture is too rich. The nut B should then be turned down until this trouble is overcome. The spring nut B should always have at least .03125-inch clearance between it and the nut at the top when the motor is at rest.

The type C is provided with two separate gasoline spraying nozzels. The primary member P N is located in the centre of the carburetor and supplies

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sufficient fuel for all speeds up to 20 or 25 miles an hour. The second or auxiliary nozzle A N, is mounted just beneath the secondary gasoline needle valve A N V in the auxiliary air passage A A. The auxiliary needle is raised by a lever L operating over a fulcrum F by the opening of the auxiliary air valve A V.

To obtain the low speed adjustment, turn the nut N located beneath the auxiliary air valve so that the valve is brought up to seat, then give two full turns to the right for pressure. This valve should not operate when the motor is running idly. Next, turn low speed nut N up or down until the motor operates slowly, then advance the spark and open the throttle. If a backfire follow, turn nut L N down until it ceases. If the mixture be too rich, turn it up. Be sure that nut L N and lever L have some clearance on low speed.

The high speed is regulated by the lock nut L N on top of the auxiliary air valve. Raising or lowering it determines the point at which the auxiliary needle valve A N will be brought into service. It is seated by the high speed spring S 2. The lock nut L N should be about .09375 inch above the lever L for normal adjustment, but this distance can be increased or decreased to suit the motor. Richness of mixture may be determined easily by noting the odor of the exhaust. If rich it will be pungent.

Tire Vulcanizing Outfit.

(1410)—We desire a vulcanizer for tires as well as inner tubes for our own use and would appreciate very much having you give us from your experience which vulcanizer would be most practical for our purpose. We are not equipped with electricity and will be obliged to utilize gasoline or some other heating means.

WARNECKE & STIEREN LAND COMPANY.

Karnes City, Tex., July 18.

Vulcanizing outfits utilizing steam are employed largely by garages, etc., and the equipment varies in size from the portable device for the motor car to those adapted to the tire repair business. Chas. E. Miller, 97-103 Reade street, New York City; the National Motor Supply Company, 1911 Euclid avenue, Cleveland, O., and the Williams Foundry & Machine Company, Akron, O., are among those who manufacture a wide variety of these vulcanizers and will furnish information upon request.

Philadelphia to Syracuse.

(1411)—In the next issue of The Automobile Journal, will you please give me a good road route through Pennsylvania and then New York from Philadelphia to Syracuse. I am driving a Ford car and from past experience can average 15 to 18 miles an hour over good roads for five or six hours' running.

PHILA.—SYRACUSE.

Philadelphia, Penn., July 12.

The itinerary below is believed to be the shortest practical route between these two cities. The Automobile Journal's information is that the roads are for the most part good to fair. There are a few bad places between Scranton and Binghamton.

Philadelphia, Penn.—Delaware Water Gap, Penn.—Binghamton, N. Y.—Syracuse, N. Y.

Three Days, 279.5 Miles.

First Day, Philadelphia to Delaware Water Gap, Penn., 90.3 Miles.

Philadelphia to	Miles to	Total Miles
North Philadelphia	3.0	3.0
National Cemetery	5.0	8.0
Ambler	8.7	16.7
Springhouse	2.3	19.0
Montgomeryville	4.6	23.6
Sellersville	9.2	32.8
Quakertown	6.5	39.3
Cooperstown	6.1	45.4
Bethlehem	8.3	53.7
Nazareth	9.6	63.3
Belfast	5.0	68.3
Windgap Village	4.3	72.6
Windgap	2.4	75.0
Saylorsburg	2.6	77.6
Stormville	6.7	84.3
Delaware Water Gap	6.0	90.3

Second Day, Delaware Water Gap to Binghamton, N. Y., 112 Miles.

Delaware Water Gap to	Miles to	Total Miles
Stroudsburg	3.7	3.7
Analomink	5.2	8.9
Henryville	4.1	13.0
Paradise	2.8	15.8
Mt. Pocono	4.1	19.9
Tobyhanna	5.1	25.0
Gouldsboro	5.6	30.6
Moscow	10.3	40.9
Elmhurst	3.3	44.2
Scranton	8.5	52.7
Providence	2.8	55.5
Chinchilla	3.1	58.6
Clark's Summit	1.7	60.3
Clark's Green	0.5	60.8
Waverly	2.0	62.8
Wallsville	4.0	66.8
Fleetville	2.7	69.5
Glenwood	3.7	73.2
Harford	10.4	83.6
New Milford	7.1	90.7
Hallstead	6.0	96.7
Great Bend	0.7	97.4
Kirkwood, N. Y.	5.7	103.1
Binghamton	8.9	112.0

Third Day, Binghamton to Syracuse, N. Y., 77.2 Miles.

Binghamton to	Miles to	Total Miles
Castle Creek	10.1	10.1
Whitney Point	8.1	18.2
Killawog	6.4	24.6
Marathon	2.9	27.5
Messengerville	3.5	31.0
Blodgett Mills	7.1	38.1
Cortland	3.9	42.0
Homer	2.8	44.8
Tully Centre	12.5	57.3
Cardiff	7.7	65.0
Syracuse	12.2	77.2

TWICE ACROSS COUNTRY.

Frank S. Foskett, wife and daughter, of Boston, Mass., are on their way home from a transcontinental automobile trip which will take them twice across the country. Leaving Orange, Mass., in an Overland, made by the Willys-Overland Company, Toledo, O., and travelling by the way of the northern route, which includes the Great Lakes, Wyoming and Utah, they arrived in California in August, 1911. They are returning by a southern route. Mr. Foskett believes that one of the prettiest parts of the entire trip thus far was from Phoenix to Roosevelt, Ariz.

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THE AUTOMOBILE JOURNAL

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INVITING MOTORING TOURISTS.

Motoring tourists report that many cities in New England and the East apparently have neglected the streets connecting with the various through state roads, with the result that it is many times impossible to enter or leave the city without encountering stretches of highway badly in need of repair. This is a condition that by no means acts toward attracting visitors to these centres for the night stop, or otherwise.

There appears to be more general need for co-operation between city and state authorities along this line. It must be recognized that city officials are hampered somewhat by the fact that their appropriations are limited and they have a large mileage upon which to expend the money. However, it would seem to be a wise plan to see that those streets leading to the main thoroughfares were kept in the best possible condition.

The business of catering to the desires of automobile tourists has received decidedly more thought abroad than has been true in America, albeit the people of the West have taken up the matter with energy during the past year. France and other Continental countries have discovered that visitors of this character leave behind them large sums and that money expended in attracting them is a splendid investment.

It is also of interest to note that the roads board of Great Britain has evolved a scheme by which some $3,000,000 will be utilized in the construction of motor exits from the most popular centres. The proposition contemplates a roadway 80 feet wide and of the very best modern construction. Without doubt, the time is not far distant when some such plan must be adopted in America.

RUNNING ON CAR TRACKS.

Apparently it makes little difference how often the various automobile publications call attention to the danger to tires, caused by running on the trolley tracks. It might almost be counted as unfortunate that these rails are spaced just far enough apart to invite such use. Without doubt the practise is occasioned by the desire to escape the discomfort of the poor pavements, etc., but if the drivers would stop to realize the increased tire cost, they would appreciate that such comfort was gained at a decided expense.

A concrete example of this added tire cost was brought to the attention of taxicab owners in New York City recently. With tires inflated to about 65 pounds pressure, the average for taxicabs in that city, it was found that continuous running on the car tracks caused the casings and tubes to adjust their shape to the edges of the rails, and with the full weight of the car pressing down on the tires, the rail edges acted like knives, tending to break the portions of the casing fabric bearing against them. Careful estimates indicated that at least one-fifth of the tire cost on these cabs could be traced directly to the fact that they were being run on the rails of the street car systems.

COST OF GASOLINE.

During the first half of 1912, the average price of gasoline in tank wagon lots increased from 10 cents a gallon to 15, indicating an advance of one cent, practically every 30 days. Of course, the reason is to be found in the ever increasing demand for automobile fuel in the face of a limited supply.

In the meantime, inventors are still experimenting upon devices which shall eliminate the necessity of depending upon gasoline for fuel. Several notable

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successes are said to have resulted, although the time is not yet right for the announcement of their general acceptance.

FOR UNIFORM LEGISLATION.

Inasmuch as the season of 1912 bids fair to be one in which motorists will be given more than ever to long distance touring, including many transcontinental trips, the need for more uniform legislation on this subject is bound to be felt to a much greater extent. The unfortunate part of the situation lies in the fact that so much time elapses between the height of the touring season and the opening of the legislative sessions, that people forget these needs at the very time when they should be most remembered.

A study of the motoring laws in the several states indicates that considerable progress has been made along this line. However, so many commonwealths permit cities and towns to enact local ordinances that the benefits of uniform statutes are somewhat nullified. It is reasonable to expect that each locality must be given the right to regulate traffic as the needs of the community require, but this does not indicate that there is any reason in the enactment of regulations affecting the equipment of the car, for instance.

A great majority of motorists have every desire to comply with the law in all respects. They recognize that certain regulations are as necessary for their own safety as that of other users of the highway. Motoring tourists have even more reason for observing all due precautions, particularly if they are far from home. Unless there is a desire on the part of municipal authorities to discourage visits from these tourists, or to entrap them in a well organized scheme to enrich the public treasury, there should be no difficulty in the elimination of restrictions which are at best of doubtful utility in regulating traffic.

MOTOR EQUIPMENT IN HOT WEATHER.

Commercial vehicle salesmen are assisted in finding arguments during the heated periods which seem to arrive on periodical schedule during the past few years. The heat of the early part of this month was not so oppressive as that of the same season in 1911, but its effect upon horses was quite as marked in many instances. Motor trucks experience no difficulty in meeting any extreme of temperature.

One particularly good argument for all sorts of mechanical equipment of this nature came to light in Springfield, Mass., the afternoon of July 5. Fourteen fires, a majority of them apparently of incendiary origin, called out the down-town department between 12:30 and 3:45. All were in a restricted area, and at times the fires occurred so closely together that the bells hardly had time to cease ringing before another alarm was sounded.

Springfield is well equipped with motor fire apparatus, being one of the pioneer cities of the country in this respect. Only one piece of horse drawn equipment was called upon to answer these alarms, and upon its second return to the fire house the horses were unable to make another run, because of the heat. Had it not been for the fact that the city could depend upon its motors, the resulting loss must have been a matter of serious moment.

MINOR CIRCUIT BECOMES MAJOR.

The outcome of the 1913 show situation was a decided surpise, even to those who had been following the discussion most closely. In the first place, it appeared that the manufacturers were not inclined to be enthusiastic over the proposition of holding so-called national exhibitions even in the two larger cities of New York and Chicago. But that the sanctioning body should decide to add 10 other cities and continue the show season from the first of January to the last of March was unexpected, to say the least.

It will be remembered that several of the cities heretofore included in the so-called minor show circuit sought sanctions from the National Association of Automobile Manufacturers early in the present season, only to be met with refusal. There may never be any means of determining just what caused the change of attitude upon the subject, but the success which has attended the holding of shows in the smaller centres of the country during the past two years undoubtedly had its effect.

One peculiar feature of the new plan is the granting of a sanction to Boston, which always has held the largest show of all, at which the most business has been transacted, and yet the manufacturers never have cared to dignify New England's exhibition by the title of "National." Although the recognition is somewhat belated, it is probable that the dealers in Boston who have borne the brunt of the industry's most representative display for years, will welcome the assistance of those whose interests they have served.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Bassett Number Plate Holder is one of many practical and useful accessories brought out by Charles A. Bassett, Providence, R. I., and is made in two styles for attachment to the front axle and rear of the automobile. The front device comprises a clamp with screw and locking nut and is so designed that it may be slipped over the I beam section axle and adjusted and locked easily. The number plate is attached to the holder by wing nuts and means are provided for adjusting the position of the plate.

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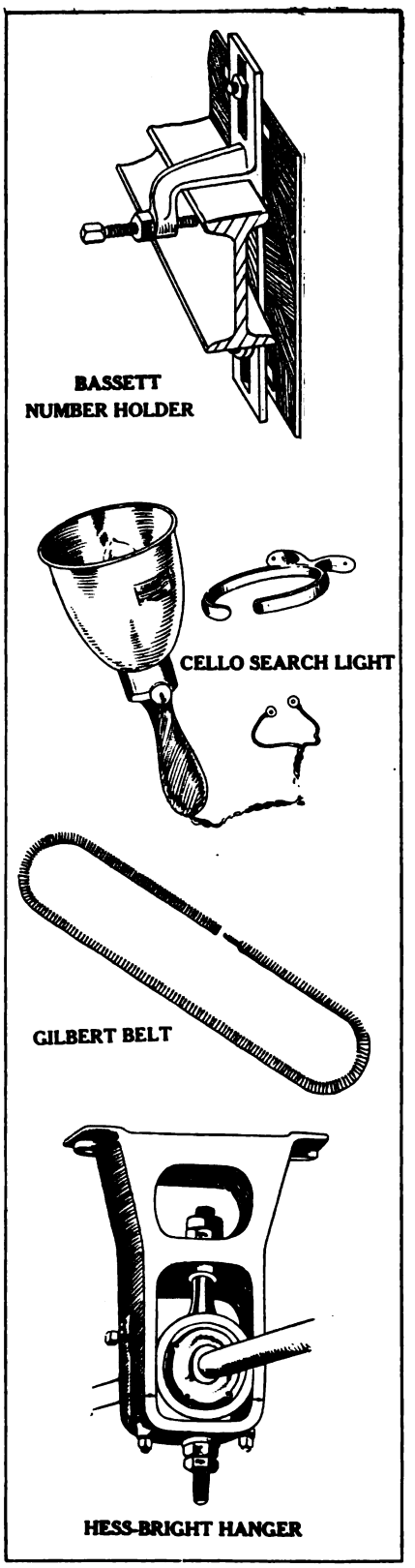
The Cello Searchlight, manufactured by the A. S. Campbell Company, Boston, is designed especially for service in locating street signs, guide boards, door numbers, etc., and differs from those of usual construction inasmuch as it is equipped with a hanging bracket for attachment to the car. The latter arrangement makes for convenience, as the lamp is always accessible. The diameter of the reflector is three inches and the bulb is a tungsten, eight candlepower requiring a six-volt current. The lamp is nickel plated and it is claimed by the maker that it will throw a powerful beam of light.

★

The Gilbert Steel Belt, produced by the Gilbert Manufacturing Company, New Haven, Conn., is a device which eliminates slipping of the member as it is composed of the finest grade of coiled piano wire and when utilized for driving fan or oiler pulleys maintains the proper tension at all times. A feature of the Gilbert product is that the ends of the belt form threads for screwing together when attaching the member. The belts are made in different sizes and lengths and are inexpensive.

★

The Hess-Bright Hanger, made by the Hess-Bright Manufacturing Company, Philadelphia, well known maker of bearings, possesses many advantages over the ordinary form of hangers as by the utilization of ball bearings instead of plain members, friction is reduced to a minimum, power cost reduced, and economy effected in operation, as well as in space in shafting. Careful experiments conducted by the company developed the fact that with ordinary babbitt bearings there is a considerable loss due to friction and that with Hess-Bright ball bearings the coefficient of friction is but one-sixth of one per cent. Another feature emphasized of the ball bearing hanger is that it rolls true in contact regardless of shaft deflection, does not heat and requires but little lubricant for proper operation.



★

Dixon's Motor Chain Compound, manufactured by the Joseph Dixon Crucible Company, Jersey City, N. J., is a composition of graphite and a lubricant especially adaptable to motor chains, and comes in solid form, neatly and compactly wrapped. It is well known that the best treatment for driving chains is to cleanse them thoroughly and immerse them in a bath of graphite and tallow or similar material. This involves melting the tallow and mixing in the graphite. The Dixon preparation not only saves this work but insures the proper proportion of the lubricants and the right grade of graphite. A quantity of the compound, sufficient to cover the chains, is cut from the block and melted at a temperature of 180 degrees Fahrenheit, after which the members are plunged in cold water to harden the lubricant.

★

E. & J. Parabolic Reflectors are being marketed by the Edmund & Jones Manufacturing Company, Detroit, and will appeal to owners who wish to convert their gas lamps into electric members. The device is interchangeable, composed of high grade material, and the reflector is a true parabola heavily silver plated. It is equipped with the company's adjustable

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focusing attachment which provides for any variation of the bulbs, as well as different beams of light. All reflectors are fitted with the Ediswan socket, connector, ample length of cord, and when inserted in the acetylene lamp are water and dust proof. They are designed to utilize 12 candlepower lamps.

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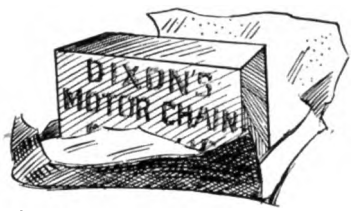
States Folding Hats have been brought out by the States Manufacturing Company, Chicago, and will interest a large class of motorists who employ their machines for travelling to and from the house and office, and who desire a hat that may be folded and placed in the pocket when not in use. The member is very light, made of silk and wool and in nine different shades. Its design is such that it may be adjusted easily to any position and is adaptable to both sexes.

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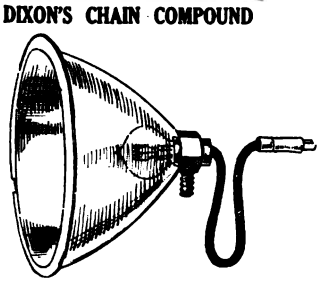
The Springfield Spark Plug Wrench is a valuable addition to the tool kit of the automobile as with it stubborn plugs may be removed easily and without danger of breaking the porcelain or injuring the shell. When an ordinary wrench is employed unless the operator be careful, the tool will slip, rounding the edges of the hexagon faces. The device brought out by the Shawyer Company, Springfield, Mass., provides for two different sized plugs, one end fitting those .875 inch across the face and the other 1.125 inch. An adjustable handle facilitates the operation of the tool which is eight inches long and weighs one pound. Being compact, it occupies but a very little room in the tool kit.

★

The Holt & Beebee Mirror is manufactured by Holt & Beebee, Boston, and is a practical and useful accessory for the automobile, especially where operated in heavy traffic. It comprises a mirror in a suitable frame and includes means for attaching to the windshield or the latter's frame. It allows the driver to note at a glance the movements of all vehicles behind, thereby preventing the possibility of accidents. It is also of service when on the road as the movement of a machine approaching from the rear may be discerned easily.



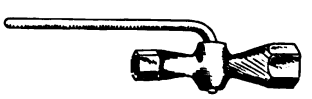
DIXON'S CHAIN COMPOUND



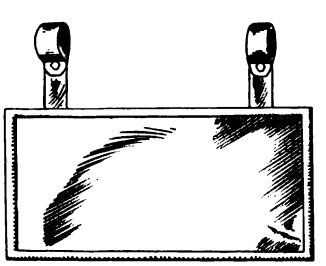
E. & J. PARABOLIC REFLECTOR



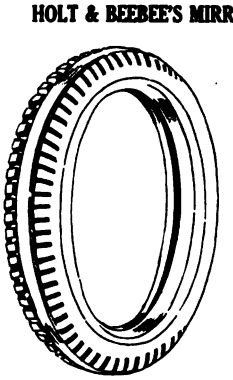
STATES FOLDING HAT



SPRINGFIELD SPARK PLUG WRENCH



HOLT & BEEBEE'S MIRROR



TYRIAN ANTI-SKID TIRE

★

The Tyrian Anti-Skid Tire is the product of the Tyer Rubber Company, Andover, Mass., and it is claimed by the maker that its design is such chains are not necessary, as the shoe will grip the road. The tread has a number of block like corrugations running transversely and between these is a strip extending in an opposite direction. It is pointed out by the maker that the two evenly moulded channels running around the tire allow the shoulder in the middle to grip the road, preventing skidding. The cross channels eliminate forward slip and make easy the starting of the machine.

★

The Bryant Spring Remover, marketed by Stevens & Co., New York City, is a compactly designed little tool for removing or replacing valve springs and is made in three sizes to fit any diameter springs. It differs from the usual valve tool as the spring is compressed or released by a rack and gear arrangement. Means are provided for locking the device in any desired position. The steel engaging device on the end of the lifting rack is a feature, as it will pass easily between the coils of the valve spring and may be twisted slightly if desired. The rack is of cold rolled steel, accurately cut to mesh with the cut gear, and the catch pin is of steel and will hold equally well in either direction. The engaging device is of high grade material, fitted and pinned securely to the rack, and the tool is nicely finished, comes in a box, and is inexpensive.

★

The American Compensating Valve, manufactured by the American Compensating Valve company, Manitowoc, Wis., is a

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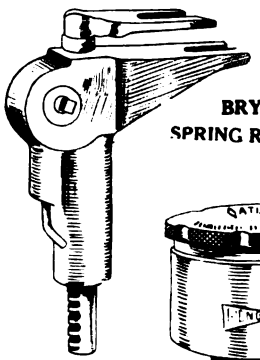
device which is attached to the auxiliary air intake of the carburetor and it is claimed by the maker that it mixes properly the air and fuel by dividing the area of the auxiliary air opening. It makes the motor exceedingly sensitive, quick to respond to the throttle and by the divided area maintains a normal vacuum under varying speeds, thereby producing a constant and uniform mixture. The device is attached easily and once set properly requires no further attention.

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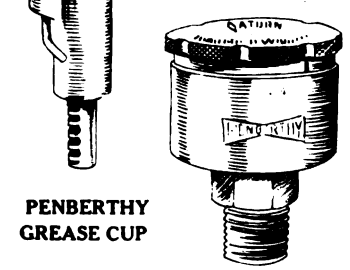
The J-M Dry Cells, made by the H. W. Johns-Manville Company, New York City, are in two types, round or square, and are manufactured especially for ignition work in motor cars, gasoline motors, signal horns, small lights, bells, etc. They register 1.5 volts a cell and are made in 20, 30 or 35 amperes capacity. It is pointed out that two series of J-M cells connected in compound series multiple, instead of series or multiple, will afford about three times the life of a single series on current, on account of the reduced rate of discharge. The J-M batteries are guaranteed to give entire satisfaction.

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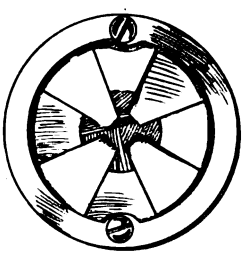
The Penberthy Grease Cup is being marketed by the Penberthy Injector Company, Detroit, and is provided with a dust proof ratchet device facilitating its operation. The cap is locked to the body of the shank by means of a cylindrical dust proof shell having projections on its inside which fit the grooves of the cover. The projections are so arranged that a very fine adjustment is possible. The positive lock arrangement prevents loss or displacement of the cover through vibration, etc., as well as permitting the desired position. The shell is also utilized as a drip cup which fits around the cover, completing the dust proof feature. The cup can be screwed in or out easily as the lugs pass over the grooves in the cover with very little pressure, yet lock positively. The same design



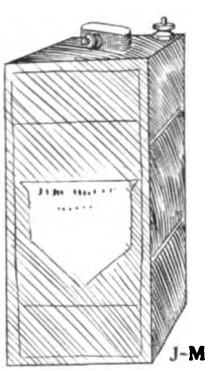
BRYANT SPRING REMOVER



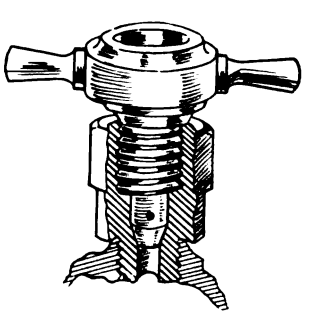
PENBERTHY GREASE CUP



AMERICAN COMPENSATING VALVE



J-M BATTERY



MORGAN PRIMING CUP

is also fitted with a ball check in the shank and is especially adapted for service in places subjected to heat. Another similar style has the shank of the cup integral with the cap. The dust proof and ratchet features are incorporated in all designs. The Penberthy device is especially adapted for motor car service where grease cups are subjected to considerable vibration.

★

The Morgan Priming Cup, is the product of B. Morgan, Newport, R. I., and possesses many advantages over the usual construction as it is claimed by the maker that leaking, sticking or the possibility of broken handles are prevented. It comprises two parts, one of which is screwed into the cylinder head, while the other is screwed into the bushing member and when rotated provides a suitable opening for the priming fluid. Another feature of the device is that it gives a large opening into the cylinder, facilitating valve or ignition timing by the piston. The Morgan priming cup is made in standard sizes, either male or female, and is constructed of high grade material.

★

The Scot Tissue Towels will appeal to automobilists who experience motor car troubles upon the road as the members serve the same purpose as a cloth towel and in addition are handy for cleaning the lenses of the lamps, etc. The material comes in perforated rolls and absorbs moisture, being on the principle of a blotter. They are very sanitary and being soft do not irritate the skin. The roll contains 150 towels, is inexpensive and may be utilized in many useful ways. The towels are produced by the Scott Paper Company, Philadelphia.

★

The Swenson Priming Cup, manufactured and marketed by B. A. Swenson, Providence, R. I., is a neat, compact device whereby gasoline or any other fluid may be injected into the combustion chamber of a motorcycle motor.

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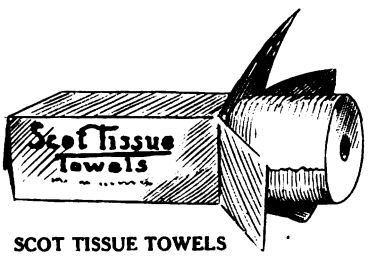
The primer is fitted with a bell shaped cup eliminating the spilling of the fuel and operated by a durable handle which when in normal position insures a gas tight device. They are made for Indian mounts, or any metric thread, constructed of high grade material and finely finished. The hexagonal faces permit of screwing the primer into the cylinder securely as well as make removal an easy matter.

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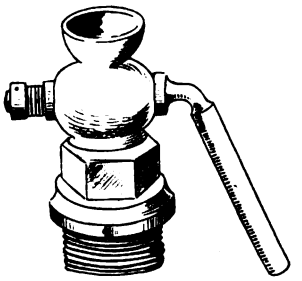
The National Number Holders, produced by the National Motor Supply Company, Cleveland, O., are made for attachment to the radiator cap, also to be fitted to the rear lamp bracket. The former are adjustable and will fit any car and carry any size of license plate. The device is attached easily to the filler cap being constructed in two parts and provided with retaining bolts and locking nuts. The holders are made of high grade material and are finished carefully in black japan.

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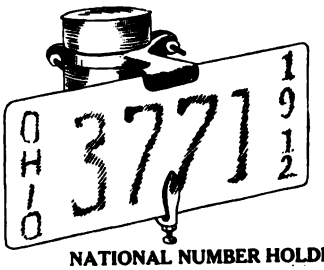
The Peerless Gasoline Separator is a practical accessory as when incorporated in the main fuel line it catches all moisture and foreign elements that may be present in the gasoline. The device is constructed of brass or aluminum, the former being designed for service on motor boats operating in salt water. The separator is in two sections, the fuel entering the lower and passing up through a chamois strainer into the upper chamber from whence it flows to the carburetor in the usual manner. All water or dirt being heavier than the fuel drops down to the bottom of the lower compartment whence it is removed easily by opening a petcock with which the filter is equipped. A special grade chamois is utilized and the maker points out that it will not harden or become dirty as it is maintained in a moistened condition by the flow of the gasoline. The device is made in two sizes by the Stott-Crowley Manufacturing Company, Detroit.



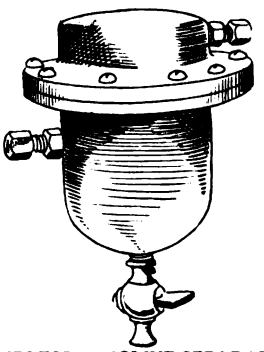
SCOT TISSUE TOWELS



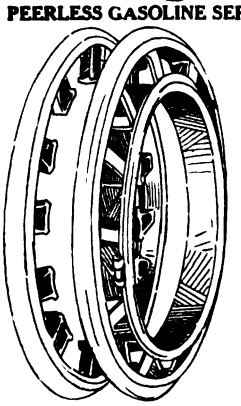
SWENSON PRIMER



NATIONAL NUMBER HOLDER



PEERLESS GASOLINE SEPARATOR



DETROIT EMERGENCY TIRE

The Detroit Emergency Tire, as the name implies, is designed to replace a shoe in the event of trouble and is marketed by the Detroit Emergency Tire Company, Detroit. It comprises a steel channel rim carrying a solid shoe, also brackets which fit the regular rim when the pneumatic tire is removed. The device is equipped with a draw locking ring, which when tightened secures the rim to the wheel. The best of material is employed and the tire is attached easily and quickly by the utilization of a special wrench. The company points out that its design is such that easy riding qualities are provided and that it will fit any type of rim.

U-Vulk is a liquid preparation by the utilization of which tires and inner tubes may be vulcanized without employing heat. It is marketed by J. E. Gimperling & Son, Dayton, O., and it is stated by the maker that containing no acid it will not injure a tube or casing. It is also claimed that cuts and tears in casings may be repaired easily and quickly in a few minutes and that the operation is so simple that it may be performed by those not familiar with tire construction. It will appeal to those who maintain their own machines, and in addition to being of service for tires, may be employed to repair rubber wearing apparel and appliances such as the horn bulb. The U-Vulk outfit is very complete and inexpensive.

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The Dayton Tire Bandage, manufactured by the Dayton Inner-Tire Company, Dayton, O., is an adhesive bandage, nine feet long, three inches wide, of two-ply, 16-ounce tire fabric and designed for emergency use in the event of a blow-out or bad cut to the casing. The ends of the bandage are equipped with large brass eyelets and means for fastening. It is stated that the bandage cannot slip and that dirt or water is eliminated by the adhesive qualities which are incorporated in it.

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WORM AND HELICAL GEARS.*

(By Frank Burgess.)

EUROPEAN practise, extending for over 15 years, has given ample evidence of the eminent success of the helical type of gearing, and I feel confident in saying that in the near future a large per-

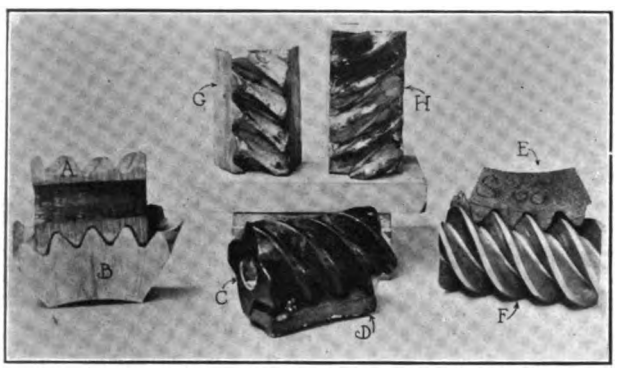


Fig. 1—A Group of Hindley Worm Gears.

centage of the cars in the United States will be equipped with this drive. Mileage records of 50,000 to 124,000 have been established.

Regarding the terms "worm," "helical" and "spiral" I would say that "spiral gear" is the term commonly given to a gear the teeth of which have a uniform twist parallel to the axis, although for technical correctness the word "helical" should be used instead of "spiral." A spiral is a line generated by progressive rotation of a point around a fixed axis, with a constantly increasing distance from the axis. Two forms of the spiral are the plane and the conical. Kent states: "When the axes of two helical gears are at right angle, and a wheel of one, two or three threads works with a larger wheel of many threads, it becomes a worm gear, or endless screw, the smaller wheel or driver being called the worm and the larger or driven wheel the worm wheel."

I suggest standardization of terms, and that to avoid confusion any gears of the helical type transmitting motion with shaft angle at 90 degrees, with a speed reduction less than 10 to one, be termed "right angle helicals;" and with any other than 90 degrees shaft angle the term "helicals," stating specifically the exact angle of shafts. If shafts are parallel the term "helical spurs" should be used.

As the term "right angle helical" is not as convenient as the term "worm gear," and inasmuch as for automobile work most ratios will be less than 10 to one, with 90 degree shaft angle, I would suggest the term "helical gears" as most appropriate. Otherwise it would be better to use the general term "worm" or "worm gear" to include all reduction ratios, even as low as one to one. This matter should be settled promptly one way or the other.

Worm gears were used at a very early date. Archimedes is credited with the invention of the screw in 250 B. C. for the purpose of launching a large vessel built under his direction. Hero of Alexandria in 150 B. C. showed the screw in several forms of his "spiritalia." About 1600 Jacobi Bessoni designed a rude lathe for cutting wooden screws. Important improvements in screws and screw cutting machinery were made by Jesse Ramsden, Henry Maudslay, Sir James Barton, Sir Joseph Whitworth and William Sellers.

During the past 20 years great strides have been made in the development of helical gears. The adoption of these gears for parallel and right-angular drives has made practically a new element in machine design. Until this form of gearing was made commercial by the invention of special machinery suitable for economical production, there was considerable reluctance on the part of the manufacturers to adopt the helical gear.

The principal reason for the adoption of the helical form of tooth appears to be its peculiar quality of silence, regardless of speed or load. With the best methods of design and assembly, great durability, strength and efficiency are obtained.

It is impracticable in an article of this character to cover all the details satisfactorily. However, I believe that on all styles of cars in the United States today the worm gear could be used successfully for rear axle purposes.

The successful worm gear should embody the following qualifications:

1—Cheapness of construction.

2—Strength for resisting shocks.

3—Hardened and smooth surfaces for durability.

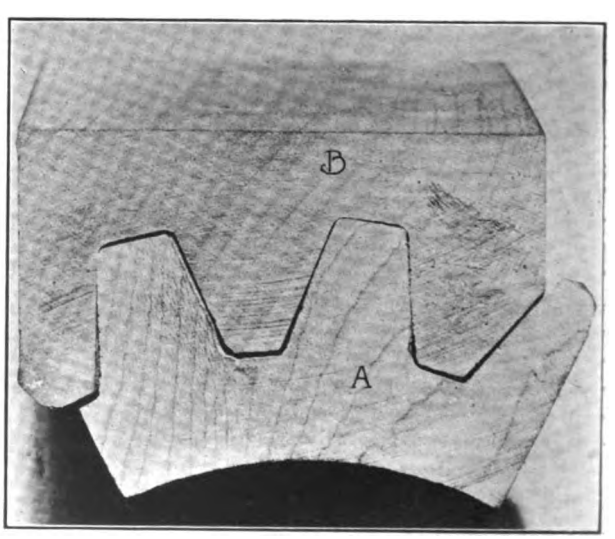


Fig. 2—Wooden Model Hindley, Enlarged 2.5 Times.

*Paper read at midsummer meeting of Society of Automobile Engineers in Detroit.

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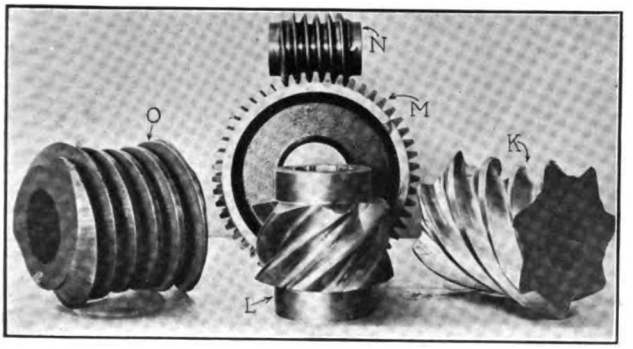


Fig. 3—Some Examples of Thread Cutting.

4—Material of a suitable composition to reduce friction.

5—Simplicity of construction and mounting.

6—Perfect bearing condition.

7—Noiselessness at any speed or load.

8—Reversibility.

9—Lightness in weight.

10—Efficiency in power transmission.

Granting that there is some argument against the worm in regard to trucks as to the dead axle proposition, this could be overcome by using the worm gear on each end of the axle, the same as sprocket wheels, having a double worm gear drive in place of the cumbersome chain drive. If at first slightly more expensive than the chain and sprocket drive, less repairs will more than make up the difference. Care should be taken to have accurate and first class bearings, both radial and end thrust.

Considerable discussion has arisen in regard to the relative merit of the straight and Hindley types, the latter first being used by Hindley of York, England. In my opinion both can be used successfully, although each has its own advantages and disadvantages. For most purposes, particularly where considerable power is to be transmitted, the Hindley has the advantage, but with ordinary machinery it is somewhat more difficult to obtain the same degree of accuracy that can be obtained in the case of the straight type.

From tests made there is no question but that there is a larger bearing surface on the Hindley type of worm than on the straight. Therefore this type of gearing will for the same pitch present a bearing of greater durability and manifestly heat less than the straight type, particularly under heavy load.

The straight type may have less trouble with end thrust bearings. The worm can move in its position longitudinally with the worm axis and therefore does not require as close adjustment of the end thrust bearings.

With first class bearings the Hindley type has the advantage, as a smaller and lighter gear can be used, thus reducing expense, especially if made up in large quantities.

Referring to Fig. 1, which represents a group of Hindley gears, the pinion in the centre marked C and the sector gear marked D show a perfect form of the Hindley type. These were made by first generating the spiral pinion C, then the sector D was made of plaster of Paris. It will be noticed by looking at the teeth carefully that the three teeth fit closely one to the other, thereby forming perfect tooth bearing. Where the sides of the teeth of pinion C are slightly convex they are correspondingly concave on the mating teeth of gear D, thereby giving approximately theoretically correct bearings.

Gears E and F represent pinion F and section E at centre of sector gear, straight type. By closely observing the bearing of the teeth of these gears it will be seen that there is only what would be called a point bearing. It is quite plain to the eye that there are less bearing points with the straight type of worm than with the true Hindley. The latter set of gears, E and F, was cut on the generating machine.

Gears A and B are a set of wooden models of Hindley gears. A section of both pinion and gear is shown at the centre. This also shows that a set of Hindley gears has a greater bearing surface than the ordinary straight type E and F.

G and H are two plaster of Paris casts taken of the teeth of the worm and gear, H being an impression of the gear and G of the worm. From these casts we are enabled to determine the tooth bearing by cutting sections A and B from a pinion and gear. We find by rubbing together the surfaces of the worm and gear, one of which is coated with sulphate of copper, that there is a much larger contact bearing on the Hindley type than on the straight type.

Fig. 2 shows a wooden model enlarged about 2.5 times actual size, of worm and worm gear teeth of the Hindley type, ratio one to one. The teeth show straight faces, with no convexity, and it will be noticed that they have a large and flat bearing surface. This also is a case where the worm or driving member is larger than the driven gear B.

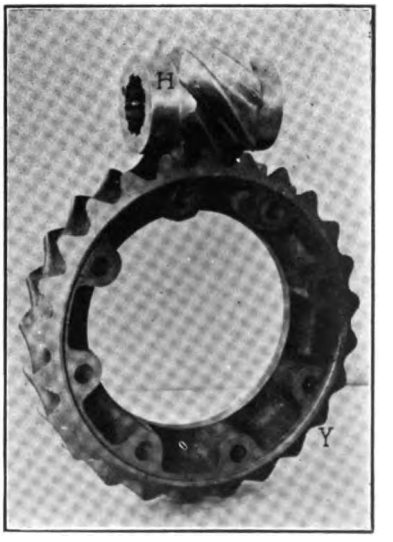
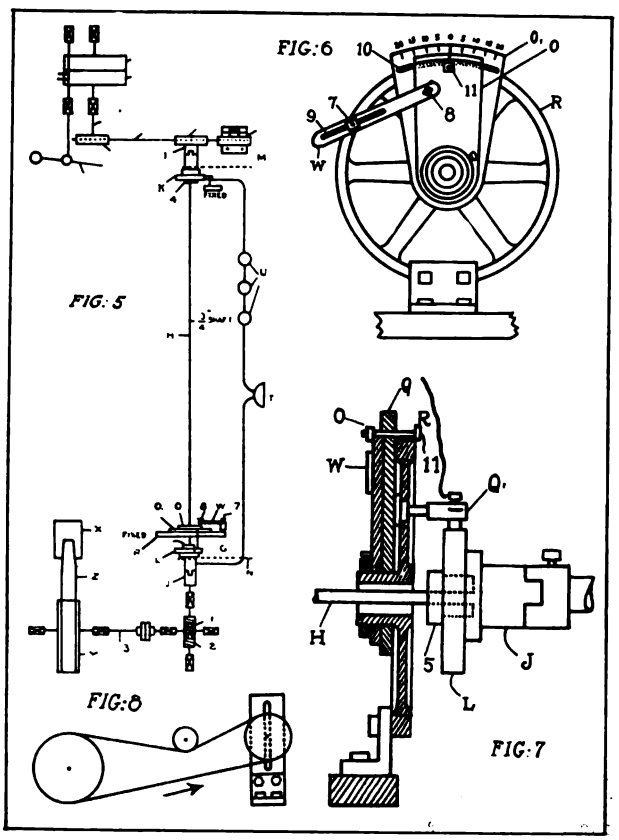


Fig. 4—Hindley Worm Gear and Conical Spiral Worm.

Referring to Fig. 3, seven-threaded Hindley pinion K is the same as Hindley pinion L, with the exception that the face is abnormal being continued out to show the conical spiral Hindley cut. There is no advantage in the additional length of face over that of L except for the purpose of comparison. It is found that it is not necessary to make the face of a conical spiral gear as wide as that of the

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Figs. 5, 6, 7 and 8—Outlining Efficiency Testing Apparatus.

straight type. The length of face on the Hindley gear is 1.875 inches between extreme points, and at the base of the tooth 2.25 inches. There should be a slight chamfer on the edge of the teeth.

A single-thread Hindley gear M in the centre is of about 5.75-inch pitch diameter and .375-inch pitch. This gear has six teeth in contact with worm N, the pressure angle is 12 degrees and the included angle 24 degrees. Worm O is a double-threaded Hindley. These gears show considerable bearing surface and give high efficiency under ordinary loads.

In Fig. 4 H and Y represent a Hindley worm gear and conical spiral worm with a speed reduction of 3.57 to one, 25 by seven teeth, .875-inch pitch, designed for a gasoline pleasure car of 40 horsepower.

The hardening process for the worm should be such as to cause the least amount of distortion, careful methods of heat treatment being employed. The benefit of this is that the gear teeth of the Hindley type which it is impracticable to grind can thereby be lapped, making the teeth concentric with the hole, which is very essential in a worm of this type. The gear should have a mirror-like polish. In this way with hardened concentric polished tooth surfaces the Hindley type presents a better surface of contact than the best form of straight worm, even though the latter is finished by grinding.

The gear is flanged on one side with eight lugs, with hole in the centre of each lug for mounting same on differential casing. There is a slight shoulder on each side of this gear so that the differential casing will form a double web, stiffening the gear so that there is no opportunity for side vibration, thereby reducing the bronze metal to a minimum.

The worm gear should be made of a special mixture of hard bronze. The gear should be slightly polished after being cut to insure a perfectly smooth glazed surface to mesh with the hardened polished worm. This set of gears, properly housed, with ball bearings and the right lubricant used, will give an efficiency of at least 90 to 95 per cent.

A simple method of testing the gears for efficiency without elaborate apparatus is to run them in their regular housing, containing a bath of oil, subjected to load to be transmitted. If they do not have a high temperature after running several hours they indicate high efficiency and suitability for the given purpose.

That there may be a satisfactory method of knowing whether gears will be suitable before being placed in cars and tested on the road, insuring proper efficiency and absence of excessive heat finally destroying their usefulness, it is quite necessary that manufacturers of rear axle drives using this form of gearing should have a proper way of testing exactly the efficiency of the gears. It would be very expensive to replace the gears after installation. After a careful study of the best mechanical and electrical absorption and transmission dynamometers, an efficiency testing machine, similar in some respects to the apparatus used at the Massachusetts Institute of Technology by Prof. F. C. Riley, was constructed during 1911. The prony brake was adopted for an absorption dynamometer and a long shaft of a small diameter arranged

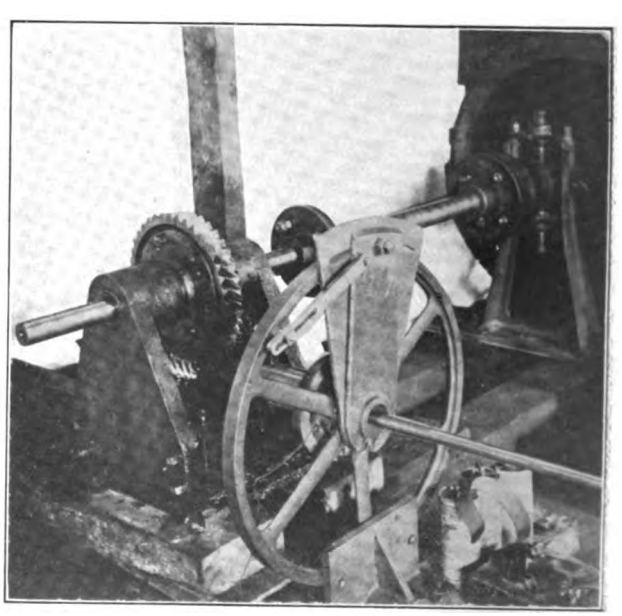


Fig. 9—Efficiency Testing Apparatus Assembled.

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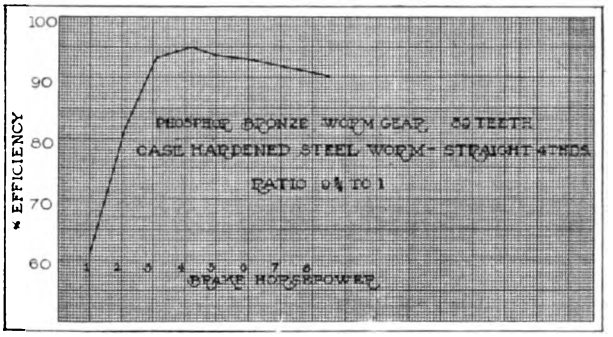


Fig. 10—Efficiency Diagram Plotted from Results Obtained by Test of Straight Worm and Worm Gear.

to obtain the torsion of the shaft in degrees by an electrical indicator apparatus for a transmission dynamometer.

This efficiency testing apparatus is shown in Figs. 5, 6, 7, 8 and 9. On shaft H is worm 1 driving the worm wheel 2 on shaft 3, on which are prony brake wheel Y and brake arm Z bearing on platform scales X. On each end of the shaft H are clutches I and J, in which are fitted bushings 4 and 5, in which the shaft H is sweated. Attached to clutches I and J are fibre discs K and L in which are inserted brass contact points making electrical connection through the fibre discs to shaft H. Bearing on the peripheries of these fibre discs are spring brushes Q and Q^1 to which are fastened insulated copper wires, in the circuit of which are located dry batteries U and the telephone receiver T. Spring brush Q is fixed while spring brush Q^1 is attached to sector O^1 concentric with the shaft H movable on lug of fixed iron wheel. Sector O is graduated each side of zero to 20 degrees in .5 degrees. Sector O^1 is fastened to fixed wheel R by link W and bolts 7 and 8 and is adjustable a small amount by slot 9 through which bolt 7 is clamped to wheel R. This sector O has a zero marked at the top which moves over the graduated sector O^1 thus enabling a fine adjustment of the zero point so that the spring brushes Q and Q^1 may be brought to coincide at the same angle. Sector O^1 is clamped to fixed wheel R by a bolt 11 through slot 10, which enables readings from zero of sector O to be determined.

As a load is applied to the brake the shaft of fibre disc L begins to lag behind the fibre disc K and the amount in degrees which this shaft lags is recorded by sectors O and O^1. The horsepower transmitted can be determined a degree or .5 degree by previously calibrating this shaft by means of lever N and M clamped to clutches I and J temporarily, M being fixed. The power supplied or in-put being found and the power absorbed obtained, the efficiency of the worm and worm gear and bearings can be found by dividing the out-put by the in-put. This apparatus appears to be accurate and the simplest and cheapest method of determining the efficiency of worm gears that I have thus far been able to find.

Fig. 10 shows an efficiency diagram plotted from results obtained from an efficiency test of a straight worm and worm gear as shown in the table appearing herewith.

Ed. Note—The Boston Gear Works, Norfolk Downs, Quincy, Mass., with which Mr. Burgess is connected, expects to undertake further tests up to 50 horsepower, using different lubricants, and with the gears mounted under conditions practically as they would have on the road.

FOR GOOD ROADS CONGRESS.

The first annual session of the American Road Congress will be held in Atlantic City, N. J., Sept. 30-Oct. 5. The congress will mark the consolidation of the conventions of 40 of the most important road organizations in the United States, including the American Association for Highway Improvement and the American Automobile Association. Atlantic City has tendered the use of the $1,000,000 pier for the gathering, and it is there that the meetings will be held. The National Association of Road Machinery & Material Manufacturers has voted to hold its exposition of materials and equipment in conjunction with the congress. The convention will be the largest of its kind ever held in this country, and will be attended by road builders, automobile men and civil engineers of world wide prominence.

Efficiency Test of Straight Type Worm and Worm Gear for Automobile Rear Axle Drive for Electric Vehicles and Light Power Cars

PHOSPHOR BRONZE WORM GEAR—39 TEETH
CASE HARDENED STEEL WORM SOLID ON SHAFT—4 THREADS } RATIO 9¾ TO 1

Test	Temperature of Worm Gear °Fah.	Degrees Twist of Shaft	N^1 R.P.M. of Worm	N R.P.M. of Worm Gear	P^1 Pounds 1 Ft. From Axis of ⅜" Shaft 9½ Ft. Long	P Net Brake Load in Pounds	H^1 Input Transmission Dynamometer Horsepower	H Output Brake Horsepower	E % Efficiency
1	74	1⅛	1393	143	6.13	14.15	1.64	1.032	61.2
2	82	2	1423	146	9.81	28.95	2.65	2.153	81.2
3	86	2¾	1416	145	12.66	42.95	3.41	3.172	93.2
4	86	3 9/16	1416	145	16.6	57.25	4.46	4.23	94.8
5	90	4 5/16	1370	140.5	21.1	71.65	5.48	5.13	93.7
6	94	5 1/16	1389	142.5	25.5	86.00	6.72	6.24	93
8	108	7½	1400	143.5	35.56	116.25	9.43	8.5	90.2

$$\text{Brake Horse-power} = \frac{P2R\pi N}{33{,}000} = PN\ (.00051) = H$$

$$\text{Transmission Dynamometer Horse-power} = \frac{P^1 2R^1 \pi N^1}{33{,}000} = P^1 N^1\ (.00019) = H^1$$

$$\%\ \text{Efficiency} = E = \frac{H}{H^1}$$

Fig. 11—Table from Which Efficiency Diagram at Fig. 10 Was Plotted.

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What is claimed to be the first and only car to have been driven from Land's End, England, to John O'Groats, Scotland, (from one end of Great Britain to the other), on the top gear throughout, under official observation of the Royal Automobile Club, was a six-cylinder Sheffield-Simplex, made by the Sheffield-Simplex Motor Works, Ltd., Tinsley, Sheffield, England. The total distance covered on this remarkable trip was 906 miles, and the test was most conclusive in every respect, particularly as there are numerous strenuous grades on the routes selected, and cities, with their congested traffic, were not avoided.

The company may be regarded as one of the few British concerns producing six-cylinder machines exclusively. Two chassis models are offered, one of 45 horsepower and the other of 25. The latter is shown herewith, but it should be remarked that there are no essential differences in the construction, aside from the bore and stroke of the motor, the method of casting the cylinders and the matter of cooling.

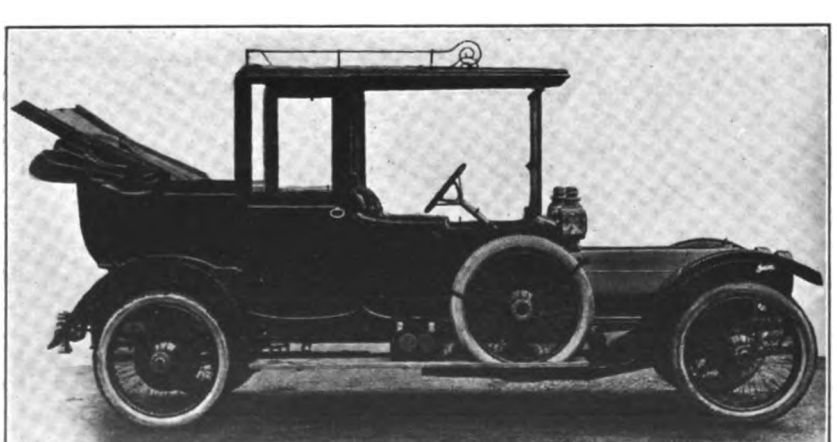
The larger engine has a bore and stroke of 4.5 inches, the cylinders being cast in pairs. The water circulation system is by pump. As will be noted by the accompanying illustrations, the 25 horsepower motor has cylinders cast in sets of three with the valves all on one side. The bore is 3.5 inches and the stroke five. Other differences are set forth herein.

A particular feature of the construction is the provision for operating the timing gears, magneto and oil pump by means of a worm. By reference to the end view, it will be seen that the castellated ends of the crankshaft and camshaft carry spiral gear wheels and are connected by a worm passing between them at an angle of 45 degrees. This is claimed to eliminate noise, and in addition, because of the rake of the worm, the magneto armature spindle connects with the wormshaft by means of a leather disc dog, which has a vernier adjustment to afford the utmost refinement in the matter of regulating the timing. The lower end of the wormshaft drives the toothed wheel oil pump through an ordinary jaw dog.

Ignition is by high-tension magneto and storage battery. The carburetor is a Zenith compensating instrument, with no moving parts to get out of order, it is claimed. Cooling is by the thermo-syphon system, and the maker feels it necessary to add that to insure that this shall prove satisfactory in every respect the water jackets and pipes are of extra large capacity. The radiator is circular in form and of ample dimensions. Cooling is still further aided by a belt driven fan.

The clutch is of the dry, multiple disc type, and it is held that the surface is such that very slight pressure is necessary to bring it into action. In connection with this member, the Sheffield-Simplex company calls special attention to the method of control, this being by a single push button type of pedal, which also operates the brakes. Of course, this scheme is by no means new in America, but it may be added that the maker of this car maintains that it possesses decided advantages, especially for the novice.

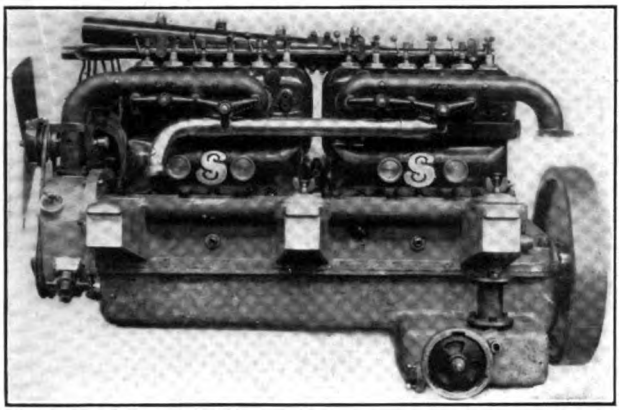
Another feature of the Sheffield-Simplex is the use of a transmission housing combined with the rear axle, a practise which has



Twenty-Five Horse Power Six-Cylinder Sheffield-Simplex Landaulet of British Manufacture.

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met with decided favor among well known American makers for some years. The whole system is enclosed, including the universal joint and propeller



Valve Side of 25 Horsepower Six-Cylinder Sheffield-Simplex Motor.

shaft, and works in a bath of lubricant.

It is interesting to note the advantages claimed for this, these being four in number. First, a large number of parts are dispensed with, and in consequence the arrangement is much more simple, and naturally, reduces weight without sacrificing strength. Second, the position of the gears reduces very considerably the strains put upon the main universal joint and the propeller shaft, thus reducing wear and tear. Third, the transmission forms one unit, and by virtue of the ball and socket form of attachment to the frame is free to move in any direction in order that the road wheels may freely accommodate their position to the inequalities of the road surface. Fourth, the position of the speed gears increases the unsprung weight on the rear tires.

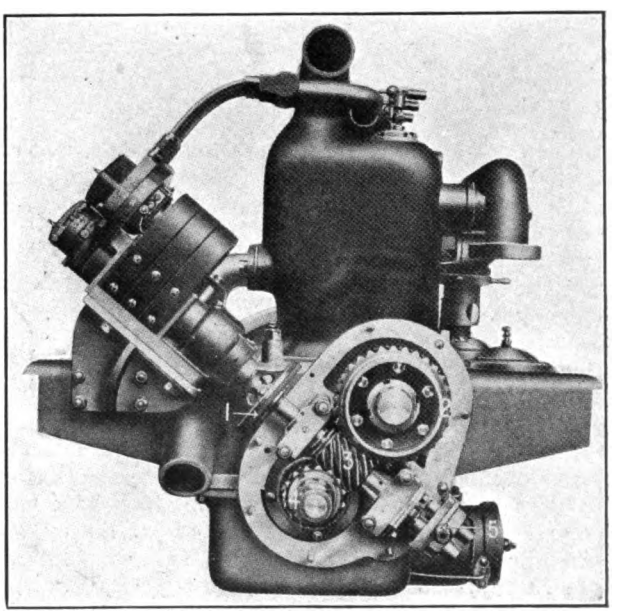
In respect to this last item, the company makes the following argument: "The extra unsprung weight enables the tires to get a better grip on the road surfaces, and reduces very considerably the chief factor that causes the tires on driving wheels to wear so rapidly, that being slip between the tread of the tire and the surface of the road. Owing to lack of perfect adhesion, and the fact that in passing over hollows in the road surface the wheels do not follow the actual contour, causing them to leave the road momentarily, the tires of motor cars are continually slipping; this causes the road surface to act like a rasp on the tread of the tire, resulting in excessive wear. Every time the road wheel leaves the ground, which is continually taking place, the load being released, the wheel accelerates in speed, in a similar way that the propeller of a steamer does when it comes out of the water in a rough sea. On coming down on the ground again the resistance of the road reduces the speed of the wheel down to that the car is travelling, and it is at this moment that the rasping action takes place. The effect of this additional weight is to keep the road wheels from leaving the ground, and the extra pressure it creates on the tires provides better adhesion to the road surface, preventing the rasping action from taking place, this reducing the wear on the tires."

Two independent sets of brakes are employed, one being operated by foot and the other by hand. Both are internal expanding and act directly on the rear road wheels, each on a separate drum. Semi-elliptic springs are fitted both front and rear, with special shock absorbing springs at the rear. Wheels are of the Rudge-Whitworth detachable wire make.

Although the Sheffield-Simplex landaulet is presented herewith, it should be stated that the company does not manufacture bodies or do carriage work. However, it has arrangements with coach workers which will supply any type of body specified, and the officials are glad to take up the matter of design with prospective purchasers, or recommend a suitable firm to do the work.

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Although similar to the laws governing the use of automobiles in this country, rules and regulations recently drafted and adopted in Japan are much more stringent. In making application for a license for business use, the applicant must give his registered domicile, actual residence, name and age, description of business, map of route of traffic, giving width of roads and location of stations. He must also give his business hours, fixed number of passengers and rate of fares if a passenger vehicle, and the capacity of freight and rate if for freight traffic. The kind of motor in car must be stated and construction plans must be provided, giving measurements and constructional details. Plans of brakes, controller and acces-

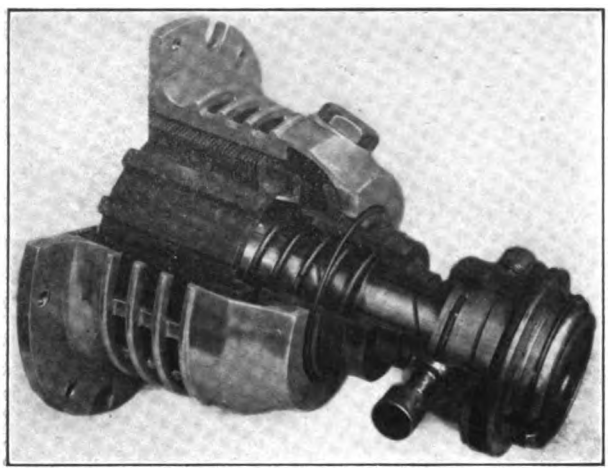


Front View of Sheffield-Simplex Motor, with Cover Removed Exposing Worm Gear Mechanism.

sories are required. Applicants for a license for private use are required to furnish the governor with the following information: Domicile, age, kind of

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motor in car, measurements, and number and rate of car. Specifications for equipment are fundamentally the same as those in effect in this country and car



Sectional View of Sheffield-Simplex Clutch, Showing Internal Parts.

must be inspected at the government office at owner's expense. Car must also be inspected by the government once a year.

American motorists in Japan are apt to become confused in adapting themselves to the new traffic regulations. While the rules are much like those in this country there are several minor differences. In Japan the regulations require that motor vehicle drivers make a wide curve in turning to the right and a small curve when turning to the left when passing a corner. This is directly opposite to the rule in effect in this country.

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The next Paris automobile show will open Saturday, Dec. 7, and close Sunday, Dec. 22. The exhibition, which will be held in the Grand Palais, will remain open to the public for 16 days. This year's show is organized by the automobile manufacturers for the automobile manufacturers, 80 per cent. of the profits to be shared by individual members taking part in the exhibition. Five trade associations—Automobile Syndicate, Cycle & Automobile Syndicate, Automobile & Accessories Syndicate, Bodymakers' Syndicate and Accessory Manufacturers' Syndicate—being represented. The Automobile Club de France figures only in an honorary capacity.

When all expenses have been paid, the profits will be distributed as follows: Forty per cent. to all exhibitors in proportion to the amount they have paid for rental of their stands; 40 per cent. to all exhibitors who for the previous six months have been attached to one of the five organizing syndicates; and 20 per cent. into the funds of the five trade associations in proportion to the amount they have paid in rental. Armand Peugeot is chairman of the committee of arrangements and M. Cezanne is the general secretary. Previous automobile shows in Paris have been exceptionally profitable.

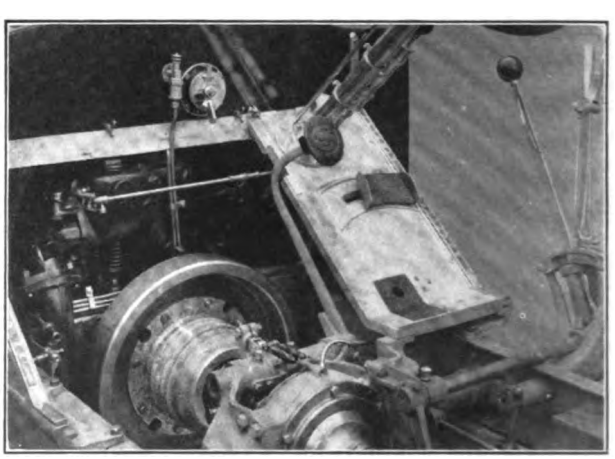
While Prince Edward Island and Bermuda have consistently kept up the barrier against the automobile, practically the only places in the world where machines are barred, the chances that they will soon be admitted to the former place are good. A. R. Brennan, a prominent citizen and publisher in Summerside, P. E. I., has commenced an educational campaign to offset the feeling against motor cars due to reckless use of them when first introduced. Having in mind the campaign conducted by Benjamin Briscoe, president of the United States Motor Company, when motor cars were being condemned as an economic waste, Mr. Brennan has asked him for information, which Mr. Briscoe is forwarding as rapidly as possible.

★

According to the advices from a United States consul in a far eastern country, a company wishes to secure an agency for a reliable low priced car for two cities in which it has stores. The consul believes that there is a good field for moderate priced American made automobiles in his district. Full particulars regarding the opening can be secured from the Bureau of Manufactures, Washington, D. C. The number of the report is 9163.

★

The Austrian Alpine tour, under the auspices of the Imperial Austrian Automobile Club, and under the direct patronage of the Archduke Leopold Salvator, was held the latter part of last month. The run was over a distance of approximately 1500 miles. Among the competitors were members of the Austrian royal family in the persons of Archduke Karl Francis Joseph and the Archduke Joseph Ferdinand, while others to enter the contest were Prince Elias of Parma, Prince Alexander Croy, the Princess Carlotte of Saxe-Meiningen, Count Alexander Kolowrat, Count Paul Draskovich, Count Heinrich Schonfeld, Count Siegfriend Wimpffen, Count George Orssich, Count



Sheffield-Simplex Clutch and Operating Gear in Position, Showing Sliding Control Pedal.

Eugen Lamberg, Baron Walter Franz and Baron Alexander Styrcea. One American car was entered. a Ford, made by the Ford Motor Company, Detroit.

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In view of the great engineering feats contemplated in Mesopotamia, it will be remembered that the first mechanically propelled vehicle to traverse the Arabian desert and cross the River Euphrates was an Argyll car, made by Argylls, Ltd., Alexendria, Scotland. The work now under way is referred to as "resuscitating the Garden of Eden."

★

An accompanying illustration presents a portion of the fleet of White cars, made by the White Company, Cleveland, O., taking part in the Russian war office motor vehicle trials of last month, in which the American machines led all competitors in the matter of economy in consumption of fuel and oil. The work of the 1.5-ton White truck created exceptional interest among the army officials.

Forty-five cars started from St. Petersburg, covering 1540 miles, sometimes across sand hills where no roads existed, until 35 reached Moscow. The White team of two touring cars, two ambulances and the 1.5-ton truck, finished with a perfect score. Other makes competing were: Mercedes, Benz, Napier, Saurer, Adler, Charron, Laurrin-Klement, Burre, Lancia, Vauxhall and Berliet.



Part of the Fleet of White Cars Taking Part in the Recent Russian War Department Motor Vehicle Trials.

★

That American made cars are becoming popular in Russia is evidenced by the fact that the Nyberg Automobile Works, Anderson, Ind., recently received an order for 25 Nyberg six-cylinder, 60 horsepower models from Count Nicholas Kousnetseif of St. Petersburg.

★

Through the efforts of the Calgary Automobile Club, Calgary, Alta, Can., a provincial organization was formed recently. More than 2000 invitations were sent out to owners throughout the province, and although the response was proportionately small, the gathering of those interested was a representative one. George Tempest of Calgary was elected president. The vice presidents were elected from the various cities of the province as follows: Edmonton, Kenneth McLeod; Lethbridge, L. M. Johnstone; Medicine Hat, Charles Pingle; Red Deer, G. W. Green. One of the principal efforts of the society will be to secure legislation that will require more of the revenue from automobiles to be expended for the improvement of roads.

★

There is considerable interest among English motorists regarding a proposal for the formation of a co-operative society to deal with the gasoline question. Barely outlined the plan is as follows: A co-operative society to be formed; members of motoring organizations and other motorists to be invited to subscribe one guinea ($5.11) each; limited liability, one guinea share to each member; gasoline to be supplied to members at not more than one shilling (24 cents) a gallon; members to order not less than 20-gallon lots; stocking depots to be gradually established in all large centres, and touring members to be able to purchase from these at not more than one shilling, two pence (28 cents) a gallon.

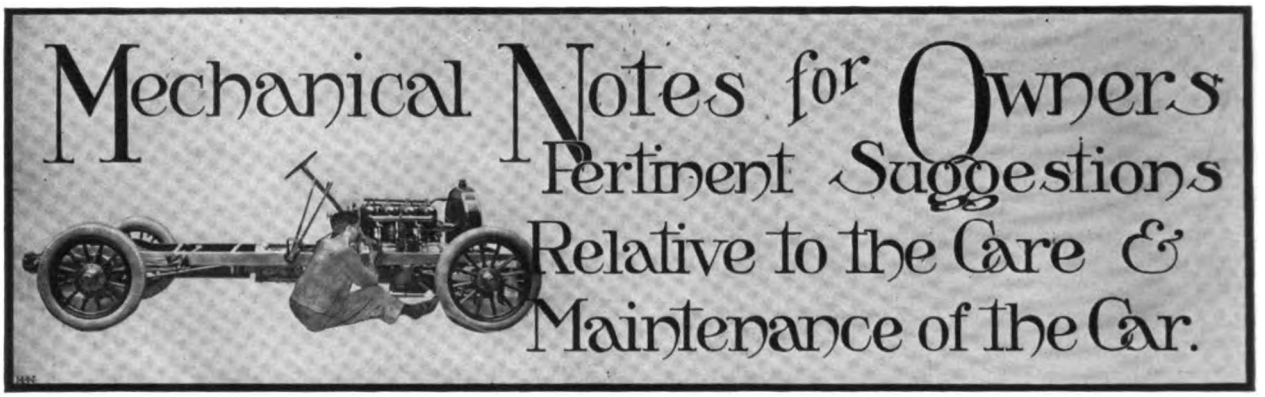
Sixty-five members of the Institution of Automobile Engineers, the British counterpart of the Society of Automobile Engineers in America, enjoyed a visit to France, inspecting many of the motor car factories in and near Paris, the latter part of June.

★

C. A. Lull, representative of the Metzger Motor Company, Detroit, in Brazil, Argentina and the Latin-American countries, says that there is a wide field of export for the American maker in South America.

"Until recently," says Mr. Lull, "almost the entire business was controlled by Europeans. The Germans and French have practically monopolized the field, although they have been unable to produce anything of moderate price to compare with the average American $1500 car. South Americans are keen seekers for the lowest markets, and the medium priced American automobile is therefore in splendid demand."

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REAR AXLE OILING DEVICE.

It is surprising to note the number of automobiles which are being operated with one of the rear wheels covered with dirty lubricant which finds its way out from the differential housing to the wheel drum whence it is spattered to the spokes and tire. Not only does the lubricant cause deterioration of the rubber, but the efficiency of the brakes is reduced greatly by the grease. This trouble is confined usually to one wheel although instances of both members being affected have been noted.

Many types of cars are fitted with rear axles having felt washers interposed on either side of the differential to prevent the lubricant from working out, but as the material becomes hard and worn, it fails to fulfill its function. Obviously, the remedy is to fit new washers but on some automobiles this occasions considerable work and many owners do not like to undertake the task of disassembling the rear construction. Removing the wheels and cleaning out the old grease affords but temporary relief and cutting down the amount of lubricant in the differential is not recommended.

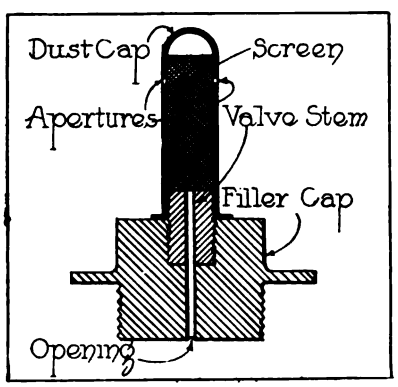


Fig. 1—Vent Device for Filler Cap of Differential.

Among the causes of the loss of lubricant is the expansion of the air within the differential housing, due to heat, which may be brought about by the weather or friction. The pressure exerted by the expanding atmosphere has a tendency to force the lubricant thrown up by the action of the gears into the axle housings, thence to the bearings where the surplus is thrown out by centrifugal force.

By relieving the pressure in the differential housing much of the leakage may be stopped, and at Fig. 1 is presented a device which was fitted to the casing by a motorist who experienced considerable trouble with leaking axles. The attachment was constructed of material found in the garage, and as will be noted by the drawing comprised a dust cap, valve stem and a piece of fine brass screening.

The filler plug on the machine was of liberal size and located well to one side of the centre of the differential housing. The plug was removed and drilled, then tapped to take a section of the valve stem which was cut off and screwed into the opening. Three apertures were next drilled in the dust cap in which was placed the brass screen as depicted in the drawing and the cap screwed snugly on the valve stem.

The screen was utilized to keep out any particles of dust or foreign matter and did not prevent the escape of the air from the housing, which found its way through the opening in the filler plug. The location of the latter was such that any lubricant thrown up by the revolving gears did not find its way into and stop up the vent. The motorist stated that the device not only prevented the lubricant from working out through the axle housing, but the supply did not require replenishing as frequently as formerly.

NOVEL REPAIR TO WATER MANIFOLD.

Many owners display considerable ingenuity in making repairs and an instance of overcoming what seemed at first to be a serious trouble was noted by the writer recently. The machine was an old model and the cylinders of the motor were of the copper water jacket type. The intake water manifold was retained by a bolt which passed through the manifold and was screwed into a spider as illustrated at Fig. 2 B. The supporting arms had become corroded and in removing the manifold, broke away.

At first the owner thought he would be obliged to purchase a new cylinder but decided before ordering the part to attempt a repair. The other three bolts would not draw the manifold up enough to make the member water tight even with the use of packing and cement. After considerable experimentation the kink outlined at A was adopted. It consisted of taking a

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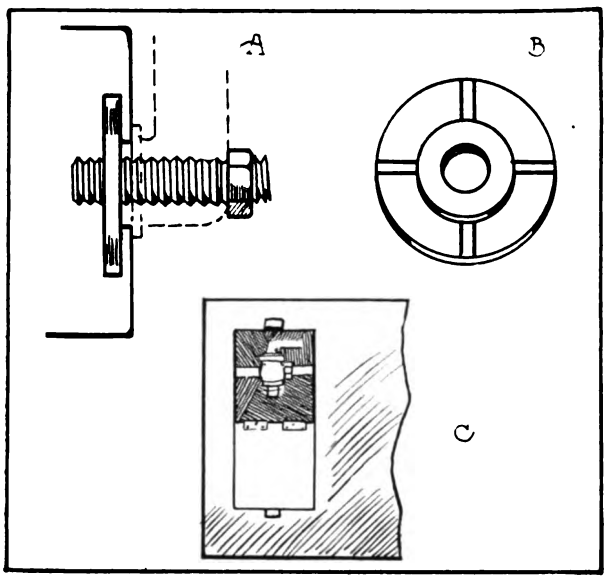


Fig. 2—Suggestions for the Owner Repairman: A, Novel Repair Made to Copper Water Jacket Bolt; B, Depicting Spider, the Arms of Which Had Rusted; C, How Operator Fitted Door to Reach Petcock in Fuel Line.

piece of metal nearly as wide as the diameter of the opening in the jacket and about .5 inch longer. A hole was drilled and tapped to take a bolt threaded its entire length. The plate was then slid into the opening and held while the bolt was caught and threaded up until snug. The manifold was then slipped over, a nut attached, and when screwed up this drew the manifold up tight. Upon testing it was found to be water tight.

HANDY PRIMING DEVICE.

Although it is rare that the cylinders will require priming in warm weather a suggestion for making a fuel container and one that is followed easily, is shown at Fig. 3. It comprises a dust cap, such as is employed to protect the valve caps of the inner tube, and the device is drilled as depicted at A. Many times the operator desires a little gasoline when on the road or in the garage for priming purposes and by utilizing the dust cap as outlined at B, the fluid may be poured into the priming cup without wasting. The device might also be employed for oiling a part by enlarging the hole, and would prove useful on the road and when the usual oil can is missing. The fact that the caps are perforated would not necessarily prevent their being employed on the tubes in the usual manner.

HANDY DOOR TO FUEL COCK.

Many owners make it a practise to shut off the fuel supply to the carburetor upon leaving the car for the night while others observe the same rule if the machine is standing idle for any great length of time. This precaution is brought about by the carburetor flooding in the past and closing the main line prevents a possible loss of fuel. On some cars the shut-off valve is reached easily while on others it is difficult of access and many owners while wishing to close the petcock dislike to crawl beneath the automobile to reach the member.

An operator of a model T Ford who lost considerable of his fuel through the carburetor flooding, fitted the trap door device depicted at Fig. 2 C. The board under the seat was sawed out opposite to the petcock and inside hinges and a catch fitted. The door is hardly noticeable, and by it the operator was enabled to reach the shut-off valve easily. Where this method may not be applicable, a petcock could readily be installed near the carburetor and between the device and the tank. To utilize it, however, the hood would have to be raised.

WHY WATER IN COOLER HEATS.

Many owners of cars complain that the water in the circulating system heats unduly now when it did not boil in cooler weather. While there are several causes for this, such as impeded circulation, boiler scale in the radiator, dirty radiator, pump not working properly, weak spark, etc., few operators ever think to change the water.

The utilization of hard water is responsible for the trouble as after repeated heating it forms a boiler scale in the water jackets of the motor which is deposited in the radiator in the form of a fine, brick colored dust. This accounts for the reddish hue of the water when it is drawn from the cooler, and when this condition exists the circulating system should be cleansed thoroughly by using a saturated solution of

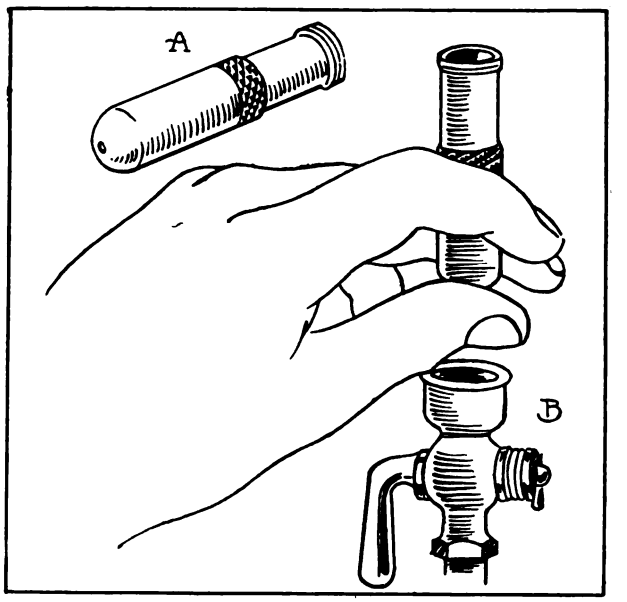


Fig. 3—Easily Made and Inexpensive Priming Device Constructed from a Dust Cap: A, How the Member Was Drilled to Permit Flow of Fuel; B, Depicting Method of Operation.

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common washing soda, afterwards thoroughly flushing out the system with clean water.

The water should be drawn off and the system flushed out at least once a week, and oftener if the motor shows signs of undue heating, provided, however, the other components of the circulating system be not at fault. In operating in hot weather it is a good plan not to fill the radiator to the top as when the fluid heats it expands, leading the novice to think that the water is boiling. Fill within a couple of inches of the top and if operating for any length of time on the low speed the water boils, remove the cap, giving vent to the steam which will aid in keeping the fluid from boiling out.

SAWDUST USEFUL IN GARAGE.

Boxes of sawdust or fine sand are useful and should be included in the equipment of the garage, particularly as the former material possesses absorbing qualities. When oil or grease has been spilled on the floor a few handfuls of the sawdust should be thrown over the lubricant and allowed to stand a little while before it is swept up. If lubricant drips from a machine and a drip pan is not utilized, the sawdust may be employed. Sand is valuable in the event of incipient fires as the material will smother flaming gasoline or oil.

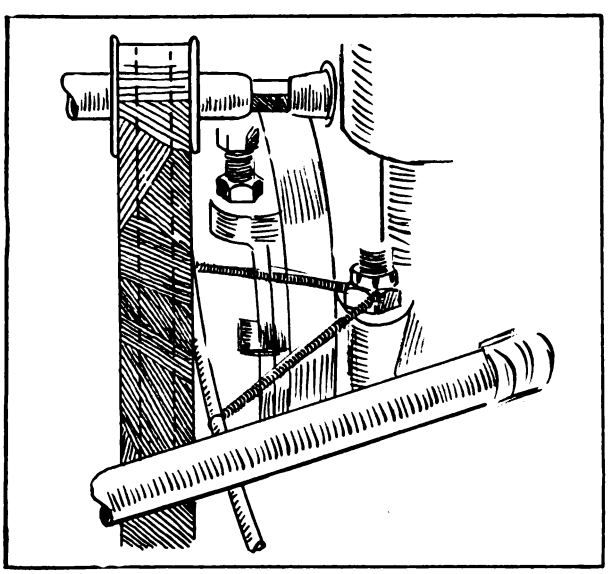


Fig. 4—Showing How a Light Spring Was Attached to Timer Rod to Retain the Member in Normal Position.

FORD TIMER ROD KINK.

Lack of attention in the matter of lubrication is responsible for wear and improper operation of many of the components of the motor car. It is surprising to note the number of owners who give no other attention to the machine than that of filling the fuel tank and oiler, a practise which results in the development of considerable play in certain parts.

An instance of this kind is noted on some model T Fords, the timer of which is actuated by a rod having ball and socket connections. These members are not subject to wear if attended to properly, but if the sockets become filled with grit and are not lubricated, play will develop, causing the rod to come in contact with the fan belt, and wearing that member as well as the rod.

The remedy is to fit new connections which are inexpensive, but the trouble was overcome by one owner who attached a spring as outlined at Fig. 4. A light spring was tied in the centre to the rod and the ends fastened as shown in the drawing. The tension was very light, just sufficient to hold the rod away from the fan belt, and the spring was divided into two sections to maintain the rod as desired when the timer was advanced or retarded in operating the car.

SETTING SPARK PLUG GAPS.

Few owners ever give the spark plugs the attention these devices require for efficient operation of the power plant. The majority of drivers know by heart the rule that the gap of the magneto plug should be about .015625 inch and that of the ordinary plug about .03125. Much has been said and written relative to the importance of adjusting the gaps, but having once set the points many believe that no further attention is necessary.

While it is admitted that a high grade plug will give efficient service and will not require frequent adjustment there are plugs the electrodes of which are susceptible to high voltages and in time burn away, enlarging the gap and consequently affecting the spark. It is obvious that the larger the gap the more pressure is required to force the high-tension current to bridge the space. The timing of the spark is also changed to a certain extent, especially where the battery is the source of current. It is an excellent plan to remove the plugs occasionally and readjust the gap, employing a gauge to insure accuracy. It is surprising how smoothly a motor will run after the plugs have been adjusted properly.

GROUNDING MAGNETO.

Few operators of machines equipped with high-tension magnetos understand more concerning their operation than the throwing of the switch lever, and in the event of trouble with the wiring are at a loss to know how to proceed to remedy the fault. To interrupt the flow of the current to the spark plugs, the primary circuit of the magneto is grounded, or short circuited.

This is brought about by connecting an insulated wire between the terminal on the contact breaker box and the frame of the car, and incorporating a switch in the line. When the switch is thrown to "off," it

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is really closed, and the magneto ceases to generate a high-tension current. If the wire leading from the terminal to the switch or the lead from the latter to the frame becomes chafed, and comes in contact with any metal of the chassis, a ground is produced. If the magneto be supplying current for ignition, it is obvious that the engine will stop.

An instance of an operator being unable to switch off the ignition was noted recently by the writer, and the driver had to stall his engine when he desired to stop. An inspection of the switch showed that the wire leading from the terminal on the magneto had worked loose. When this lead was replaced the difficulty was eliminated.

In the event of trouble of this nature the operator should bear in mind that the motor can be stopped by grounding the primary current which may be done by taking a screw driver or strip of metal and making a connection between the terminal on the circuit breaker and the most convenient metal part of the chassis.

LION COMPANY LOCATES.

The Lion Motor Car Company of Adrian, Mich., whose plant was destroyed by fire, June 20, is again in the field. A reorganization has been effected and the new plant obtained. It is claimed that the first car will be marketed within a very short time. Within 90 days, it is announced, the company will be turning out its full quota of cars. The firm is to remain in Adrian, despite many reports to the contrary. The Industrial Association of the city has guaranteed $100,000 to keep the factory, and the new plant is considerably larger than the one destroyed. The factory organization remains practically the same.

UNITED STATES TIRES.

All five brands of the United States Tire Company's tires, United States, Hartford, G & J, Morgan & Wright and Continental, are to be merged into one brand, the United States, this fall, according to an indication by Elisha S. Williams, president of the Rubber Goods Manufacturing Company, which is a subsidiary of the United States Rubber Company, and which owns the United States Tire Company and the plants grouped in it.

It was predicted when the new brand was created a few months ago that a consolidation would eventually result, and that the new one would supersede all others. Although it is said that after fall there will be but one brand, there will be several grades to meet market conditions.

According to information from Mr. Williams no decision has been reached regarding a location for the new tire factory that the United States Tire Company is to erect at a cost of from $3,000,000 to $5,000,000. He intimates, however, that it will probably be built in the West.



COMING EVENTS.

August.

Aug. 7—Race meet, Cleveland, O.
Aug. 8-10—Beach meet, Galveston, Tex.
Aug. 23-24—Road races, Elgin, O.
Aug. 25—Track races, Columbus, O.

September.

Sept. 7—Track meet, Hamline, Minn.
Sept. 9—International aviation race, Chicago, Ill.
Sept. 17—Grand Prize race, Milwaukee, Wis.
Sept. 20—Pabst Trophy race, Milwaukee, Wis.
Sept. 21—Vanderbilt Cup race, Milwaukee, Wis.

October.

Oct. 3—National tour, Detroit, Mich.
Oct. 7-11—Reliability run, Chicago, Ill.
Oct. 12—Track meet, Salem, N. H.

November.

Nov. 6—Track meet, Shreveport, La.

December.

Dec. 7-20—Automobile Salon, Paris, France.

1913.

January.

Jan. 4-11—Show, Cleveland, O.
Jan. 4-11—Show, Madison Square Garden, New York City.
Jan. 4-11—Show, Grand Central Palace, New York City.
Jan. 20-25—Show, Philadelphia, Penn.
Jan. 27-Feb. 1—Show, Detroit, Mich.

February.

Feb. 1- 8—Show, Chicago, Ill.
Feb. 10-15—Show, Minneapolis, Minn.
Feb. 17-22—Show, Kansas City, Mo.
Feb. 24-March 1—Show, St. Louis, Mo.

March.

March 3- 8—Show, Pittsburg, Penn.
March 8-15—Pleasure car show, Boston, Mass.
March 17-22—Show, Buffalo, N. Y.
March 19-26—Commercial car show, Boston, Mass.
March 24-29—Show, Indianapolis, Ind.

GASOLINE PRICES RAISED.

The fifth advance in the price of gasoline to garages in New York City within a period of six months was made recently, and it is believed this is only a forerunner of a general increase all over the country The advance just made was one cent a gallon, and brings the price up to 15 cents.

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THE FOUR-SPEED TRANSMISSION.

(By W. H. Cameron.*)

IT MAY sound strange when I make the prediction that the next radical change in automobile engineering will be the general adoption of the four forward speed transmission. By that I mean that in my opinion the four-speed transmission is bound to become generally used in all good American cars.

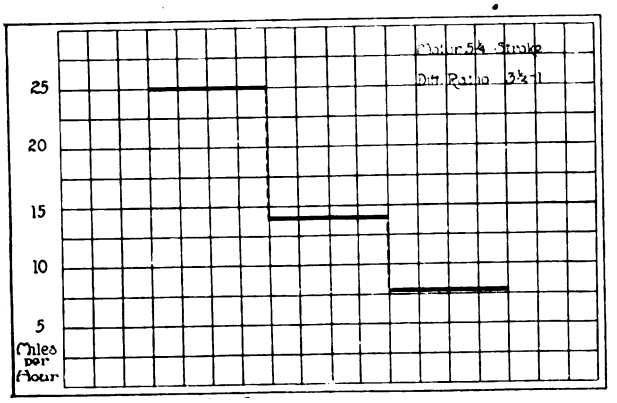


Fig. 1—Three-Speed Transmission, Indicating Gap between Second and High—Looks as If Something Were Missing.

Today it is found in this country only in the highest priced cars. You can count on the fingers of one hand the cars selling under $3000 that now have four speeds forward. Abroad, where special reasons have forced the use of the four-speed transmission in the large majority of cars, its advantages are better understood.

One reason for its use on foreign cars is the extremely small bore of cylinders, due to the fact that the tax is graded by the size of the bore. An American car of more than four-inch bore has little demand in England where a bore of three inches and a fraction is generally used with an extremely long stroke, to give the maximum horsepower.

Under such conditions the four-speed transmission is positively essential, both to economize the power and to gain the required flexibility of control. Its use under these conditions, however, only serves to illustrate the actual money saving in fuel and less strain upon the machine, as well as the advantages in driving which will come with the widespread adoption of the four-speed gearbox in America. For the same engineering principles apply in our case as in theirs.

Before passing the point of economy, let me say I believe that the tendency in America will be decidedly to smaller bore. This is due to the fact that everybody knows gasoline is becoming scarcer, and is sure to mount in price. I think the small bore is coming, even with the effort to popularize the six-cylinder car. The popular six-cylinder car of the future will be one with about the same piston displacement as the standard fours of the present.

*Member Society of Automobile Engineers.

Question of Cost in America.

The four-speed gearbox has been confined to high priced cars in America, primarily because of its prohibitive cost. Engineers, and I may say manufacturers, almost unanimously admit the great advantage of four speeds over three, but the cost question has caused the delay until the demand of car buyers has become imperative. It means a complete change of design—more gears—wider gear centres—a big expense for the improvement, when all are totaled.

But the advantages to be gained from it are certainly so manifest, so great that it is a question of only months when it will be generally accepted. And with our roads, the four-speed transmission comes to general practise none too soon. Motorists generally realize now, that the life of a car depends upon its use and abuse. It does not take a car owner long to reason to the fact that making a car put forth every ounce of power on frequent grades is highly detrimental.

"Learn to control your car exclusively by the gas, as far as possible," says the instructor in motoring, to the school. The salesman says the same thing to the beginner who has purchased his car, in 99 cases out of 100. Everybody who gives advice on running a car says it, thereby admitting that something is wrong, or lacking in the transmission. Yet everybody realizes on a moment's reflection that the transmission is the logical first means for the control of the speed.

Now it takes long experience and special aptness —I may say genius—for driving to know just how far to throttle in regulating a car by gas. Few ever learn it perfectly. The driver who does it with any degree of skill, knows his car like a human friend and brother, and is also guided by some sixth sense of intuition.

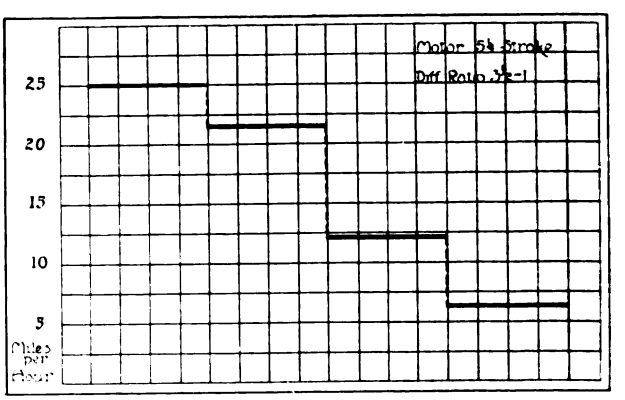


Fig. 2—Four-Speed with Indirect Fourth—Third and Fourth Very Close Together; and Yet in Use They Are Really Closer, Due to Inefficiency of the Gears.

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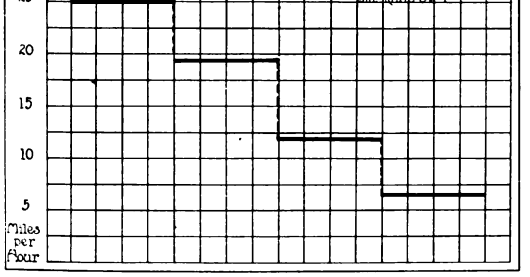


Fig. 3—Regarded by Writer as the Proper Ratios with All Speeds About Equally Spaced.

book but in not a few cases to human life. It costs money to pull the engine speed down until the car almost quits on high, and then to race the engine to pick up on second, as is so commonly practised.

We have grown used to the sight of the driver on high gear, killing his motor at street crossings, street car tracks and railroad tracks, by throttling down before he can get his clutch out. If instead he slips into third speed on a proper four-speed transmission, he has a gear ratio which is practically the same as a 4.5 to one rear axle—by having which, as any one knows, the car can easily be throttled down to two or three miles an hour, and still pick up quickly.

By this time it should not be necessary to explain that the basic purpose of four-speed transmission is not to satisfy a mania for more speed. This was a common error when the four-speed transmission was rare practise.

Four-speed transmission provides an efficient, feasible and logical control of the car—a control not based on guesswork, but upon an accurate, proved and dependable gearbox, built in accordance with universally acknowledged mechanical principles, and in accordance with the best engineering practise the world over.

It provides this control without wasting the fuel—without racing the motor, and consequently with far less vibration. It relieves the motor of undue strain, especially in taking heavy grades. With four speeds (the direct drive being on the fourth) the long sand stretches—the heavy mud roads—the miles of axle-deep slush—the hills and mountains may be negotiated without fear of punishing the motor, in the way that now works havoc, and shortens by years the life of the best car built.

More Pleasure in Driving.

Unless one has actually driven with a four-speed transmission, he does not know the satisfaction and pleasure that it adds to driving. To those who have not tried it I would say: Make a test of two cars, everywhere, every day, not only to climb grades, and not only to do away with unnecessary engine racing, but to provide a really essential speed, between second and high where the gap now exists.

Grade climbing is one of the problems most satisfactorily solved by the four-speed gearbox. Every motorist knows that unless he has an engine on which he can depend for a practically unlimited pull, he will find the inclination of many grades just a trifle too much for his top speed. On such a grade with a four-speed gearbox he can drop to third speed and it takes his car up like a bird. With a three-speed car, he has to drop from top speed to second—and he makes an awful drop—in fact, almost 50 per cent. lower than high.

If you have had this experience, you know that resigned expression with which everybody settles back in the car, to make the best of it until the car can be thrown into high gear. The same condition is encountered in many roads which are just a little too heavy for top speed. The funeral pace then has to be taken on second speed, although the car is actually capable of much better speed on these roads.

We shall understand the necessity of the four-speed transmission more perfectly, if we say that while the speed ratios of a proper four-speed car are 1, 2, 3, 4, (the fourth being the top speed) the speed ratios of a three-speed car are really 1, 2, 4—the gap between the second and high being so great that there is really no third speed. So when we put in a four-speed gear box we are actually adding a third speed to the car.

I have talked to many veteran motorists, and they agree with me that the four-speed gear box is needed

Table No. 1.

Speed	Transmission Ratios	Ratios—Engine to Wheels
Third	1.00—1	3.50
Second	1.80—1	6.30
First	3.20—1	11.20
Reverse	3.88—1	13.58

Table No. 2.

Fourth	.86—1	3.01
Third	1.00—1	3.50
Second	1.76—1	6.16
First	3.40—1	11.90
Reverse	4.60—1	16.10

Table No. 3.

Fourth	1.00—1	3.50
Third	1.29—1	4.51
Second	2.10—1	7.35
First	3.76—1	13.16
Reverse	4.57—1	15.99

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Direct Drive on Fourth, the Best.

The greatest question in four-speed transmission is the ratios of the gearing, or the number of times the motor must turn over to the number of revolutions of the rear wheels. The subject has engaged the attention of the leading engineers in Europe and America for several years; but it is only lately that they have practically agreed as to the direct drive.

There are two types of four-speed transmissions: One direct on third speed, the other direct on fourth. The latter is generally conceded to be greatly in advance of the former. This is overwhelmingly proved by the practise on the great majority of cars now using the four-speed gearbox.

Of 157 four-speed foreign cars, 132 have the direct drive on fourth. Of the American cars now using four speeds, 75 per cent. have the direct drive on the fourth. In fact, as the four-speed gearbox gains in favor the indirect fourth will drop out overnight.

Difference Shown by Table.

A study of the tables and diagrams shown herewith will enable the reader to see the difference at a glance. Table 1 shows a common three-speed transmission which is about what is fitted to 85 per cent. of the three-speed cars. It will be noted that 3.5 rear axle gear ratio is used in all three tables. If the driver rushes his car at a hill on the high gear and has to change down he goes to second, which is almost 50 per cent. lower than high.

It will be noted that in this transmission the first or low speed is only 11.20 to one. This is the reason that so many cars are forced to back over the stiffer grades if there is no other way round. The reverse of course is lower. This is the result of transmission design.

Take the next table now, which is No. 2. It shows a transmission of a well known and popular car. This is for the motorist who thinks he wants to burn up the roads, and who buys a car with an indirect fourth. He overlooks the fact that he loses almost all that he thinks he gains, through the inefficiency of the gears, and has two speeds which are almost alike. It also will be noted that he has not much better second and low than his friend with the three-speed.

The Ideal Transmission.

Now, the ideal transmission, in my opinion, is shown in Table No. 3. It will be seen that, when it is necessary to change from fourth to third, a speed is obtained which enables the car to go over the hill at a fairly good rate.

Also note that the second in this is almost between the first and second of the others, consequently if the car is fitted with a good clutch, the operation for all ordinary driving resolves itself down to a three-speed job (as the second can be used for starting on the level) leaving the extremely low first and reverse for emergency.

In the above, I have but briefly outlined facts on which the judgment of the best engineers at home and abroad is based, in favor of four-speed transmission. Taking all these facts (and the showing of the tables and diagrams herewith) into intelligent consideration, everyone must realize that four speeds, with the direct drive on the fourth, is the immediate step in the evolution of the leading cars.

GOODYEAR BOOKLETS ISSUED.

The Goodyear Tire & Rubber Company, Akron, O., recently issued two booklets, entitled "Get All the Mileage from Your Tires," and "Make Inner Tubes Last Longer." Both are small, but contain a fund of information appertaining to its own particular line. The company also recently issued the second number of "Aviation." This contains several photographs of leading aviators and aviation meets, and is extremely interesting.

BARNES RESIGNS TWO OFFICES.

Claire L. Barnes resigned as third vice president and a member of the board of directors at a recent meeting of the board of directors of the Motor & Accessory Manufacturers in New York City. William H. Crosby was elected as a member of the board of directors, to fill the unexpired term of Mr. Barnes, whose office will continue until January, 1914. F. C. Billings, already a member of the board, was elected as third vice president, to fill the unexpired term of Mr. Barnes, which office will continue until January, 1913. The following concerns were elected to membership: Hood Rubber Company, Boston, Mass.; the Lefever Arms Company, Syracuse, N. Y.; the American Hardware Corporation, New Britain, Conn.

HAYES MADE ADVERTISING MANAGER.

Frank M. Hayes, who has been in the employ of the Luke Horsfall Company, Hartford, Conn., for the past three years, resigned recently to accept a position as salesman and advertising manager of the Lovell-McConnell Company, Newark, N. J., maker of Klaxon and Klaxonet automobile horns. When he left the Hartford concern, employees in the plant presented him with a travelling bag.

DURGIN WHEEL PLANT MOVES.

As a result of efforts on the part of the Commercial Club in Hutchinson, Kan., the Durgin Auto Wheel Company has decided to move its plant from Lawrence, Kan. The move was made as the plant required greater facilities. The Durgin wheel is made so as to abolish tire blow-outs, prevent skidding and yet be durable. It has a tire made of selected blocks, which give it exceptional wearing qualities.

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IN THE Commercial Vehicle Field

New Trucks and Applications, Time and Money Saved, and Other Items of Interest.



ELECTRIC SERVICE VEHICLE CLUB.

The Electrical Vehicle Club of Boston, which had its inception April 3, 1911, recently ended its activities for the present season with a dinner. The members have held weekly meetings since September, at which addresses have been made by authorities on haulage, and especially electric transport service. The main object of the club is to bring before the business men of New England the advantages to be gained by the use of the electric service wagon.

EDWARDS MAKING TESTS.

Commissioner Edwards of the New York City street cleaning department recently secured an appropriation of $10,000 for use in testing motor vehicles in connection with the removal of ashes and garbage. Instead of making purchases, he has rented six machines and they will remain in commission until the close of the fiscal year. He estimates he will be able to save the city 52 cents a ton on this work in the future.

USES G. M. C. AT SAVING.

By the use of a G. M. C. five-ton truck, made by the General Motors Truck Company, Detroit, it is estimated by the Staf-O-Life Feed & Milling Company, New Orleans, La., that a saving of $4200 results when a comparison is made with the work formerly done by horse drawn vehicles. The truck carries a load of approximately 10,000 pounds, and covers a distance of between 40 and 50 miles a day, consuming from seven to eight gallons of gasoline.

GARFORDS IN NEW YORK.

New York City recently placed in commission its first motor driven patrol wagons, three Garford machines, made by the Garford Company, Elyria, O., being assigned to duty below 14th street, replacing nine horse drawn vehicles. An illustration of one of the new cars is shown herewith.

The chassis is the standard Garford public serv-



Garford Patrol Recently Installed by New York Police Department, Equipped with Motz Cushion Tires.

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ice type, with 40 horsepower motor, four-speed transmission, pressed steel frame and 145-inch wheelbase. The machines are all equipped with Motz cushion tires, made by the Motz Tire & Rubber Company, Akron, O. Each set carries a guarantee for 10,000 miles, which is equivalent to nearly two years' service.

PIERCE-ARROW CARRIES LUMBER.

The Capitol City Lumber Company of Hartford Conn., has devised a means of loading and unloading a Pierce-Arrow five-ton truck, made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y., so that both operations require not more than five minutes, five to six tons of lumber being carried at a time. This means more than double, and almost triple the amount that could be handled by a pair of work horses. The truck was designed by the Miner Garage Company, Hartford. An extra long wheelbase has been provided for a regular Pierce-Arrow chassis. The body is equipped with rollers which permit the load to be dumped in one minute. The lumber to be delivered by the truck is assembled on a feeder at the yard, and a system of rollers has been devised, whereby the lumber can be moved to the body of the truck in about three minutes.

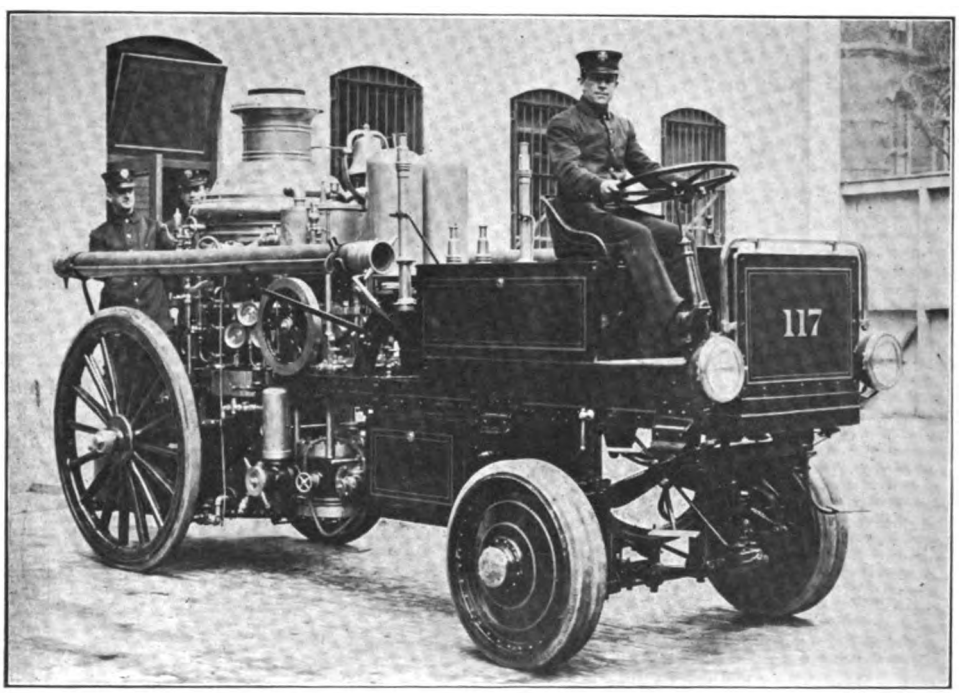
COLVER LOCOMOBILE REPRESENTATIVE.

The Locomobile Company of America, Bridgeport, Conn., recently secured Fred F. Colver to have charge of its truck department in its New York branch, and this feature of the business in the surrounding territory. Mr. Colver has been connected with the automobile industry for eight years having been with the Pope Manufacturing Company, the Buick Motor Company and the Studebaker Corporation.

TESTS COUPLE-GEAR TRACTOR.

Tests of what is believed to be the first electrically driven fire engine in America, were recently undertaken by the department in New York City. All experiments to date have been successful, and the machine is now in daily use at the De Kalb avenue station.

A horse drawn steamer was converted by the removal of the front wheels, and all equipment forward of the so-called "gooseneck," and the substitution of a two wheel Couple - Gear gas - electric tractor, made by the Couple - Gear Freight-Wheel Company, Grand Rapids, Mich. A general idea of the machine's appearance can be gained from the accompanying illustration.



Couple-Gear Tractor Fitted for First Electrically Driven Steam Fire Engine in America.

The engine is driven by current from the battery, located above the deck, and supplied to motors contained in each of the forward wheels. These motors are each three horsepower and will take a momentary overload of 200 per cent. so that for a brief period 18 horsepower may be utilized. It is estimated the engine may be driven 22 miles on a single charge, and at a rate of 20 miles an hour when occasion requires.

EXPERIMENTS WITH G. M. C.

Interesting experiments have been conducted in Detroit with a G. M. C. truck, made by the General Motors Truck Company of that city. The machine was used for the delivery of asphalt, proving that not only can unloading be accomplished more quickly, but the speed with which deliveries are made allows the workmen to spread the material while it is hot, thereby insuring a much improved road surface. Recently, work was done 3.2 miles from the asphalt plant. Trips were made by the truck every 55 minutes, carrying five tons of material sufficient to spread over an area of 70 square yards. Eight trips a day were made.

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42 tons of asphalt being delivered. The distance travelled was 50 miles a day.

THE SILENT CRESCENT.

The ease with which the operator can gain access to the motor is one of the most notable of the many desirable features of the Silent Crescent, made in one, two and three tons capacity by the Crescent Motor Truck Company, Middletown, O. While the engine is located under the seat, this unit is divided so as to be swung outward and backward, an operation which requires but a few seconds. Application has been made for a patent on this ingenious arrangement, which is brought out clearly in the illustration of the vehicle which is presented herewith.

The motor itself is of the well known Rutenber make, designed especially for commercial vehicle service, this being a four-cylinder unit with bore of 4.125 inches and stroke of 4.25, giving a rating of 30 horsepower. Ignition is by Remy magneto, although an option of either Bosch or Eisemann is given if desired. The carburetor is a model L Schebler. Cooling is by gear pump, driven off the right hand side of the engine. The radiator is a Werner, suspended by a spring device which absorbs all road shocks. Lubrication is by a combined splash and force feed circulation system.



Novel Provision for Power Plant Accessibility on Silent Crescent Models.

The clutch is a tapered cone, fitted with adjustable springs. Three speeds forward and reverse are provided with the selective sliding gear transmission, which is made as a unit with the jackshaft. Final drive is by roller chains. Liggett type service brakes are fitted to the rear wheels and operated by pedal, while the emergency members are Duplex, fitted to the jackshaft and actuated by lever. Full elliptic springs are employed, both front and rear. The wheelbase is 108 inches and the tread standard, 56 inches. The net weight of the chassis is 3600 pounds and the body carrying space is 60 by 108 inches.

STUDEBAKERS FOR FIREMEN.

The fire department in Camden, N. J., recently purchased three Studebaker roadsters, made by the Studebaker Corporation, Detroit. They have been equipped with chemical apparatus, and respond to all alarms of fire. The department officials estimate that they can make 60 miles an hour whenever traffic conditions permit.

PEERLESS MAKES FINE RECORD.

A Peerless truck, made by the Peerless Motor Car Company, Cleveland, O., recently made a unique record in Worcester, Mass., being credited with the delivery of 60 tons of coal in 9.5 hours. The truck had a special body, unloading mechanically without the aid of shovels. The coal was hauled from the yards of the dealer to the State Hospital and the Worcester Technical School. The dumping body was so constructed that following the discharge of the load it righted itself while the machine was gathering speed on its return to the yards.

LONG MILEAGES FOR WORM GEARS.

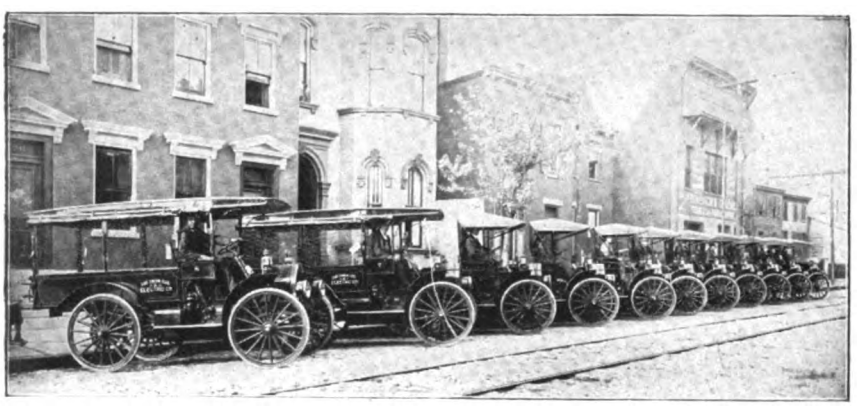
Totals of 58,000 and 124,000 miles are recorded for two worm gears used in two motor trucks in England. The one with the 58,000 miles to its credit is used by a prominent biscuit manufacturing concern, and the other is operated by the London Omnibus Company. As this type of final drive was not introduced in this country until last year, when the Pierce-Arrow Motor Car Company, Buffalo, N. Y., utilized it in the manufacture of its five-ton model, no such

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mileage can be shown in this country. Well known engineers believe there is nothing in American service, however, that would prove a bar to similar records in this country, and some high mileage feats on this side of the Atlantic are anticipated in the next few years.

AUTO-WAGONS IN FLEETS.

From the photograph reproduced herewith, it is possible to judge the growing popularity of the International Auto-Wagons, made by the International Harvester Company, Chicago. Many concerns have come to recognize the worth of these cars for light delivery purposes, as is proved by the fact that a large number have been ordering them in fleets of late. The accompanying picture shows 11 of these machines, which were recently sold to a large concern in Cincinnati, O. The company reports another order for 11 by a public service company in that city, which plans to entirely eliminate horse drawn vehicles from its service, while a Chicago house recently placed 21 in commission.



Fleet of 11 International Auto-Wagons Delivered to Concern in Cincinnati, O.

SAVING CREATED BY G. M. C.

Comparative figures compiled by the Schwabacher Bros. Company, Seattle, Wash., show that its G. M. C. truck, made by the General Motors Truck Company, Detroit, has been utilized in the delivery of groceries for the past six months at a decided saving over the former method where horses were used. The truck cost averaged $150 a month, including driver's wages, garage expenses, oil, gas, tire replacements and all other incidentals. During this period it carried 1,950,000 pounds of goods. The total cost of delivery a ton was 93 cents and the average price for team deliveries as charged by the transfer companies in the same territory is from $1 to $2 a ton. The shipping clerk says that the average cost a ton for the territory covered by the truck would be $1.60 by team. This gives the truck credit for a saving of 67 cents a ton.

LOZIER MODELS NEXT WINTER.

Although the Lozier Motor Company, Detroit, had planned to place a five-ton truck, a model of which was displayed at all the big shows last winter, on the market this year, the increase in the pleasure car business made it impossible to do so, according to a statement made by President H. A. Lozier of the company. It is the intention of the concern, however, to begin the manufacture of trucks the coming winter. With an average overload of 30 per cent. one of these Lozier models was run continuously for 488 hours recently. After this and many other severe tests, the only change decided upon was to enlarge the diameter of the rear wheels.

PEERLESS EFFECTS BIG SAVING.

The Howell Condensed Milk & Cream Company, Jersey City, N. J., recently placed in commission a Peerless five-ton truck, made by the Peerless Motor Car Company, Cleveland, O., which it estimates will save $3000 a year in ferry tolls alone. The company hauls every night a large quantity of milk from Jersey City to a point two miles in the interior of Staten Island. The truck makes two trips with 100 40-quart cans, each weighing 110 pounds.

The present route covers a run of eight miles from the distributing station in Jersey City to the Bergen Point ferry and a run of two miles after reaching Staten Island. This makes a round trip of 20 miles or 40 miles for the night. The ferry tolls are 35 cents for each passage or $1.40 for the night.

Teams which formerly did this work could not take this route because they could not cover it in time to deliver the milk sufficiently early. Two teams formerly left the distributing station and proceeded to New York by the way of Erie Railroad ferry. The toll was $1 for each team. From Manhattan it was one mile to South ferry, and the ferry toll from this point to Staten Island was $1.50 for each team. This amounted to $10 a night.

USES AN AUTOCAR.

A truck, fitted with a special body, made by the Autocar Company, Ardmore, Penn., was recently placed in commission by the Massachusetts Institute of Technology, for use in the collection of ashes. The machine is equipped with an end-dumping device, the front of the body being raised by a chain belt operated by a hand crankwheel. For loading a line crane

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with block and fall is utilized. A large ash barrel is easily lifted into the wagon and emptied by use of the crane. The body is of pressed steel, and the chassis has a capacity of about 3000 pounds. The driver's seat is over the motors so as to give a maximum body length with a minimum wheelbase.

NEW WOLVERINE-DETROIT.

The Pratt, Carter, Sigsbee Company, Detroit, Mich., recently placed on the market an 800-pound delivery wagon, which was given its initial test on the recent 703-mile run of the Wolverine Automobile Club from Detroit to Indianapolis and return. This latest addition to the product from the Michigan city will be known as the Wolverine-Detroit. The accompanying illustration shows it on its recent trip.

It is fitted with a single-cylinder, four-cycle, water-cooled motor, having a bore of 4.5 inches and stroke of 5.5 inches. The thermo-syphon system is used for cooling, lubrication is by constant level splash, ignition by jump spark with coil and multiple dry battery, and carburetion by a float feed automatic type vaporizer, with a single gasoline adjustment. Drive is by friction discs. The tires are 32 by 3.5-inch pneumatics.

Throughout the trip mentioned, the car carried a load of 1105 pounds, at an average speed of 17 to 18 miles an hour. An average gasoline consumption of 20 miles to the gallon was recorded. Four men accompanied the vehicle, these being W. C. Pratt, H. C. Carter, N. J. Fleming and G. E. Buckley.



Wolverine-Detroit Light Truck Acting as Baggage Wagon on Recent Cross Country Tour.

EMPLOYS TWO LOCOMOBILES.

Two Locomobile five-ton trucks, made by the Locomobile Company of America, Bridgeport, Conn., have been working all spring and summer in connection with the construction of a 4,500,000,000-gallon reservoir in Easton, near Bridgeport. Some interesting figures comparing the work they accomplish with that formerly done by horse drawn wagons have been compiled. In the one matter of hauling coal, it has been estimated that with the truck the cost is 11.37 cents a ton-mile, while with horse drawn teams the cost was 18.79 cents.

NEW PACKARD TRUCK.

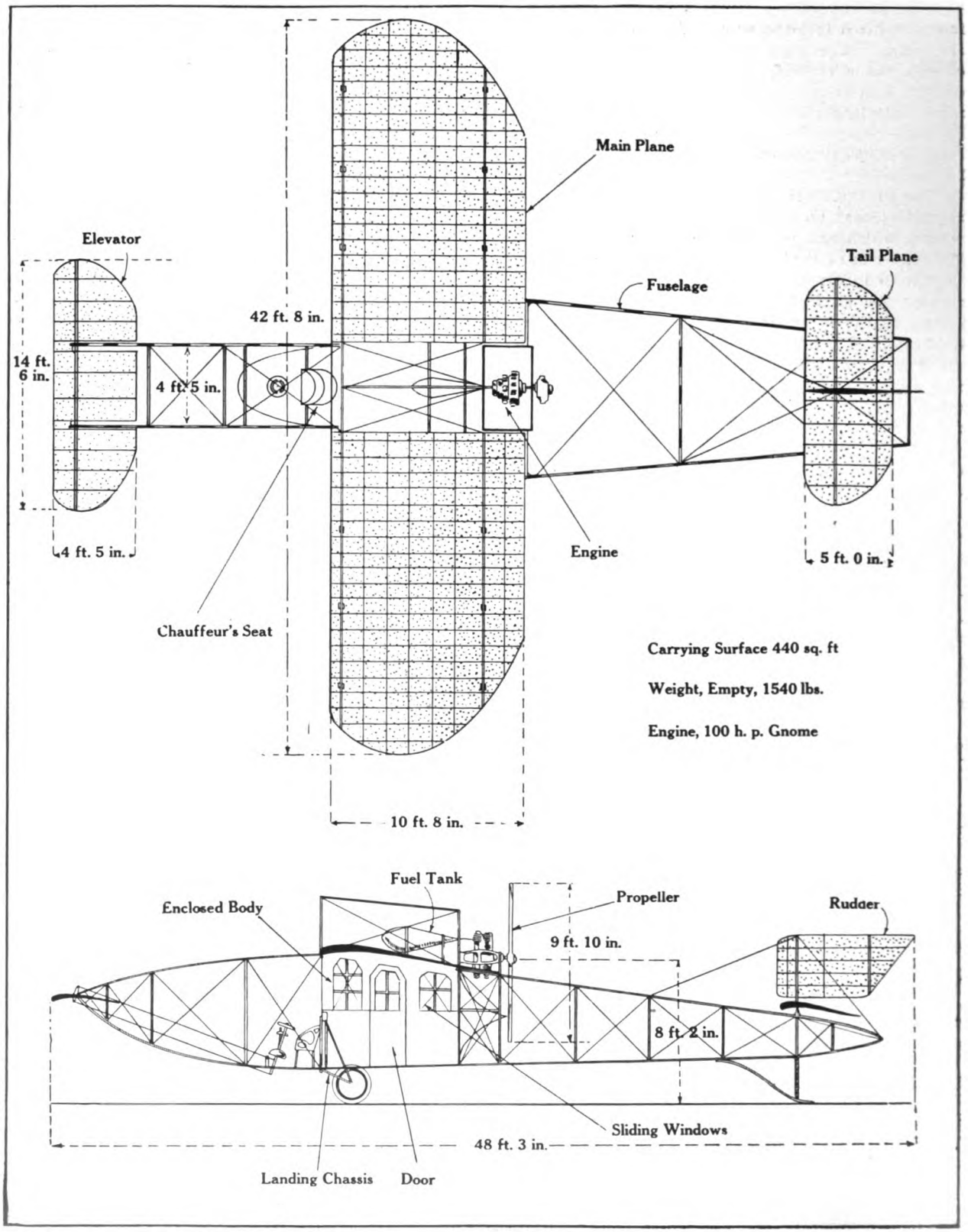
In order to round out its output of commercial vehicles, the Packard Motor Car Company, Detroit, recently placed a five-ton truck on the market. This is much like the three-ton Packard except that it has a more powerful motor and is of much heavier construction. The motor is rated at 40 horsepower, having a bore of five inches and a stroke of 5.5 inches.

KELLY COMPANY ENTERTAINS.

The Kelly Motor Truck Company, maker of Kelly vehicles, recently entertained nearly 30 fire chiefs and city government officials from various sections of Ohio, western Pennsylvania and West Virginia at its plant in Springfield, O. Trial runs and demonstrations of a new combination hose and chemical were witnessed.

Among those present were: Chief Lughler, Youngstown, O., president of the International Association of Fire Engineers; Chief Frank J. Connery, New Castle, Penn.; N. R. Hamilton, Youngstown, O.; C. A. Chambers and Chief Fred L. Martin, Chester, W. Va.; W. B. Martin, Steubenville, O.; Chief J. P. Hay, East Palestine, O.; E. W. Connelly, New Castle, Penn.; Chief Phillips, Wellsville, O.; Chief Roew, Wheeling, W. Va.; W. A. Lyon, C. J. Hubbard, H. Beck, S. J. French and Peter Hunter, Ravenna, O.; T. W. Dixon, New Castle, Penn.; Fred Peace, representing Gamewell alarm systems; Charles Ansley, Springfield, and A. L. Forschler, mechanician of the Kelly Motor Truck Company.

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Plan View and Side Elevation of Bleriot Limousine, Showing Details of Construction and Dimensions of Components.

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Progress of Aerial Navigation.

Mechanical Details and Features of Construction.

THE BLERIOT LIMOUSINE.

Those who are giving careful study to the science of aerial navigation must take cognizance of the steps by which the art of flying has progressed, and while many will be inclined to feel that the so-called Bleriot limousine shown herewith is a forecast rather than an accomplished fact, it nevertheless is true that this machine has flown successfully. More than that, several other aeroplanes, along this same general line have been constructed and flown abroad. In spite of this statement of fact, the practicability of a creation of this type is open to discussion, at the present stage of experimentation.

The machine in question was designed by Louis Bleriot, a pioneer in the construction of successful heavier-than-air types, at the request and under the guidance of Henri Deutsch de la Meurthe. The latter has been instrumental in encouraging all forms of use for the internal combustion motor and kindred industries. It was he who offered prizes early in the history of the automobile for the construction of models embodying certain ideas which he had evolved or in which he believed there was sufficient merit. He has played much the same part in the development of certain accessories, appliances and fittings for motor cars, notably the self-starter.

Officially, this monoplane is designated as a Bleriot type 24, although it has been termed an aerial limousine in this country, a flying berline in France and an aerocar in England. In general plan it does not differ materially from the regulation Bleriot monoplane, except that it has an elevator in front, worked in conjunction with the adjustable tail plane, and the construction throughout is heavier because of the additional weight it is designed to carry.

The greatest amount of interest attaches to the limousine body, which is the portion designed by M. Deutsch and was constructed by Rothschild & Sons, well known as a manufacturer of automobile bodies. It is a splendid example of the coachmaker's art.

This compartment is hung directly below the main plane and rests at the forward end on the regulation type of Bleriot landing chassis, equipped with liberal shock absorbing members. The material is three-ply wood of light weight, the entire structure weighing but 176 pounds. It is wholly enclosed, admission being by a door on either side, fitted with sliding windows. These windows, the two at either side of each door, and the two in front, are of non-inflammable celluloid, prepared by a special process, and are carried in wooden frames.

The interior presents a decidedly luxurious appearance. The seats are of wicker work, and together with the door panels, are fitted with air cushions. The ceiling and floor are covered with cork. Provision is made for four persons, seated vis-a-vis.

The pilot, or chauffeur as he is termed, is seated immediately in front of the limousine body, well below the main plane, and without protection, save for the small guy wires at either side. An extension of the limousine floor reaches slightly beyond the regulation Bleriot type of control, consisting of steering wheel and suitable levers.

The fuselage is of the usual girder type, and examination of the plan view discloses that that portion in front is only about half as wide as the rear portion. The latter tapers slightly toward the tail and extends to a point beyond the tail plane. Four tail booms carry the adjustable lifting tail, after the biplane practise and above these is the large vertical rudder.

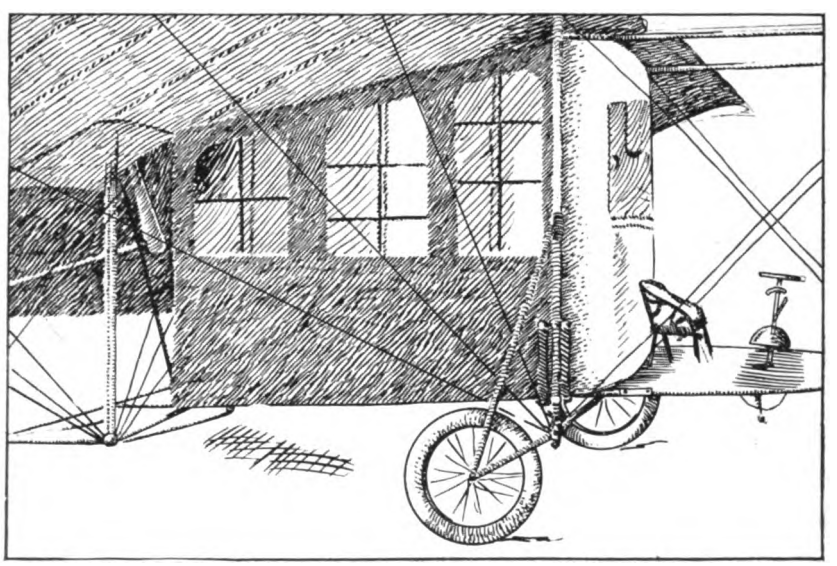
The motor, a four-cylinder, 100 horsepower revolving Gnome, is at the rear and just above the roof of the limousine body, although it is in a direct line with the forward portion of the body and the leading edge of the main plane. Fuel is supplied by gravity from a stream line tank, placed in front of and slightly higher than the engine. The propeller is close coupled with the motor, and revolves behind the body, this portion of the design being that which has met with the chief objection on the part of those who have driven the machine. The location is such that the propeller must necessarily revolve in somewhat rarified air and the result is considerable loss of power.

Georges Legagnaux made the experimental tests

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with this machine and succeeded in attaining a speed of 40 to 45 miles an hour. Considering the power of the motor, and the results which have been obtained with other types of Bleriot monoplanes, and machines of other makes, equipped with similar motors, this would seem to indicate that the placing of the propeller was at a decided disadvantage. The scant attention to the matter of reducing head resistance also had its effect in this regard, without doubt. Still, inasmuch as the machine was not designed for speed, perhaps this feature is not of so much moment after all.

As has been stated, the landing chassis is of the usual Bleriot type, although not of the very latest design. The most recent Bleriot monoplanes have been equipped with non-swivelling wheels, while those adopted for the limousine are more like those which first made their appearance on the Bleriot type 13. Of course, the whole carriage is much strengthened,



Sketch Indicating Suspension of Limousine Body and Location of Chauffeur's Seat and Control.

and the track, or tread, is eight feet, two inches instead of about six feet.

The rear skid also shows a marked difference from previous Bleriot design. With the majority of these monoplanes a single or double piece of bent cane is utilized to support the empennage, while with this machine the curved skid is equipped at the rear with a shock absorbing device.

Accompanying sketches show the dimensions of the various components, and indicate other details not touched upon herein. The entire assembly is interesting largely because of its novelty, and while other constructors have attempted to reproduce its main characteristics, this will always remain the pioneer enclosed passenger carrying aeroplane, designed and constructed along lines closely paralleling those of the present day automobile so far as they appear to be applicable to such machines.

K-R-I-T CAR PATHFINDER.

A K-R-I-T car, made by the K-R-I-T Motor Car Company, Detroit, Mich., was used to blaze the trail for the $100,000,000 highway, which it is proposed to build across the State of Pennsylvania. The official machine left Philadelphia, travelling through Lancaster, York, Gettysburg, Chambersburg, Everitt, Johnstown to Pittsburg and return. Those to make the trip besides the driver were the associate editor of the Philadelphia Press, and President Gans of the League of American Motorists. The trip was made without mishap, the car giving entire satisfaction.

RHOADS IS GENERAL MANAGER.

Benjamin A. Rhoads, superintendent of the Dayton Motor Car Company's plant, the Dayton, O., branch of the United States Motor Car Company, has been appointed general manager to succeed J. B. Myers, recently resigned to become the general superintendent of the Marion Motor Car Company of Indianapolis. Mr. Rhoads has been with the company for about 35 years, starting when it was engaged in the manufacture of agricultural implements. He was made master mechanic when the production of bicycles was begun, and superintendent when the factory was equipped for the manufacture of automobiles. He remained in the same position when the United States Motor Company took over the plant, and his recent promotion comes as a mark of approval for his many years of faithful service. Mr. Rhoads carries with him to his new position the well wishes of hundreds of employees, over whom he has had supervision for years and also those of many business friends he has gained throughout the industry.

DeLISSER WITH AJAX TIRE CONCERN.

Horace DeLisser recently resigned the vice presidency of the United States Motor Company, with headquarters in New York City, to become chairman of the board of directors of the Ajax-Grieb Rubber Company, Trenton, N. J., maker of Ajax tires. Mr. DeLisser had been with the United States Motor Company since its formation, leaving the tire business to join with Benjamin Briscoe in that enterprise. Much importance is attached to his return to the Ajax concern as it involves the establishment of a plant in Europe for the manufacture of Ajax tires. Mr. DeLisser will leave the latter part of July to make a study of the conditions abroad.

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ELEMENTS OF MOTORCYCLE CONSTRUCTION.

Part XV---Outlining the Complete Overhaul of the Mount---Preparation of the Tool Equipment and Suggestions for Facilitating the Work.

(By C. P. Shattuck.)

NOT only will the operator find his road experience of value in overhauling the motorcycle, but the knowledge of the various components obtained by the disassembling and reassembling will be of decided service in remedying minor troubles. This holds true particularly of the proper adjustment and in tuning up the motor. The veteran rider usually overhauls his mount during the winter or early in the spring, but machines which have seen constant and severe usage may require a partial or complete renovation at other times, and the work may include the replacement of worn parts.

Broadly speaking, there is not much of this nature that is necessary about the modern motorcycle aside from a general cleaning and adjustment. There are, however, a large number of older mounts being utilized, and it is obvious that these will require a more complete renovation, the amount of work depending upon the design and condition. While it is admitted that experience is the best guide in the overhaul, there is much that may be performed by the novice who is familiar with the components of his mount. In attempting this work the amateur will do well to study each part during the disassembly, noting its function carefully. This will be of material aid in the reassembly.

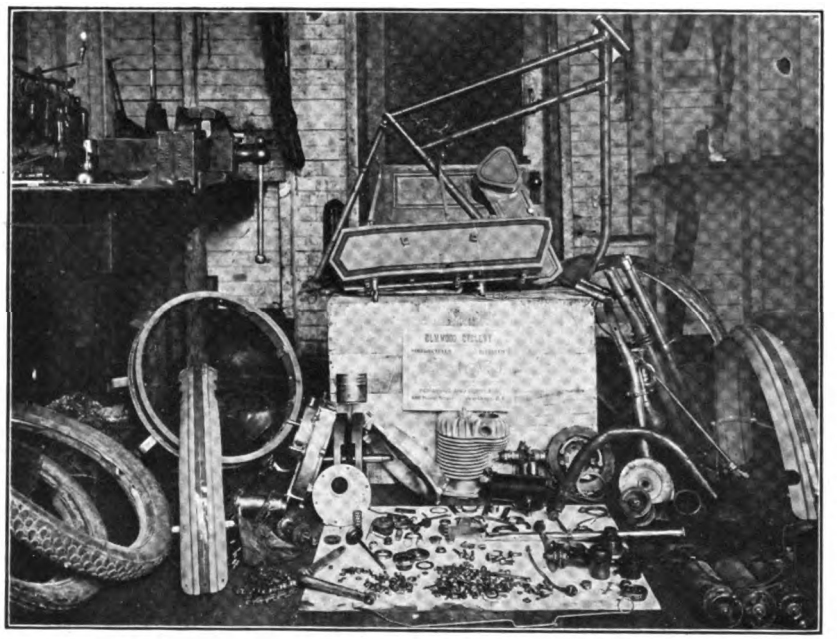


Fig. 86—Illustrating How a Motorcycle Appears When Completely Disassembled.—A Decidedly Unusual Photograph.

The suggestions contained herein do not apply to any particular make or condition, it being the object of the writer to treat the subject in a general manner. Although the cost of the overhaul by an expert is by no means prohibitive, there are many who desire to become better acquainted with their machines, and these are to be commended, as the knowledge acquired will be invaluable in event of serious trouble being encountered while on the road.

The novice should bear in mind that successful work cannot be performed with an ordinary wrench, a screw driver and a hammer. There are numerous small nuts and parts to be loosened and adjusted, many of which are so located as to be difficult of access, and if the workman be not equipped with proper tools the faces of the nuts will be injured. A nut that has been rounded through careless application of the wrench may occasion considerable trouble in replacing and tightening.

Unlike the motor car, the overhaul of the motorcycle does not necessitate the use of heavy tools, and the equipment for the latter should include a pair of combination pliers, a large and small screw driver, small and medium sized monkey wrench, ball pein hammer, adjustable S wrench, valve lifter, files, spoke tightener, can for gasoline and brush for cleaning. Some emery paper or cloth will be of service, also shellac and paper for gaskets, valve grinding compound, old cloth or waste, can of hand soap, lead or copper hammer, soldering outfit, etc. A large C clamp will be of value in disassembling the spring forks while a set of box wrenches having an universal joint attachment will be useful in removing bearings and other parts. While the list may appear formidable, many riders already possess the greater portion of these and such as are lacking may be borrowed from a fellow enthusiast. The C clamp may be secured from some carpenter and it is likely that he may also prove to be a motorcyclist.

Fig. 86 presents the mount completely disassembled, and it will be noted that there are numerous screws, nuts and bolts, which may become lost, if some

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means are not provided to guard against this. Small wooden boxes or tins will serve for this purpose, and it may be added that it is well for the rider who is



Fig. 87—Outlining How Bearings Are Filed to Eliminate Play.—Note Manner of Utilizing File.

making his first overhaul to place the parts of each component in a separate box during the work of the disassembling. The expert can throw them all into a pile and pick out the nut or screw desired, but the amateur is apt to waste much valuable time in searching for the proper bolt. Then, again, he is liable to utilize a nut or screw which fits, but which did not come from the member being reassembled. By proceeding slowly and being systematic, the novice should be able with a little study of the mount to complete the task without difficulty.

Dismantling the Mount.

The first operation is to remove all accessories, including the horn, speedometer, acetylene light, gas tank or generator, pennant holder, luggage rack, etc. These members should be inspected carefully and if in need of repairs, attended to. Otherwise, they may be cleaned and put aside in a safe place.

As the power plant is one of the most important components of the motorcycle, it is advisable to take it from the frame and carry it to the bench for dismantling and cleaning. Before this can be done, however, it is necessary to disconnect all attachments and leads, and see that all dirt and grease has been removed, as foreign elements may get into the crankcase.

The gas and spark connections must be detached at the levers of the carburetor and magneto. If the machine be of the battery type, the leads at the breaker box must be disconnected. Next, shut off the gasoline and oil at the tank and displace the leads to the carburetor and crankcase, as well as those utilized with the hand pump.

Having made sure that all pipes and connections are free, the exhaust pipe should be detached from the motor and muffler. It is possible that the tubing may be "frozen" where it connects with the silencer, in which event the application of a little kerosene usually will start the member. If not, heat will have to be applied.

Belts and Chains.

The removal of the belt and chain should not prove a difficult matter, as the average rider is well experienced in the adjustment of these members. The leather belt should be cleaned and dressed, while the chains will require a thorough cleansing in gasoline or kerosene, after which they should be boiled in a preparation of tallow or beef fat in which is utilized a little powdered graphite.

If a free engine device is employed the controlling lever is detached. Before taking the cylinder or cylinders from the frame it may be easier to disconnect the wire or wires to the spark plugs and remove these members, noting at the same time that all other leads are disconnected. The valve caps, if mechanical members are fitted, are next displaced, after which the valve lifting tool is brought into operation. The valve spring is compressed and retaining key or pin is taken out, before the springs and valves may be removed. Unless one is familiar with the intake and exhaust members it is advisable to allow them to remain in the cylinders.

Removing Motor.

The engine is now ready for removal from the crankcase. Loosen retaining nuts, then rock the cylinder to start it from the crankcase. A screw driver may have to be inserted between the cylinder and casing to separate the members but undue force should not be employed. After the cylinder has been loosened, rotate the pulley or the sprocket by hand until the piston is at the bottom of its stroke, with the con-



Fig. 88—Depicting the Crankcase, Cylinder, Valves and Timing Mechanism of Battery Model.

necting rod lying against the lip of the crankcase at the opposite side to that on which the cylinder is to be removed.

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Next slide the cylinder off very gently, being careful not to injure the piston or rings in the operation. Before removing the crankcase the old lubricant is

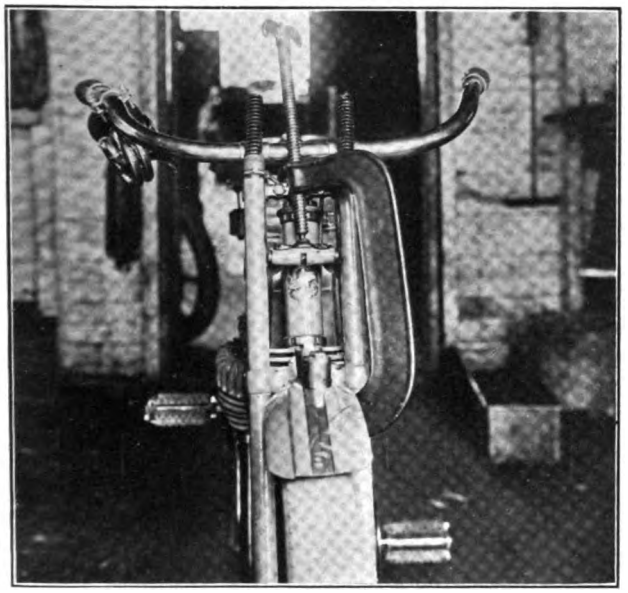


Fig. 89—A Large C Clamp Will Be Useful in Removing the Components of the Spring Forks.

drained out, and it may be flushed with kerosene, as this method will save considerable work in cleaning.

It is not imperative that the cylinder be detached from the crankcase. It may be taken out as a unit by disconnecting the bolts securing it to the frame. If the valve caps have become "frozen" the work of removing these members will be made more easy with the power plant in the frame. This, however, is optional with the workman.

Frame, Wheels, Etc.

If the overhaul includes enamelling the frame, mudguards, forks, tanks, etc., it is an excellent plan to dismantle these components and send them to the enamelling shop. Although similar preparations may be purchased, if the owner is discriminating, and takes a pride in the appearance of his machine, it is advisable to have the work done by the expert, as the result will be more satisfactory.

If the machine is to be refinished, the wheels must be removed, as will the tanks, mudguards, forks, handlebars, levers, crankhanger, etc. If the last named be of the spring design, such as depicted at Fig. 89, the novice is apt to experience considerable difficulty in disassembling the parts as he will be bothered in compressing the members sufficiently to permit of removing the connections. The kink outlined at Fig. 89 is employed by an expert repairman and is very simple. A C clamp, large enough to slip over the upper and lower portions, is necessary and by screwing down the threaded bolt the springs will be compressed, making the removal of the springs an easy matter.

In taking out the forks, the bearings will require loosening and in performing this work the uninitiated is liable to drop and lose some of the balls. However, the motorcyclist as a rule is a graduate from the ranks of bicycling and the experience acquired in the care of the latter will be of value when overhauling the mechanically propelled road vehicle. In connection with displacing of the bearings the boxes referred to in the early part of this discussion will be of service. As all ball bearings should be disassembled, and the balls, races and cones be cleaned and lubricated before replacing, it is an excellent plan to place each bearing in a separate box and mark it for identification.

There is little to be done to the clutch and transmission by the amateur other than to follow the instructions of the maker as to adjustment and lubrication. Some clutches are more easily pulled apart than assembled and if the member does not operate satisfactorily after complying with these instructions, it is best attended to by the expert who makes a specialty of the design. This may save considerable time and expense.

To complete a successful overhaul of the motor the bench should be equipped with a vise, as the tool will be invaluable when handling certain components. After removing the cylinders and crankcase to the bench the magneto should not be detached until the gearcase cover is removed and the pinions examined to note if they are marked. If not, these may be to make easy the replacement of the members.

Regarding the magneto, this member should not be tampered with, as there is nothing to be done except lubricate it in accordance with the instructions of the maker. If the device has been giving trouble it is best to ship it to the manufacturer, although cleaning certain parts is permissible and the operation will be outlined in proper sequence. If the mag-

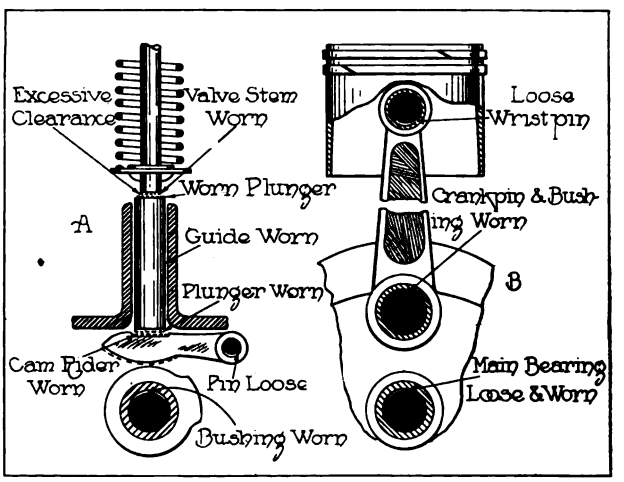


Fig. 90—Outlining Worn Parts Which Affect the Operation of the Power Plant: A, Showing Wear of the Valve Mechanism; B, Depicting Components Which May Be Responsible for Knocks in the Motor.

neto does not require any attention, it should be set away where it will not be injured.

(To Be Continued.)

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



The National Tours.

For the second time in the history of the Federation of American Motorcyclists, national tours to the convention took the place of the old national endurance run. Instead of two divisions, as was the case in connection with the Buffalo meet last year, there were four parties which made their way simultaneously toward the gathering in Columbus, O.

The tourists from the northeastern section of the country assembled in Albany, N. Y., under the leadership of Tourmaster F. S. Ellett, Elmira, N. Y. Previous to the actual start, July 13, the members of the Albany Motorcycle Club entertained the visitors at a smoker, and when the beginning of the trip was made, accompanied them as far as Schenectady, where it was decided to split the party into three sections, each in charge of a lieutenant.

Excellent roads were encountered as far as Fonda, when a sandy stretch of 15 miles caused some little unpleasantness. Fine macadam ways took the tourists through Utica to Syracuse, the night stop. Sunday found the riders in Buffalo, and Monday in Cleveland. Throughout the entire journey local motorcyclists did their utmost to make the stay in town a pleasant memory, and on several occasions lunch was served. Particular mention should be made of the dinner in Erie, Penn., where the 100 men sat down to tables waited upon by wives of Erie club members.

The southeastern division, from Baltimore, Md., was in charge of Howard French of that city. Seventy-five riders composed this party, which found many poor roads and much heavy mud, occasioned by recent storms. At Zanesville, O., the entire party was invited to make use of the Masonic Temple swimming pool, which had been placed at the disposal of the Zanesville club. Needless to say, the tourists were not slow in accepting the invitation.

The northwestern riders left Chicago in charge of J. A. Campbell of Toledo, O. There were about 120 machines in line at the start, but this number was increased materially in nearly every town of any importance through which the party passed. Several women accompanied their husbands, either on tandem seats or in sidecar attachments.

Louisville, Ky., was the rendezvous for the southwestern party, and the tourmaster was E. G. Baker of Indianapolis, Ind. Some 50 riders were in line in this division before it finally reached Columbus.



Members of the Providence Motorcycle Club at the Recent Annual Climb on Noose Neck Hill.

About 11:30 in the morning of Tuesday 385 machines rolled into Columbus, accompanied by members of the Columbus club, and the convention became an accomplished fact. Shortly after the arrival of the tourists, a heavy shower broke over the city and the mounts were drenched as they stood in line in front of convention headquarters. Careful count of the machines showed the following results as to makes:

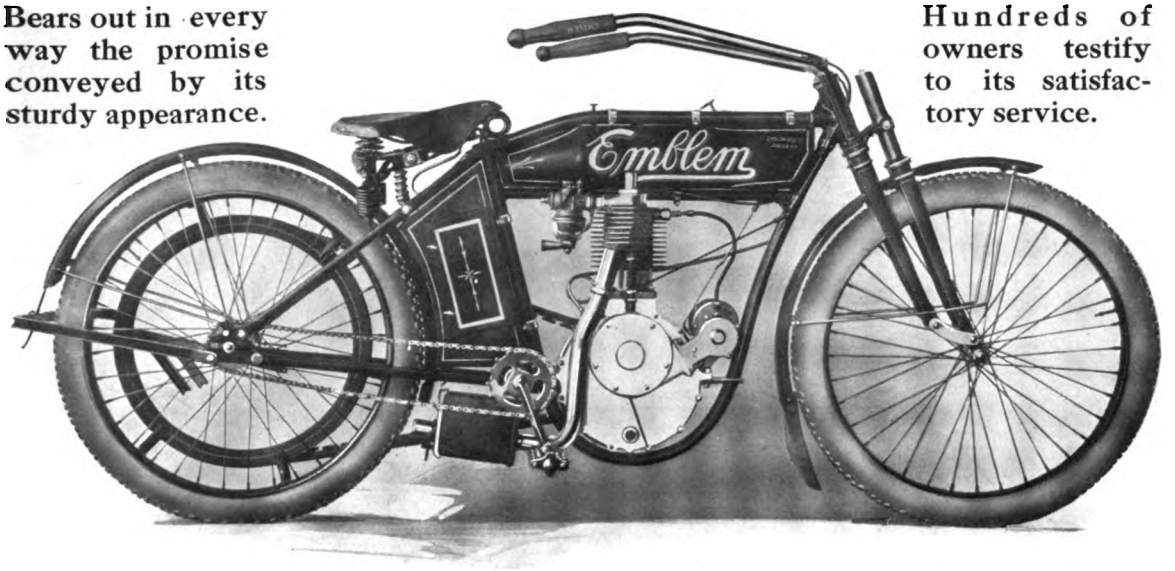
Indian, 147; Harley-Davidson, 70; Excelsior, 38; Thor, 33; Yale, 29; Merkel, 24; Emblem, 11; Henderson, seven; New Era, five, Flanders, four;

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Minneapolis, Pope, Pierce, R-S and M-M, three each, and Wagner, two. It also is of interest to note that six per cent. of these were battery equipped and 94 per cent. utilized magnetos. According to the Bosch Magneto Company, 97 per cent. of the magneto models employed Bosch instruments.

Secretary-Treasurer's Report.

The report of Secretary-Treasurer G. B. Gibson at the annual convention of the Federation of American Motorcyclists in Columbus, O., indicates a splendid growth in membership during the past year. July 1, 1911, there were 9664 riders affiliated with the federation, while on the same day this year this had been increased to 16,250, a clear gain of 6586. A year ago there were 168 affiliated clubs, and this number has been increased to 291, a gain of 123. Repair shop registrations have jumped from 322 to 678, a gain of 356.

The treasurer's report shows the following summary:

Balance on hand July 1, 1911	$1,135.28
Receipts from all sources	16,265.80
Total	$17,401.08
Paid out during year as shown by vouchers	14,077.07
Balance on hand July 1, 1912	$3,324.01

Emblem at Toledo.

More than 5000 people witnessed the race meet at Toledo, O., under the auspices of the Interstate Racing Association, July 15, during which Taylor and his Emblem were in their old time form. The fastest 10 miles of the day was made by this combination, as shown by the following summary:

Five miles, open—First, Oberwegner, Excelsior; second, Flath, Pilot; third, Happ, Thor; time, 7:15.

Ten miles, stock—First, Taylor, Emblem; second, Willis, Indian; third, Birkenbach, Thor; time, 11:25.

Ten miles, handicap—First, Willis, Indian; second, Taylor, Emblem; third, Weitzman, Merkel; time, 12:32.

Five miles, open—First, Willis, Indian; second, Evans, Indian; third, Weitzman, Merkel; time, 6:17.

Five miles, stock—First, Evans, Indian; second, Happ, Thor; third, Long, Merkel; time, 4:18.

Fifteen minutes—First, Willis, Indian; second,

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which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK

Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

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Weitzman, Merkel; third, Bailey, Indian; distance 12 miles.

Five miles, private owners—First, Happ, Thor;



Workmen in the Assembly Department of the Emblem Manufacturing Company, Maker of Emblem Machines.

second, Long, Merkel; third, Butoer, Yale; time, 8:14.

Club Notes, Here and There.

Riders in Middletown, O., have organized the Middletown Motorcycle Club, and plan to affiliate with the F. A. M. F. M. Wittlinger, 523 Yankee road, is the secretary.

The roads over which the Short Grass Motorcycle Club of Kansas will travel on its annual tour next month are reported to be in excellent condition by Wells Bennett, the pathfinder.

Members of the North Shore Motorcycle Club of Chicago recently completed a 24-hour endurance run between that city and Milwaukee.

One of the summer tours for the Minnesota State Automobile Association is being outlined and mapped by J. W. Whitehead of Minneapolis on a motorcycle.

One of the objects of the newly organized motorcycle club of Scranton, Penn., is to assist in the good roads movement.

The annual outing of the Maryland Motorcycle Club of Baltimore, Md., was recently held, a run being taken to a shore resort on the Potomac river, where an excellent dinner was served, followed by a programme of outdoor sports.

The Englewood Motorcycle Club of Chicago, Ill., held a moonlight picnic at Mauch Grove, Maywood, Ill., recently. The ride to Maywood, a distance of 18 miles from the headquarters of the club, was made by more than 200 members. Luncheon was served, followed by a musical programme and dancing.

The Atlanta Motorcycle Club of Atlanta, Ga., has a membership of 75. A run was made to Folsom's park, 16 miles from Atlanta, recently, where an old-fashioned Georgia barbecue was enjoyed.

The Yale Motorcycle Club has been formed in Toledo, O. The officers are: President, A. S. Weiler; secretary, J. W. Schroeder; messenger, Standly Ladd; road captain, S. J. Chubbuck.

The National Capitol Motorcycle Club of Washington, D. C., which claims the second largest membership of any of the clubs affiliated with the F. A. M., has started a campaign for members which it is hoped will result in the club's taking the lead before the end of the year.

Longest Tandem Tour.

The longest tour on a tandem to the F. A. M. meet in Columbus, O., was accomplished by Mr. and Mrs. E. H. Parker of Denver, Col., riding a Merkel, made by the Miami Cycle & Manufacturing Company, Middletown, O. Before starting on this trip the machine had covered a little over 3000 miles, and the journey to Columbus added 1961 miles more. A detour was made to visit the Merkel plant, during which the accompanying photograph was taken. Reading from left to right, the members of the party are: E. H. Parker; G. H. Snyder, Merkel agent at South Bend, Ind.; Elmer E. Smith, who holds the same position in Richmond, Ind.; Chief Engineer Joseph Merkel; John Merz, Indianapolis representative, and O. Weed, a well known Merkel racing rider of Bluffton, Ind.

Indians Win at Taunton.

Earl Gove of Brockton, Mass., riding an Indian machine, made by the Hendee Manufacturing Company, Springfield, Mass., was the winner of the five-mile race on the Taunton, Mass., fair grounds track at a recent meet under the auspices of the Taunton Gentlemen's Driving Club. Gove just succeeded in beating



Convention Tourists Stopping at Merkel Plant in Middletown, O., on Their Way to Columbus Meet.

out John Jarand of Providence, R. I., also riding an Indian. The race was the feature event of the afternoon. The riding was on a dirt .5-mile track, not

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banked at the curves. Gove's best time for a mile was 1:20. In two previous shorter events, Jarand was the winner.

Herman Secures Most Members.

F. J. Herman of Pueblo, Col., was the winner of the solid gold F. A. M. pin offered to the member securing the greatest number of new applicants during the fiscal year of 1911-12, just closed. His record was 74.

Fitted with Bosch Magnetos.

According to an announcement by the Bosch Magneto Company, New York City, all of the motorcycles to finish in the Tourist Trophy races, just completed in England, were fitted with Bosch magnetos.

Motorcycles for Fire Wardens.

Motorcycles for use in patrolling long stretches of country in the national park regions of California were adopted recently. It has been found that the men can cover much more territory than they did formerly by horse, and the motor driven machines have been found more efficient in every way. The riders travel between 100 and 150 miles each day.

Triumph on the Market.

The Triumph Manufacturing Company, Detroit, organized last April for the production of Triumph motorcycles, has made such progress in the details of factory organization that the first machines were shipped recently. Two thousand motorcycles are now passing through the plant at 51-55 East Woodbridge street, in lots of 50 each and within a short time dealers all over the country will be receiving their first allotments. The company is turning out two types, a single-cylinder, one-speed model and one of two speeds. The first develops 5.5 horsepower and the latter 10. The officers of the company are: President, Robert M. Brownson; vice president, C. C. Wormer; secretary, Muir B. Duffield; treasurer, George W. Sherman.

Swenson on Long Trip.

Among the prominent New England motorcyclists who went over the road to attend the annual convention in Columbus, was B. A. Swenson, who was accompanied by Mrs. Swenson on an Indian mount, with a sidecar attachment, made by the Hendee Manufacturing Company, Springfield, Mass. The outward route was by way of Worcester, Springfield and Pittsfield, Mass.; Albany, Fonda, Syracuse, Rochester and Buffalo, N. Y.; Erie, Penn., and Cleveland, O. While in Buffalo a side trip to Niagara Falls was enjoyed. The return to Providence will be over an entirely different route, including New York City.

Win Old Sol Lamps.

The winners of Old Sol lamps, donated by the Hawthorne Manufacturing Company, Bridgeport, Conn., during the month of June were as follows: Indian Motorcycle Club, Mobile, Ala., two; East Side Motorcycle Club, East St. Louis, Ill., two; Austin Motorcycle Club, Chicago, Ill., one; West Texas Motorcycle Club, Stamford, Tex., one. In the contest covering a period of four months, ending June 30, and participated in by clubs affiliated with the F. A. M. previous to March 1, the winners were as follows: Topeka Motorcycle Club, Topeka, Kan., 56 new members, three lamps; Jacksonville Motorcycle Club, Jacksonville, Fla., 34 new members, two lamps; Cortland Motorcycle Club,



Howard Tromans of Rhode Island Motorcycle Club, With Majestic Sidecar and Harley-Davidson Mount.

Cortland, N. Y., 33 new members, one lamp; Lockport Motorcycle Club, Lockport, N. Y., 32 new members, one lamp; Maryland Motorcycle Club, Baltimore, Md., 30 new members, one lamp.

Policemen Learn to Ride.

Police Commissioner H. S. Amoit of Wyandotte, Mich., recently announced that every man in the department must learn to ride the motorcycle recently purchased. The machine was bought primarily to capture automobile speeders, but the officials believe it can be put to several other uses, and it is possible additional mounts will be bought.

Constant Wins Bosch Cup.

As a result of the racing in connection with the convention in Columbus, O., J. U. Constant of Brooklyn, N. Y., is the all around national amateur

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Immediate deliveries of 1912 Indians, any Model. Cash or installment. Full line of equipments and supplies, also clothing for the Motorcyclist.

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champion of the Federation of American Motorcyclists and holds the Bosch trophy until the 1913 meet. The annual award of this cup, by the Bosch Magneto Company, New York City, makes it possible to determine a winner, since the prize goes to the rider securing the most points in the one, two, five and 10-mile, and one-hour events.

Two of these races were held previous to the convention, and as a result Constant had 12 points; Donald Klark, seven; Donald Johns, six, and Erwin Baker five. Constant won the one and 10-mile events and Klark the five-mile. This gave Constant 29 points and Klark 17. Both Constant and Klark ride Indians. Ray Seymour on an Indian won the national professional five-mile championship and Edward Hasha, also on an Indian, that for 10 miles.

Election of Officers.

The election of officers at the 10th annual convention of the Federation of American Motorcyclists in Columbus, O., July 17-21, resulted as follows: President, Dr. J. B. Patterson, Pratt, Kan.; secretary-treasurer, Dr. G. B. Gibson, Westboro, Mass. (re-elected); directors for three years, E. M. Estabrook, Bangor, Me. (re-elected), and William M. Johnson, owner of the Riverview track in Chicago. President Patterson has announced that he will reappoint Dr. J. P. Thornley of New York as chairman of the competition committee.

EAST JOINS AMPLEX FORCES.

Another announcement of a change in the personnel of the Olds Motor Works organization at Lansing, Mich., is made in that George L. East has resigned as director of advertising to take a similar position under President W. J. Mead of the Amplex Motor Car Company, Mishawaka, Ind., maker of Amplex cars. Mr. East has been with the Oldsmobile people some five years, during which time he has had general supervision of the advertising and publicity. He will be located at the Chicago offices of the Amplex concern.

BOILLOT USED MOBILOIL.

It appears that while American drivers were not successful in the recent Grand Prix race over the Dieppe course in France, American supplies were victorious. At least, the Vacuum Oil Company, Rochester, N. Y., is in receipt of the following cablegram from its Paris representative: "Boillot driving Peugeot car won Grand Prix, Dieppe, using Mobiloil." Naturally, the result of this test abroad is particularly gratifying to the Vacuum Oil Company, and should prove of interest to all American motorists.

ADOPTS WIRE WHEELS.

Decided interest in the matter of wire wheels has been created in America during the past few months, and it is not at all surprising to learn that at least one manufacturer has adopted this equipment for the 1913 season. Reference is had to the Dayton Motor Car Company, Dayton, O., a subsidiary of the United States Motor Company, and maker of the Stoddard-Dayton. It will be remembered that this concern was one of the first in America to utilize the Knight motor, and the wire wheels are to be fitted to the six-cylinder Knight model.

The 1913 line consists of the six-cylinder, built as a touring car, limousine and compartment roadster; the 48 horsepower with valve-in-the-head motor, and touring, limousine and compartment roadster bodies; the 38, with block motor and as touring car, compartment roadster, coupe, limousine and landaulet, and the 30 with block motor and as touring car and compartment roadster.

All limousine bodies are designed to seat seven passengers and embrace every feature and appointment that make for comfort and convenience. The roadsters, all of the compartment type, have a large enclosed space for luggage back of the driving seat. The new landaulet and coupe are typical of the Stoddard-Dayton's standard of coachwork, the former being designed as a seven-passenger car and the latter for three.

For the most part, no radical changes have been made. Minor mechanical refinements that have been dictated by service, have been incorporated, and there are numerous details which tend to simplify driving and promote comfort.

MERCER AGENCIES COMBINE.

The Whiting Motor Company of New York City recently acquired the Philadelphia branch of the Mercer Automobile Company, 620-622 North Broad street, which will hereafter be conducted as an agency of the Whiting company. The Philadelphia agency will have the territory including Pennsylvania, Delaware and Maryland in addition to the present territory of the Whiting Company of New York and New Jersey, excepting Mercer county, the home of the Mercer factory. The Whiting Motor Company's New York headquarters are at 1802 Broadway with a Newark branch at 486 Central avenue.

GRANT COMPANY MOVES.

The Grant Motor Car Company, Cleveland, O., moved into new factory buildings at 152nd street and St. Clair avenue, Collinwood, recently. The main building is 100 by 400 feet and the auxiliary structure is 60 by 160 feet. Both are of reinforced concrete. The new models made by the company will not bear the date of the year manufactured, but will be listed in series. Series No. 2 will be placed on the market Jan. 1, and each succeeding year another series will be added. The output of the company at present is 15 cars a day, but one model being manufactured. A six-cylinder roadster will be placed on the market the first of next year.

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The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Canadian Overman Company, Inc., New York City; $20,000; incorporators, A. Z. Gray, W. A. Pease, Jr., L. Wilmerding, D. Sage.

Roberts & Sherburne, Inc., Boston, Mass.; $30,000; incorporators, Edward R. Sherburne, W. Medford, Frank L. Roberts, William H. Whalen.

V-C Motor Company, Augusta, Me.; $100,000; to deal in motor cars; incorporators, Horace Mitchell, C. E. Smothers, William E. Sisk.

The Automobile Vehicle Corporation, Buffalo, N. Y.; $20,000; incorporators, L. A. Kenyon, Frank H. O'Neill, Otto A. Hagelm, James C. Fox.

Egypt Garage & Machine Company, Scituate, Mass.; $6500; incorporators, William E. Chaffin, Charles M. Litchfield, Charles W. Peare.

Shafer, Decker Company, Rochester, N. Y.; $50,000; president, Charles H. Shafer; treasurer, C. P. Hugo Schoellkopf; general manager, Frederick J. Decker; secretary, James B. Shanly.

Merchants Motor Service Corporation, Philadelphia, Penn.; $100,000; incorporators, William Vees, George B. Tets, George L. Oddy, Nathan W. Bushby.

The Worcester Spring Company, Worcester, Mass.; $25,000; to manufacture springs, etc.; incorporators, Charles B. S. Jackson, G. A. McKenzie, C. E. Sampson.

Seaton Wheel Company, Nashville, Tenn.; $130,000; to manufacture automobile wheels; incorporators, G. Jackson, Samuel S. Lord, B. C. Seaton, John T. Landis, J. Ray Boone.

Goldfinger Auto Renting Company, New York City; $2000; incorporators, Benedict Goldfinger, Walter E. Fisher, Isaac Wolf.

The Walker Tire Chain Company, Toledo, O.; $150,000; incorporators, Henry F. Rohrman, Charles A. Newman, Charles P. Eger, A. M. Edwards, George C. Bryce.

Saratoga Auto Company, Brooklyn, N. Y.; $5000; to deal in motor cars; incorporators, George D. Smith, 2123 Metropolitan avenue; Harry A. Bogard and Emily J. Bogard, both of 18 Furman avenue.

D. K. & D. Company, New York City, $5000; to manufacture motors; incorporators, Eckford D. DeKay, Sidney G. DeKay, Andrew C. Dam.

C. & T. Auto Specialty Company, New York City; $10,000; to deal in motor accessories; incorporators, George F. Connelley, John J. Treacy, John R. Hunt.

Service Recorder Company, New York City; $10,000; to manufacture automobile devices; incorporators, Harold F. Seymour, Frederick Seymour, Benjamin N. Levy.

Todd & Courtney Company, Barberton, O.; $10,000; incorporators, J. H. Todd, O. I. Courtney, L. E. Courtney, C. C. Courtney.

Federal Auto Accessories Company, Columbus, O.; $2000; incorporators, J. R. Loofburrow, H. M. McDonald, W. C. Wetherhold, E. J. Mace, M. L. Mace.

Schacht Motor Car Company, Los Angeles, Cal.; $100,000; incorporators, O. A. Walling, William Dietz, W. T. Kreitz.

Harvard Garage Company, Boston, Mass.; $5000; incorporators, E. F. Blake, John B. Lynch, W. E. Collins.

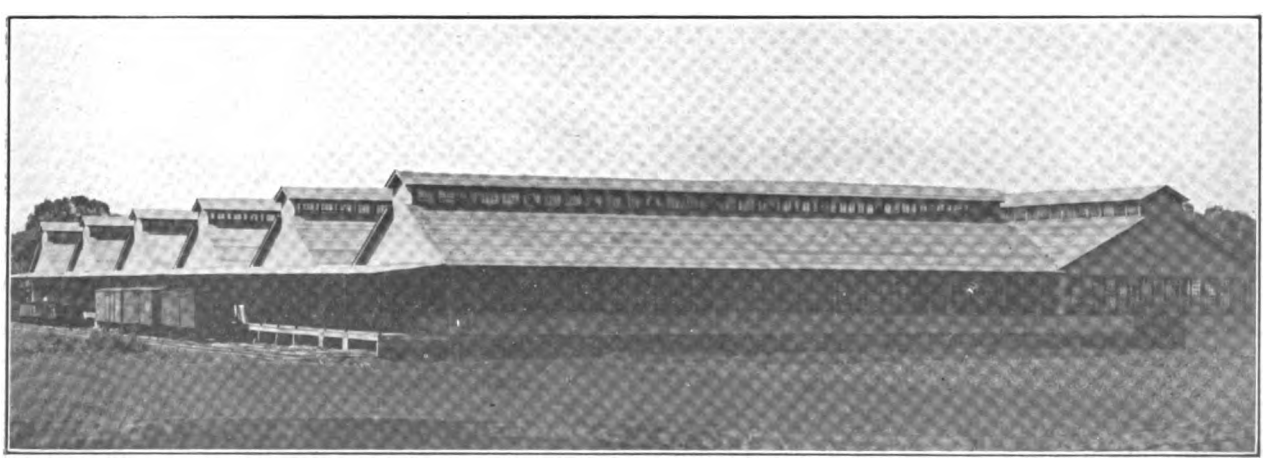
The Buroff-Fuller Motor Company, Watertown, Wis.; $30,000; incorporators, John M. Sorlie, Edward R. Buchholz, Martin O. Larson, Ragnvald Strum.

Brooks Motor Car Company, Buffalo, N. Y.; $100,000; incorporators, Herman G. Rechstealner, George B. North, B. O. Kerr.

Electric City Specialty Company, Buffalo, N. Y.; $25,000; automobile specialties; incorporators, Joseph E. Stark, John H. Beer, Ida E. Stark.

Peninsular Automobile Company, San Francisco, Cal.; $15,000; to deal in motor cars; incorporators, H. E. Holmes, John D. Gish, W. T. Chubbuck.

Hippe Motor Car Company, Chilton, Wis.; $15,000; to deal in motor cars; incorporators, Robert H. Hippe, Herman Gierow, F. J. Egerer, George J. Berger.



Factory of the Penn Motor Car Company at New Castle, Penn., with Main Building, 510 by 60 Feet, and Six Wings, Each 150 by 60 Feet.

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WITH THE MANUFACTURER.

C. Lawrence Wisehart, Elmira, N. Y., has assumed the management of the Resilio Company, 511 South Clinton street, Syracuse, N. Y., maker of a new tire filling product.

The Firestone Tire & Rubber Company, Akron, O., has opened a branch in Montreal, Can.

Charles D. Schmidt, with headquarters at 416 Broadway, has been appointed sales agent for New York City by the Baldwin Chain & Manufacturing Company.

R. J. Mackenzie, has joined the Kelley Motor Truck Company, Springfield, O., as purchasing agent.

The Webb Motor Fire Apparatus Company, St. Louis, Mo., it is reported, is to move to Allentown, Penn., in the fall. Mack truck interests are said to have stock in the company. During 1911 the firm made an even 100 pieces of fire apparatus. This year its business is reported as even larger. Milton A. Strauss, formerly with the Moon Motor Car Company, has been appointed sales manager for the Webb concern.

The R-C-H Corporation, Detroit, Mich, recently opened a branch and service station in San Francisco, Cal. A. E. Morrison, western sales manager, made the arrangements for the opening, the step being necessary in order to care for the increasing trade on the Pacific Coast. The building secured is a three-story structure, in the heart of San Francisco's automobile district, and provides 18,000 feet of floor space. The corporation now has stations and factory branches in Detroit, Chicago, New York, Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Kansas City, Minneapolis, Denver, Los Angeles and Walkerville, Can.

The Penn Motor Car Company, formerly located in Pittsburg, Penn., now occupies its new factory buildings in New Castle, Penn., covering more than five acres. The main structure is 510 by 60 feet, and is used for the chassis assembling and chassis painting. Running back from this building are six wings, each 60 by 150 feet, which are to be used for the machine shop, upholstering and top departments, testing and repairs, stock rooms and final assembling. The entire building is of steel, concrete and glass. There is excellent light and ventilation, and one admirable feature is that there is not a post in the entire structure. Situated so that it can easily ship by four different trunk lines, the railroad facilities are excellent. The company makes pleasure cars and a light delivery motor car.

Harry E. Freeman, for 12 years connected with the advertising department of a prominent Cleveland newspaper, was recently appointed sales and advertising manager of the Sewell Cushion Wheel Company, Detroit.

D. E. Keith, manager of the Indianapolis branch of the Ford Motor Company, is makng a six weeks' tour over Indiana in a Ford car. He is visiting all of the 65 agents in the state, and making a thorough investigation of the automobile prospects in Indiana for 1913.

The G. & T. Tire Company has purchased a tract of ground, 170 by 220 feet, in Indianapolis, Ind., on which it will erect a five-story building of reinforced concrete to cost approximately $100,000.

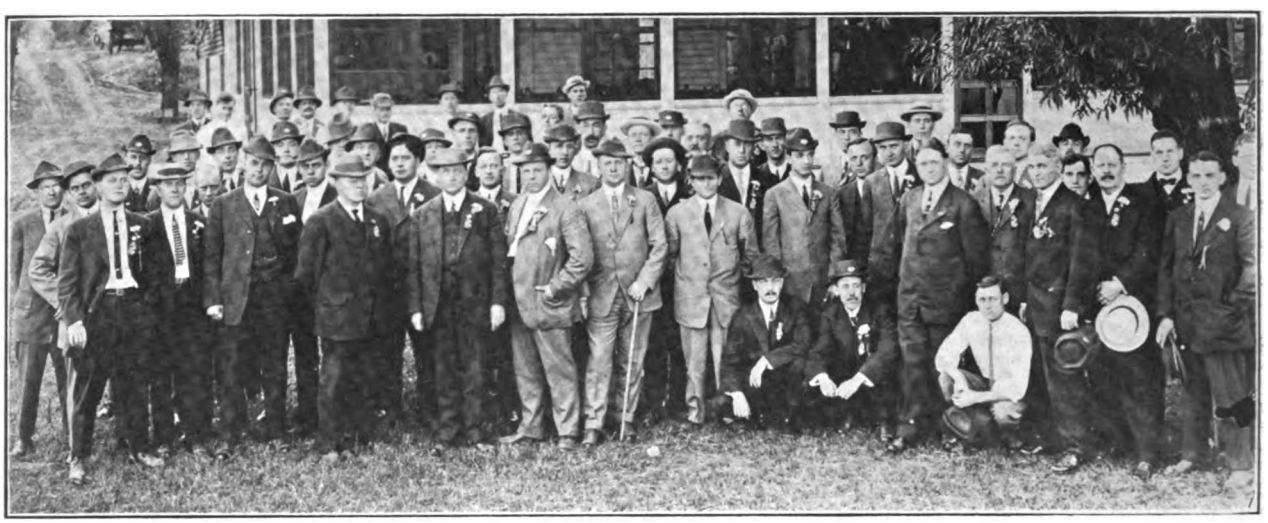
The Dorris Motor Car Company's new factory, St. Louis, Mo., is rapidly nearing completion. The new building will mean practically a doubled capacity for the Dorris company. The structure is fireproof and three stories in height.

The Timken-Detroit Axle Company is having two large additions built to its plant in Detroit. The firm denies the report that it has purchased land in Toledo, O., and that a plant is to be erected there.

The Cartercar Company, Pontiac, Mich., has just closed a contract giving the MacEwen-Webster Auto Company of Swift Current, Sask., the agency for Saskatchewan, Alberta and Manitoba.

The Todd Manufacturing Company is to open a factory at 820 Mary place, Minneapolis, Minn., for the purpose of making radiators, hoods, fenders, drip pans, tanks and other sheet metal specialties for automobiles. The parties representing the firm are Frank Todd, formerly superintendent of the Long Manufacturing Company of Chicago and Detroit; B. A. Wolfe and Morgan C. Wood.

Arthur I. Philp has become associated with the Studebaker Corporation, Detroit, as assistant sales manager of the automobile division. He was until recently district manager for the United States Tire Company, and prior to that was with Morgan & Wright. In the old bicycle days he sold Imperial wheels for Ames & Frost.



District Managers of the Willys-Overland Company at Their Recent Annual Convention in Toledo, O.

The Willys-Overland Company recently held its annual district managers' convention at Toledo. The session was of three days' duration, the time devoted to business and to pleasure being almost equally divided. While the men assembled were busy enjoying the various entertainments and banquets they were also laying vigorous plans for 1913. Business meetings were held at the plant of the company each morning and afternoon, while the evenings were spent at the theatre or about the table. A power boat ride and banquet at the Toledo Yacht Club headquarters brought the convention to a close.

GARAGE AND DEALER.

The Standard Motor Car Company, which covers the Pacific Coast and operates distributing agencies in San Francisco, Oakland and Los Angeles, for the sales of Stoddard-Dayton cars, made by the Dayton Motor Car Company, Dayton, O., is to give a two weeks' vacation in the East to the salesman who makes the best record between May 1 and July 31. The Stoddard-Dayton factory and other plants of the United States Motor Company will be included in the itinerary.

H. W. Evans, who has been connected with the San Francisco branch of the Locomobile Company of America of Bridgeport, Conn., for the past two years, has

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been put in charge of the truck business of the company on the Pacific Coast. George A. Crane has been secured by the Locomobile company to take charge of the truck business in the territory controlled by the Chicago branch. Before joining the Locomobile forces, Mr. Crane was connected with the Knox Automobile Company and the United States Motor Company.

The American Locomotive Company, New York City and Providence, R. I., recently announced the following new dealers added to its list: H. T. Rogers, Binghamton, N. Y.; Six Thirty-eight Tire & Vulcanizing Company, Memphis. Tenn.; W. H. Ash, Peekskill, N. Y.; George E. Stocking, Rochelle, Ill.; Geddes & Sheffield, Calgary, Atla., Can.; Taylor & Musson, Edmonton, Alta, Can.

J. J. Cole, president of the Cole Motor Car Company, Indianapolis, Ind., accompanied by General Sales Manager Charles P. Henderson and William L. Colt, the latter of the Colt-Stratton Company, New York City, eastern distributor for Cole cars, have been making a tour of the agencies in the East. The first stop was in Pittsburg, from which city they went to Washington, Baltimore, Philadelphia and Newark, to New York, where a banquet was held, at which representatives of the metropolitan press were the guests of honor. A similar gathering was held in Boston.

G. A. Besosa of San Juan has taken the agency for the Marmon cars, made by the Nordyke & Marmon Company, Indianapolis, Ind. G. L. Omohundro of Little Rock, Ark., is also a new Marmon dealer.

The Henderson Motor Car Company recently awarded contracts to the following agencies: W. A. McKnight, Alexis, Ill. Johnson Motor Car Company, Philadelphia, Penn.; Service Motor Sales Company, Newark, N. J.; James A. Binney, Boston, Mass.; Atlanta Auto Sales Company, Inc., Atlanta, Ga.: Mattoon Refrigerating Company, Mattoon, Ill.; Bonnheim-Moore Motor Car Company, San Francisco, Cal.; the Blackhawk Auto Company, Waterloo, Ia.; A. C. Schafer, Grundy Centre, Ia.; Model Auto Sales Company, St. Louis, Mo.; Matheson Motor Company, Washington, D. C.; J. W. Wilcox, Los Angeles, Cal.; Whittlesey Garage & Machine Company, San Bonito, Tex.; J. J. Deskin, Missouri, Ia.

H. W. Yeager, president of the Yeager Piano Company, Hartford, Conn., has taken the agency for the complete line of Velie pleasure and commercial cars, made by the Velie Motor Vehicle Company, Moline, Ill. His territory will include Hartford and vicinity.

H. F. Sundin has become the distributor for the National car, made by the National Motor Vehicle Company, Indianapolis, for Kansas City and vicinity. He was formerly a travelling representative of the National company.

E. E. Guthrie and Henry Winn of the Kansas branch of the R-C-H Corporation, Detroit, have returned to their duties after spending a week at the factory.

The R-C-H Corporation, Detroit, recently signed 1913 contracts with the following: The Smith Motor Car Company, Hazleton, Penn.; Shaffer Manufacturing Company, Baltimore, Md.; W. L. Reisinger, Newport, Penn.; Model Garage, Lynchburg, Va.; Yale Motor Company, Camden, N. J.; Peters & Kittell, Hornell, N. Y.; Willard Morris, Dansville, N. Y.; F. E. Wickwire, Elmira, N. Y.; Slawson & Lounsbury, Jamestown, N. Y.; Cook Brothers, Castle, N. Y.; Muncie Motor Company, Pasadena, Cal.; William H. Hedges, Southampton, N. Y.; I. A. Silvie, Jr., Port Richmond, N. Y.; the Central Motor Car Company, New York City; James N. Bussey, Troy, N. Y.; Walter J. Connelly, Hartford, Conn.; Central Garage Company, New Canaan, Conn.; O. W. Smith, New Philadelphia, O.; Vincent & Hurd, Hiram, O.; Old-Oakland Motor Company, Cincinnati, O.; Drayton Auto Company, Drayton, N. D.; White Bear Auto Company, St. Paul, Minn.; Olson-Hemming Auto Company, Morris, Minn.; Dalley Motor Company, Washington, N. C.; W. T. Hearne, Whitakers, N. C.; Capitol Motor Car Company, Raleigh, N. C.; W. A. Blackburn & Co., Goldsboro, N. C.; Worley & Terrey, Viola, Ill.; E. L. Warneke, Sterling, Ill.; J. H. Reichardt & Co., Cornell, Ill.; C. C. Hinckley, Aurora, Ill.; Victor F. Michelson, Chicago, Ill.; H. Ohlendorf, Freeport, Ill.; Sears Automobile Company, Des Moines, Ia.; John M. Knapp, Rensselaer, Ind.; Niles Center Garage Company, Niles Center, Ill.; A. A. Marvin, Son & Co., Maple Park, Ill.; Heckbarth & Schering, Palatine, Ill.; B. E. Graham & Co., Mount Pleasant, Mich.; G. A. Webber, Jackson, Mich.; Worthrup & Clark, Houston, Tex.; Cole Bros., Malta Bend, Mo.; C. E. Bobo, Paxton, Ill.; E. E. Whipple, Providence, R. I.; Warden Hardware Company, Geneva, O.; L. F. Portz, Loudonvile, O.; Carr Bros., Scio, O.; Harry E. Heckert, Springfield, Mo.; Charles Murray, Colby, Kan.; W. H. Sherrick & Co., Centerview, Me.; G. D. Prentice, Great Falls, Mont.; J. J. Schutz, St. James, Minn.

The Indiana Garage & Sales Company, located at 3316 East 15th street, Kansas City, Mo., has closed a contract with the Lincoln Motor Car Works, Chicago, whereby it wil become distributing agent in Kansas City for the Lincoln light delivery wagons. The first shipment of cars has been received.

The Everitt Auto Sales Company, recently incorporated for $30,000 under the laws of Ohio, has opened a salesroom for the distribution of Everitt cars, made by the Everitt Motor Car Company, Detroit, formerly the Metzger Motor Car Company, throughout the State of Ohio. The officers of the company are: President, H. K. Dobson; vice president, Elmer E. McConaha; secretary and treasurer, A. F. White.

The Baldwin Smith Motor Truck Company, 115 East Second stret, Wichita, Kan., has been organized for the purpose of handling commercial motor vehicles in Wichita and vicinity. The company recently closed a contract with the Lincoln Motor Car Works, Chicago, Ill., becoming distributing agent for the Lincoln light delivery wagon.

Fred Campbell, proprietor of an accessory house in St. Louis, Mo., has been elected president of the Motor Accessories Association of that city.

L. L. Law, manager of the Jackson Motor Parts Company, Toledo, O., will be distributing agent for the Jackson car, made by the Jackson Automobile Company, Jackson, Mich., in northwestern Ohio, southern Michigan and eastern Indiana.

The Speedwell Motor Car Company, Dayton, O., has taken over the San Francisco agency and has made it a branch. H. Harry Croninger will be the manager.

The United International Motors, Ltd., the foreign affiliation of the United States Motor Company, recently took new quarters at 212-14 Portland street, London, Eng.

The Meridan Automobile Company, Indianapolis, Ind., has sold its property and business at 724-730 North Meridan street, to the Waverley Company, which will use the property as a factory sales branch and garage for electric cars. It will be under the management of Henry C. Churchman.

O. E. Stoll is in charge of the new branch and service station recently opened in St. Louis, Mo., by the General Motors Truck Company.

The Rhineland Machine Works Company has opened an office and store at 1254 Michigan avenue, Chicago, Ill., which it will occupy with the American Electric Manufacturing Company.

The Oakland Motor Car Company is having a $50,000 salesroom, garage and repair shop erected in Atlanta, Ga.

The Locomobile Company of America, Bridgeport, Conn., has contracted for the erection of a $40,000 garage and showroom at Atlanta, Ga.

The G. E. & H. J. Habich Company, New England distributor for the Cole automobile, made by the Cole Motor Car Company, Indianapolis, Ind., recently moved into new quarters on Bickerstaff street, Boston. The building is one of the best appointed service stations in the East.

City Garage & Sales Company, is the title of a concern which will enter the garage business in San Diego, Cal., as soon as quarters can be completed. A building is being constructed at Cedar and Cordova streets.

M. Nabors and R. M. Northcutt are among the latest additions to the automobile industry in Atlanta, Ga., where they have formed a partnership and secured the agency for the Cole and Alco pleasure cars and the Alco and Federal trucks. The firm will occupy salesrooms at 239 Peach street.

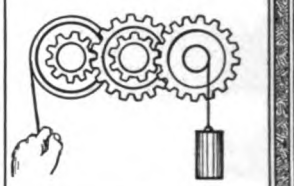
Davis B. Roberts, manager of the Buick Garage in Hartford, Conn., which was partly destroyed by fire recently, announces that the building is to be replaced at once.

L. R. Pingrey and C. A. Waite, formerly partners in the West Liberty Auto Company, West Liberty, Ia., have dissolved business relations, and Pingrey will conduct the garage formerly operated jointly.

The Corona Machine & Auto Works is the name of a new repair concern which recently started business in Corona, Cal. The officers and stockholders are: President, John H. Phillips; vice president, R. L. Willits; secretary and treasurer, Edward I. Barnes.

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RECENT MOTOR VEHICLE PATENTS



Dow Ignition System.

Willard A. Dow, Braintree, Mass., has patented an ignition system for internal combustion engines. It is very compact, comprising as it does, magneto and battery circuits, also an induction coil and switch. Provision is made for attaching the various primary, secondary and ground wires and for cutting in the coil or magneto circuits as desired. Being in cartridge form it is installed easily on the dash of an automobile.

Swearingen Muffler.

The prohibiting of the use of cut-outs on mufflers has stimulated the efforts of inventors to produce a muffler which will not only reduce the noise of the exhaust to a minimum but back pressure as well. Zachariah Swearingen, Oscealo, Ia., has been granted a patent for a silencer which is fitted with removable heads, the latter being provided with suitable openings for the admission and egress of the burnt gases. The interior of the device is equipped with a deflector of concavo-convex design, also conical and other similar member. The components are held together by means of tierods and it is claimed by the inventor that the muffler may be disassembled and cleaned easily.

Pennock Horn.

Willard Pennock, Minerva, O., has been granted a patent for a motor car horn operated by the exhaust from the engine. The three tubes are similar in construction to the usual tube horn but the passages for the gases are slotted and means are provided for registering these spaces, as well as for directing the flow of the exhaust through the signal and for interrupting the same.

Roberts Self-Starter.

A large number of patents has been granted of late for self-starting devices for automobiles. Judson O. Roberts, Cripple Creek, Col., has patented a mechanical starter for gas engines, which comprises a reciprocating starter shaft, a coupling adapted to engage said shaft with that of the motor, also a coil spring centred around the starter shaft. The spring is supported by a pair of wheels having guide engagements, a number of pawls and a dog controlling their movements. An auxiliary spring is provided to maintain the connecting coupling from engagement when the device is not in service. Pivotally connected to the starting mechanism is a lever in turn secured to a rod which is actuated by a lever conveniently placed to the driver or operator. Means are also provided for rewinding the spring by the power of the motor.

Thomson Pivot Lamp Device.

Among the latest devices for mounting the headlights of the motor car so that the members will be turned simultaneously with the front wheels, is the the invention of Arthur Gale Thomson, San Francisco, Cal., to whom a patent has been granted. The rotating means are obtained by mounting the lamps on a turntable device and the lights are operated together by means of a connecting tierod, which actuates the bell cranks secured to each lamp. Motion is imparted to the device by the steering mechanism which operates a series of pivotally mounted levers.

Hart Automobile Jack.

Charles A. Hart, Findlay, O., has been granted a patent for a novel form of automobile jack by means of which a motor car may be run onto the member and jacked up by a tilting movement. The jack comprises a tiltable frame, including standards, the latter being provided with base fulcrum members. Each standard has on its underside main and auxiliary bearing surfaces extending at an angle to one another to support the frame in a tilted or vertical position. Runners are fitted, these being for the purpose of receiving the wheels of the vehicle and pivotal means also are provided.

OTHER PATENTS GONE TO ISSUE.

Spring Wheel, Alvin R. McEntire, Folsom, Ga. A vehicle wheel comprising a hub, a number of spokes slidingly mounted and coil springs arranged between the hub casing and retaining nuts.

Lathe Attachment, John M. Palmer, Chicago, assignor to the Universal Tool Company of that city. A lathe attachment, a turret head for carrying a plurality of lathe tools, and a substantially concentric shank extending therefrom, said head and shank having a tool receiving socket therein.

Carburetor, Nathaniel C. Stamps, Ocean Park, Cal. A carburetor having the usual mixing chamber and outer air passages but provided with a movable thimble device having a central air passage and means for controlling the air passing through the inner and outer passages.

Clutch Mechanism, Frank B. Allen, Salt Lake City, Utah. A clutch mechanism including in combination a transmission ring, a split gripping ring located within the same, a hub, sleeve and means for forcing the gripping ring into contact with the transmission and operating toggle levers.

Motive Fluid Mixer, William G. Cross, Seneca Falls, N. Y. A motive fluid mixer for internal combustion engines having a transfer passage for the fluid to be mixed with gas to provide a charge of motive fluid to the motor.

Roller Bearing, Chester Arthur Heinzelman, Belleville,

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111. A roller bearing comprising an inner member mounted on the spindle of the bearing and provided at one end with an undercut recess; a beveled surface which tapers oppositely to the sides of said recess, and a roller retaining ring fitted with yielding fingers which have lugs that project into said undercut recess.

Lock Nut, George O. Douthit, Summers, Ark., assignor to M. M. McCoy, Westville, Okla. The recessed or threaded portion of the nut is provided with teeth which grip the bolt and the device is secured by means of a locking pawl.

Sash Lock and Anti-Rattler, Joseph De Mars, San Francisco, Cal., assignor in part to Frank Minitree Johnson, Cheyenne, Wyo.; Anthony J. Walker, Niagara Falls, N. Y., and Arthur J. De Mars, San Francisco. A sash lock having a flanged casing with rock shaft journaled in the flanges, bent into two loops and provided with a stop projection adapted to engage the back of casing, and two flat spring indents. The free ends of the springs project in opposite directions and engage the edge of the sash.

Spark Plug, Joseph J. Lombardi, New York City. An electric ignition device comprising a hollow base portion and an insulating block fitted therein through which extends the electrode. The lower part of the shell has a circular opening and means are provided for raising or lowering the electrode to obtain the desired gap.

ated, providing for different positions of the shield.

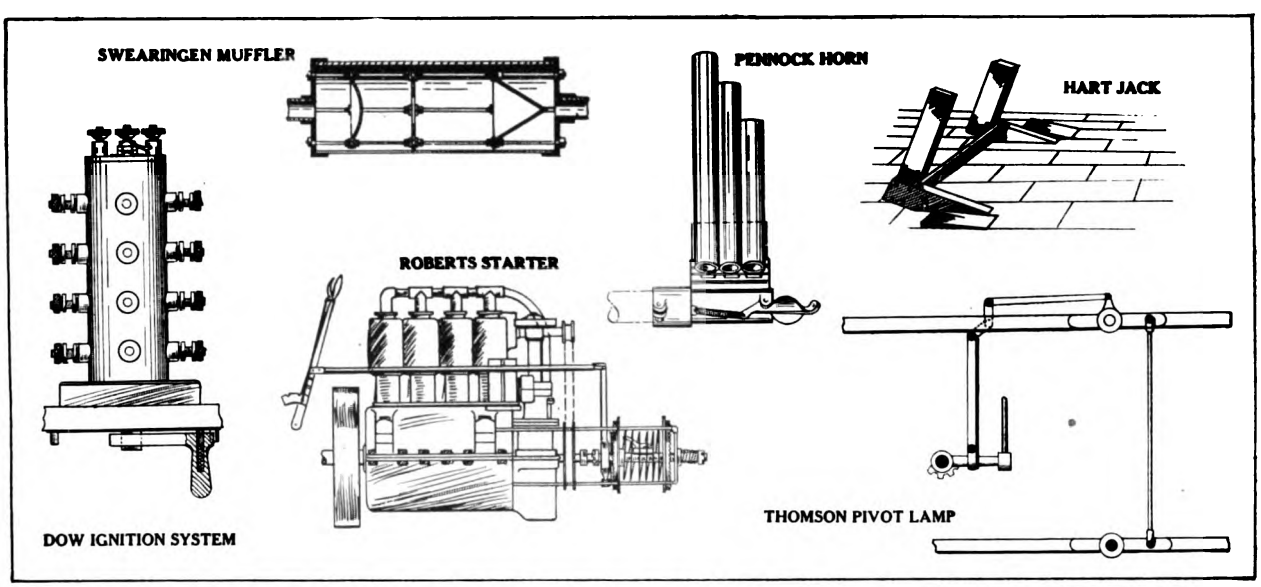
Wrench, Thomas J. Kennel, Middletown, O. A wrench having serrated jaws, also those of the usual construction. Means are provided for adjusting either set.

Spring Wheel, Robert Stock, Silver Creek, N. Y. A spring wheel having hollow spokes connecting the hub and rim, and main guide rods passing through openings in the rim and their inner ends within the spokes. Coiled springs are fitted inside the hollow spokes and auxiliary guide rods are incorporated between the ends of the springs and the outer rim. Other coiled springs are provided between the outer and inner rims.

Multi-Cylinder Engine, Samuel James McFarren, Pittsburg, Penn. A four-cycle gas engine having an uneven number of cylinders in two parallel groups, a shaft having oppositly set cranks, each of two said groups of cylinders being above a horizontal plane passed through the axis of said shaft. The pistons of the cylinders of one group are connected with one crank while those of the other group are attached to another shaft.

Spray Carburetor, Gottfried Plumm, Berlin, Germany. A carburetor having a revolving conical top with mixing mechanism and a porous nozzle pipe.

Expansible Piston, Edmond Van Bever, Watertown, Mass. A hollow shell piston, hvaing inwardly extending bosses with wristpin fitted therein, and a shell portion integral with the piston body extending inwardly from



Depicting Some of the Recent Ideas of Inventors Relative to Devices Applicable to the Motor Car and Its Allied Industries.

Vehicle Tire, Lewis Quintal, Cleveland, O. The device comprises two rims between which are interposed coiled springs resting in cup shaped members and means are provided for their retention and operation by adjustable bolts.

Lubricator, Ivert Larsen, Chicago. A lubricating device comprising a reservoir having a number of outlets, a rotary member for registering said outlets and a pump having a valve equipped piston for actuating the lubricant.

Spring Wheel, Herman M. Strawn, Marysville, Cal. A spring vehicle wheel having outer and inner rim members between which are fitted semi-circular springs which are retained by a device secured to the inner rim.

Motorcycle Handle, William F. Boast, Sterling, Col. A handle comprising a hollow grip of resilient material, having a coiled spring imbedded therein, and a block located in the outer end and engaging the springs.

Resilient Tire, Oscar H. Duckworth, Summerfield, Kan. A tire having a coiled spring formed into a series of convolutions and means for retaining spring and to provide for contraction and expansion.

Windshield, George F. Murphy, New Haven, Conn. A windshield for motor car service having curved forward members upon which the member is attached and oper-

said wristpin, said integral shell portion having a lengthwise extending slot and an external expander designed to expand inwardly extending shell portion.

Tire Tool, John H. Blake, Portland, Ore. A device for removing tires from rims, comprising a lever having teeth, a hook like lever carrying a pawl for engaging with said teeth and means for actuating same.

BAKER EXTENSION BROUGHAM.

The latest model announced by the Baker Motor Vehicle Company, Cleveland, O., maker of the Baker electric, is an extension brougham of the type which enables all the passengers to face forward. The new car is being produced as a result of the demand for the five-passenger facing forward model "Y" extension brougham, introduced a short time ago, and while its dimensions are slightly smaller and it has a shorter wheelbase, it has the same general lines and equally luxurious appointments.

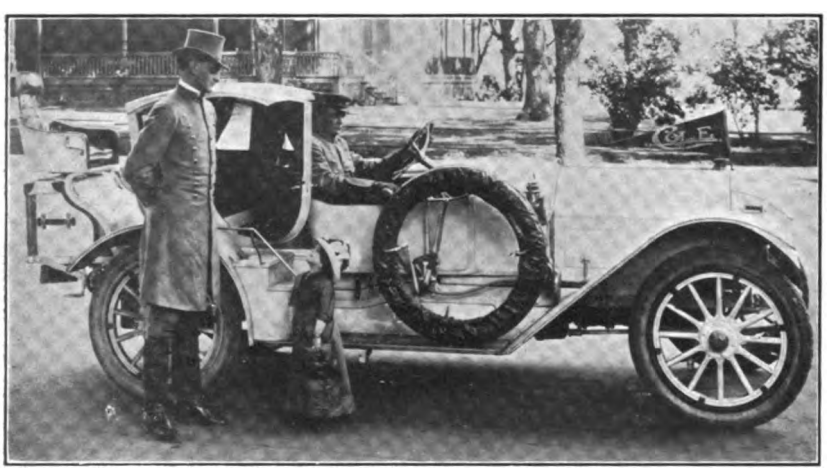
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K-D MOTOR COMPANY FORMED.

The K-D Motor Company (Knight-Davidson Motor Company) was recently incorporated for $100,000, for the purpose of manufacturing the K-D motor, the invention of Miss Margaret E. Knight of South Framingham, Mass. The incorporators are Margaret E. Knight, Anna F. Davidson and Beatrice M. Davidson. It is intended to have the principal office of the concern in New York City. Nothing has been done except to file the certificate of incorporation and hold a stockholders' meeting. It is proposed, however, in the near future to open an office in New York City and to vigorously prosecute the business.

NEW WHITE POLICY.

The White Company, Cleveland, O., maker of White pleasure and commercial cars, announces that it has given up entirely the idea of bringing out new models at a certain specified time each year. In accordance with this policy, in the future White cars will be known by their model letters, without reference to date, and a model will continue, irrespective of the year, until it is found advisable to change it. At that time the current model designation will be dropped, and a new one will be substituted. Any change in design or construction that is found desirable will be made as soon as it is apparent that such will be a real improvement, instead of waiting to announce it at the end of the season. For these reasons there will be no 1913 announcement of White cars.



Princess Victoria, the 25.5-Inch Midget, Her Giant Footman and Her Special Cole Coupe-Roadster.

SALESMEN AND ADVERTISING.

The automobile industry is giving more and more attention to the subject of salesmanship. Those who have studied the matter closely are convinced that advertising is closely allied with the salesman. The particular merits of each were set forth in a most interesting manner in an address recently given by Franklin P. Shumway, of the Franklin P. Shumway Company, an advertising agency, located at 373 Washington street, Boston, before a body of selling agents, etc., in New York City. In this advertising was described as the silent salesman, which if rightly employed, costs the manufacturer, jobber and retailer nothing, and saves money for the consumer. Several examples were cited in which it was set forth that proper advertising had so increased the income that the net profit was sufficient to wipe out the cost of the advertising. The address has been reprinted in booklet form and is being distributed to those who are interested.

A SPECIAL COLE ROADSTER.

It is not uncommon for motor car manufacturers to be called upon to change certain portions of the machine to fit the person who is to operate it. This usually applies to the pedals and other similar details, but an accompanying illustration presents a piece of work which went much further in this respect. The car is a special coupe-roadster, made by the Cole Motor Car Company, Indianapolis, Ind., for Princess Victoria, a 25.5-inch midget weighing 19.75 pounds.

It is a regular stock Cole chassis, the only deviation being in the coupe body. This is mounted in the rear of the roadster seats, the gasoline tank having been removed and located under the rear end of the special body. Provision also is made for the giant liveried footman, who accompanies the midget on her travels about the country.

The interior of the coupe is attractively decorated with red satin, and contains every comfort for the diminutive princess, and as may be noted, is entered by a short flight of steps. The entire assembly has occasioned not a little favorable comment, and the Cole company has been the recipient of many congratulatory messages with reference to its neat appearance. In every way the Cole company has demonstrated that it is fully able to undertake any type of special design.

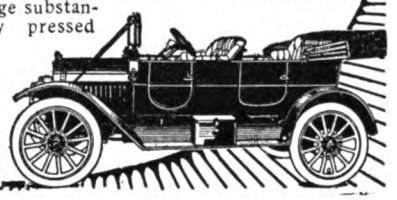
HUNDREDS, NOT THOUSANDS.

In connection with the mechanical description of the Keeton car, made by the Keeton Motor Company, Detroit, in the June 25 issue of The Automobile Journal, mention was made that the company expected to place 15,000 cars in the market this year. This should have read 1500.

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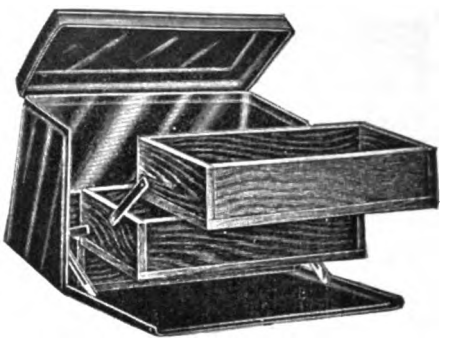
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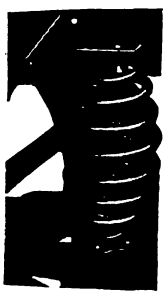
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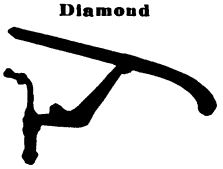


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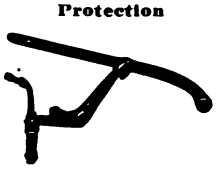
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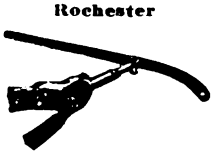


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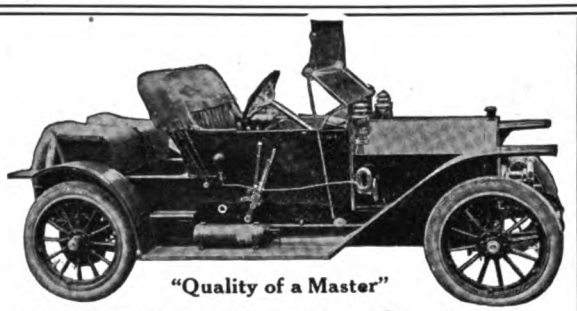


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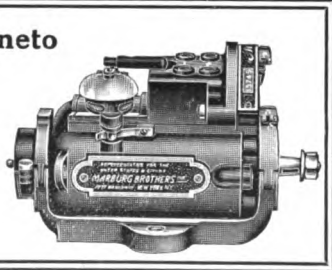
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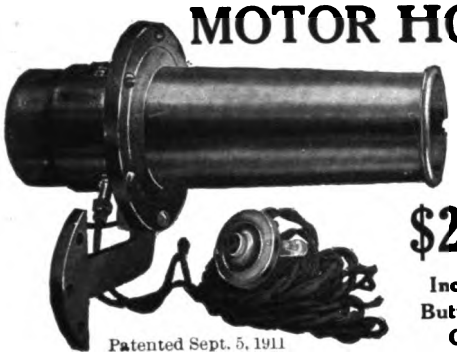
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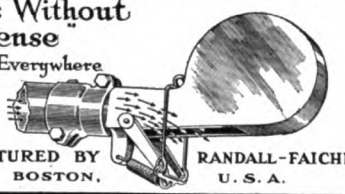
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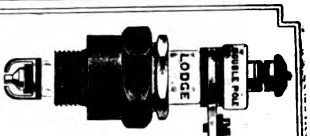
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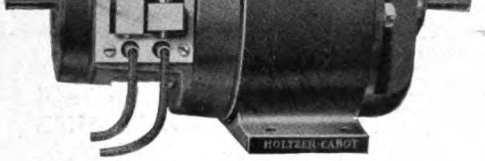
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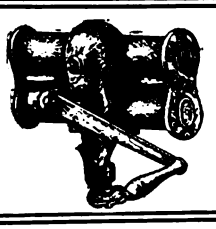
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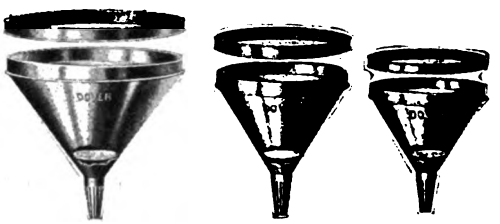
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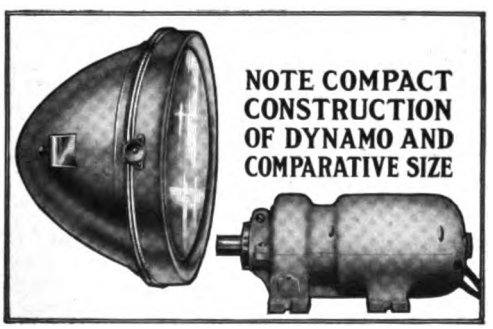
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Branch: 143 No. Wabash Ave., Chicago.
Havoline Oil Co., 17 Battery Place, New York. (Havoline.)
Branches: Pacific Coast—Kohl Bldg., San Francisco; Western—People's Gas Bldg., Chicago; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O.; Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.
Haws, Geo. A., 77 Pine St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.
Kellom & Co., Chas. F., 113 Arch St., Philadelphia. (Invader.)
Branch: 284 Columbus Ave., Boston.
Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York Lubricating Oil Co., 116 Broad St., New York. (Monogram.)
Branches: 126 Massachusetts Ave., Boston; 37 New Jersey R. R. Ave., Newark, N. J.; 407 Franklin Bank Bldg., Philadelphia; 1436 Michigan Ave., Chicago; 1111 Superior Ave., N. W., Cleveland; 435 Turk St., San Francisco; 618 Banning St., Los Angeles, Cal.; Virginia and Railroad Ave., Seattle, Wash.; 177 The Vale, Acton, London, W., England; P. O. Box 619, Johannesburg, South Africa.
New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York. (Polarine.)
Branches: In all cities.
Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.
Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 605 Brown Bros. Bldg., Philadelphia; 154 Exchange St., Bangor, Me., 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.
Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.
Bretz Co., J. S., 250 W. 54th St., New York. (U. & H.)
Kimball Manufacturing Co., Motor Mart, Boston. (Mea.)
Marburg Bros., 1786 Broadway, New York. (Mea.)

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Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., Walton Ave., and 138th St., New York.

Branches: 1679 Broadway, New York; 1110 S. Michigan Ave., Chicago; Motor Mart, Boston; 430-36 Van Ness Ave., San Francisco; 368 Woodward Ave., Detroit; 1226 S. Olive St., Los Angeles, Cal.

MATS.

Sidwell Pedal Mat Co., 245 Columbus Ave., Boston. (Pedal.)

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Simplex.)

MIXING DEVICES, GASOLINE.

Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.

Emblem Manufacturing Co., Angola, N. Y. (Emblem.)

Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)

Swenson, B. A., 298 Blackstone St., Providence. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Hazard Motor Manufacturing Co., 785 Coates St., Rochester, N. Y. (Hazard.)

Western Motor Co., Marion, Ind. (Rutenber.)

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National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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PUMPS, TIRE.

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Clarke Pump Co., 1489 Washington St., W. Newton, Mass. (Crown.)

Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demontachable.)

Branches: New York, Chicago, San Francisco.

RIM REMOVERS.

Wm. L. Tobey, 20 Lewis St., East Boston, Mass. (Q. D.)

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)

Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (L B A.)

Branches: 136 West 52nd St., New York; 1191 Woodward Ave., Detroit; 436 South Dearborn St., Chicago.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Acme Torsion Spring Co., 21 Cambria St., Boston. (Acme.)

Boyd, F. Shirley, 903 Boylston St., Boston.

Hartford Suspension Co., 146 Bay St., Jersey City. (Truffault-Hartford.)
Branches: See Jacks and Lifting Devices.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")

Branches: 218 W. 84th St., New York; 222 Elliot St., Boston; Teck Building, Buffalo; 10 W. Eager St., Baltimore; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

Sumner, George, Inc., 1841 Broadway, New York; 55 Boylston St., Boston. (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

Bosch Magneto Co., 223-225 W. 46th St., New York.

Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo. (All-In-One.)

Hardy Co., R. E., 1134 Austin Ave., Chicago. (Sta-Rite.)

Janney, Steinmetz & Co., Philadelphia.

Kimball Manufacturing Co., Motor Mart, Boston. (Lodge Double-Pole.)

Randall-Faichney Co., Boston. (Mac-Kae.)

Progressive Manufacturing Co., The, Torrington, Conn. (Black Eagle.)

Splitdorf Electrical Co., Walton Ave. and 138th St., New York.

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Jones Speedometer, New Rochelle, N. Y.

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Perfection Spring Co., 1542 Superior Ave., N. W., Cleveland.

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SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)

Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)

Branches: See Cylinder Cleaning Compound.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

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Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.

Leather Tire Goods Co., Suspension Bridge Station, Niagara Falls, N. Y. (Woodworth treads, repair boots and emergency stops.)

Page-Lester Co., 129 W. Van Buren St., Chicago. (Tite-Wad Rubber Putty.)

TIRES—CASINGS AND INNER TUBES.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: 15 Park Sq., Boston; 1731 Michigan Ave., Chicago; 905 First Ave., South, Minneapolis; 1529 Cleveland Place, Denver; 1038 South Main St., Los Angeles, Cal.; 544 Van Ness Ave., San Francisco; 917 E. Pike St., Seattle; 316 North Broad St., Philadelphia; 1197 Broadway, New York; 48 Auburn Ave., Atlanta, Ga.; 743 Woodward Ave., Detroit; 1616 Grand Ave., Kansas City.

Diamond Rubber Co., Akron, O. (Diamond.)

Empire Tire Co., Trenton, N. J.
Branches: 292 Devonshire St., Boston; 1305 Michigan Ave., Chicago; 842 Woodward Ave., Detroit; 264 Halsey St., Newark, N. J.; 73rd St. and Broadway, New York; 148 Chambers St., New York; 322 North Broad St., Philadelphia.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 171½ Dorrance St., Providence.

Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)

Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.

Shawmut Tire Co., 97 Bedford St., Boston.

United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Motz Tire & Rubber Co., The, Akron, O. (Electric Special, Motz Cushion.)
Branches: New York, Philadelphia, Chicago, Kansas City, Cleveland.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Ajax-Grieb Rubber Co., Trenton, N. J. (Ajax.)
Branches: See Tires—Casings and Inner Tubes.

Diamond Rubber Co., Akron, O. (Diamond.)

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.

Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.

Republic Rubber Co., Youngstown, O. (Republic.)

United States Tire Co., Broadway and 58th St., New York.
Branchess See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS. (See Cars, Commercial.)

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Caldwell Manufacturing Co., 1756 Cranston St., Providence.

TURNTABLES.

Canton Foundry & Machine Co., Canton, O. (Universal.)
Portland Garage, Portland, Me., (Portland.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 250 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124. Hartford, Conn. (Kant-Break.)

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Williams Foundry & Machine Co., Akron, O.

WASHING DEVICES.

Perfect Manufacturing Co., Albany, N. Y.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

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Cutler, George A., Taunton, Mass.
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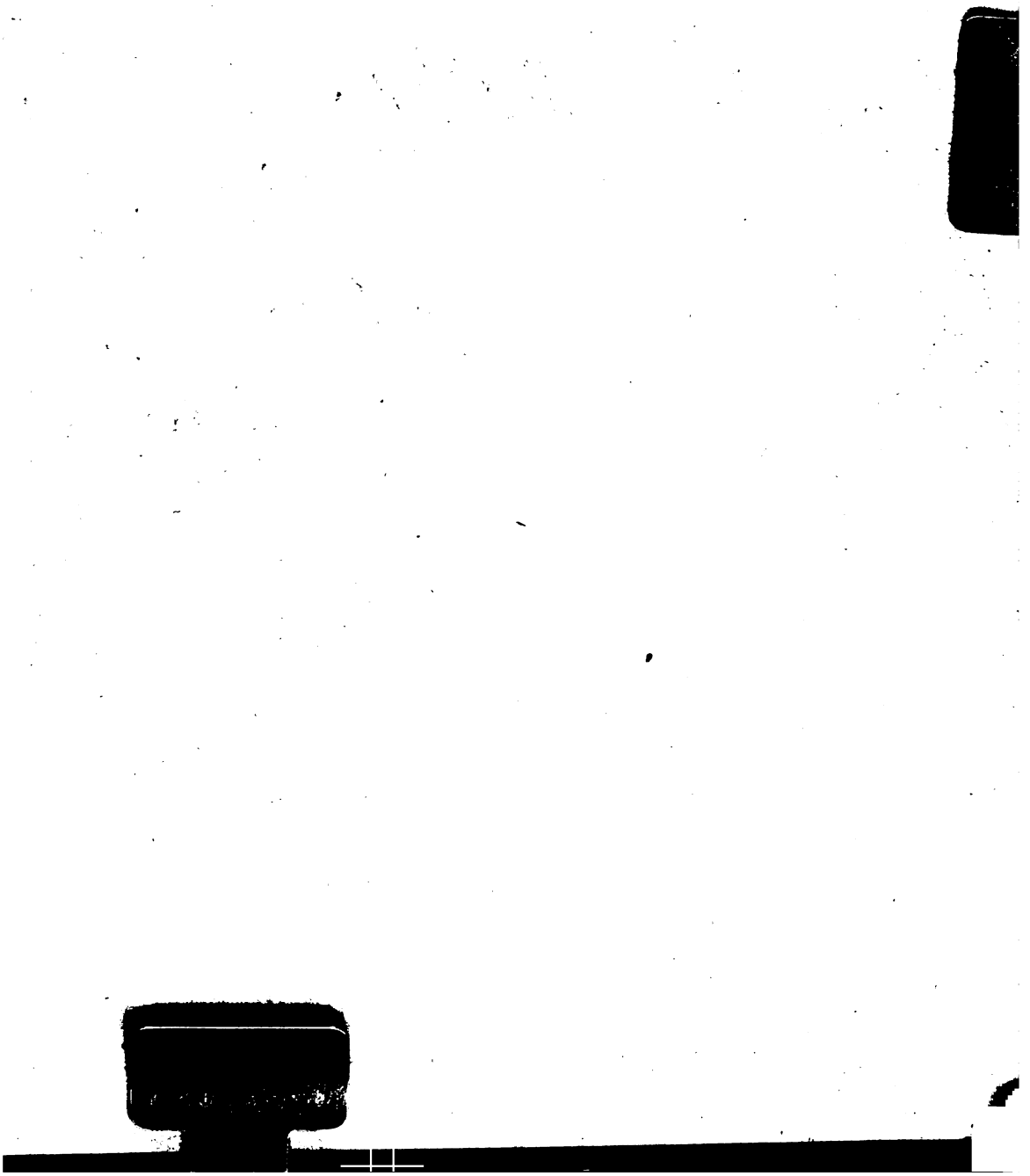
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